



पंडित रविशंकर शुक्ल विश्वविद्यालय, रायपुर छत्तीसगढ़ भारत
Pt. Ravishankar Shukla University, Raipur Chhattisgarh, India
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NAAC “A” Grade

CRITERION-III

EVIDENCE(S), AS PER SOP

METRIC No. 3.4.5	Number of research papers published per teacher in the Journals as notified on UGC website during the last five years
<ul style="list-style-type: none">• Link landing to the paper/article• Link to the journal website• Screenshots of research articles clearly showing the title of the article, affiliation, name of the journal, year and authors name if the links and DOI number are not available	

होते हैं।

बाल्यावस्था के मध्य बालक खेलकूद में रुचि रखते हैं जो मित्रों या खिलाड़ियों के माध्यम से एक से अधिक बालकों के बीच एक ही समय खेलकर पूर्ण होती है। गुड़िया एवं गुड़िया गृह बालिकाओं के बीच एवं खिलाड़ी गाड़ी बालकों के बीच काफी रोचक व मनोरंजक खेल हैं। अब ये 8 वर्ष के होते हैं, तब नाटक या ड्रामा करने की स्थिति में आ जाते हैं। विविध येशमूषा धारण करना व बड़े व्यक्ति की भूमिका करना उचित लगता है।

पूर्ण बाल्यावस्था के दिनों में ये खेलों में रुचि रखते हैं जिनमें बुद्धि एवं शरीर का उपयोग हो। गोली, बंदी तरतारियों से खेलना, मिड़ियों की सीटी बजाना आदि कार्य ही इस उम्र के बालकों को प्रिय लगते हैं।

चाहे स्कूल हो या घर हर जगह बालक को खेल स्थल नजर आता है। संक्षेप में खेल स्थान बालकों के लिये आश्चर्यजनक संसार का अभिज्ञान कराता है। यह बालकों में खेल भावना, शरीर, बुद्धि एवं विश्वास को बढ़ाता है। यह एक समूह का अंग बनता है। समूह भावना से बालक में देने व पाने का भाव, सूक्ष्मग्राहिता, तीक्ष्णबुद्धि होना, बातें बनाना एवं कल्पनाशीलता में अभिवृद्धि होता है। वस्तुतः खेल ही बालक में आपस में रहने की तैयारी तथा उनके आपसी अनुभवों से लड़ना व फिर मित्र बन जाना आदि से जीवन में साहसी बनने का भाव आता है। मतवैधिन्य एवं फिर मिल जाना ही एक शक्ति है जो उनके विकास में सहायक होती है जब यह बड़े व व्यस्क होते हैं।

हम सब भी पूर्ण विकसीत बालक हैं एवं हमें बालकों की विशेषताओं को संजोकर अपने में निहित रखना चाहिए ताकि हम बालकों के

नजदीक रह सकें। यही भावना हमें उनको समझने एवं उनकी आवश्यकताओं को बेहतर ढंग से से जानने तथा उनकी सहायता करने में लगाने प्राप्ति प्रियतम बालक के लिए नागरिक बन सकें। तब ही सारा संसार एक खेल का मैदान बनेगा जिसमें खिलाड़ी भावना एवं सहयोग की भावना प्रबल होगी तथा प्रेम व स्नेह का राज्य होगा।

डॉ. एम.टी. खरे (मेरठ)

पूर्व संचालक, पुरातत्व, संरक्षण एवं
कविलेखाना, मेरठ, मध्यप्रदेश

डॉ. के. प्रकाश कश्यप (बिन्दू अनुष्का)

पूर्व उप-संचालक, पुरातत्व, संरक्षण एवं
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प्रागैतिहासिक कालीन भित्तिचित्रों में एकरूपता

(स्पेन के अल्तामिरा एवं छतीसगढ़ के सिधनपुर
गुफा के विशेष संदर्भ में)

प्रस्तावना - दुनिया भर के प्रागैतिहासिक कालीन भित्तिचित्रों के अध्ययन से ज्ञात होता है कि इनके निर्माण की शैली में आश्चर्यजनक समानताएं विद्यमान हैं। स्पेन की अल्तामिरा गुफा तथा छतीसगढ़ की सिधनपुर गुफा दोनों ही लगभग 30 हजार वर्ष पुरानी मानी जाती हैं, जो हजारों किलोमीटर दूर होने के बावजूद भी इनके भित्तिचित्रों में समानता व एकरूपता है। यही नहीं, उत्तरी ऑस्ट्रेलिया एवं मध्यप्रदेश के होरनाबाद की गुफाओं में प्राप्त चित्र भी इन चित्रों से समानता रखते हैं।

स्पेन की अल्तामिरा गुफा - स्पेन की अल्तामिरा गुफा की खोज ने पुरातत्ववेत्ताओं को

आश्चर्यचकित कर दिया। इस खोज से ज्ञात हुआ कि आदिमानव सम्यता की शैलवाक्यस्था में भी कलाकृतियों का निर्माण करता था। उस समय निर्माण के साधन के रूप में चूबों की टहनियाँ, पत्थरों के औजार व रंगीन पत्थरों को पीस कर बनाये हुए उपलब्ध रंगों का इस्तेमाल करके वे चित्र बनाई गयी थीं। ये कलाकृतियाँ इस तरह भी नहीं दिखाई देती हैं कि किसी अनभिज्ञ मानव द्वारा फुसत के पल में मनोरंजन के लिए बनाई गई हों, क्योंकि इनमें जानवरों तथा मानवों की आकृतियों में सादृश्यता व सजीवता का ऐसा एहसास होता है जो अकल्पनीय है। दीवारों पर निर्मित ये भित्तिचित्र यह भी दर्शाती हैं कि ये निरीक्षण पूर्वक रचना कौशल के साथ तथा विशेष उद्देश्यों को लेकर बनाई गई हैं।

अल्टाविरा गुफा की खोज अचानक व संयोगवश सीत्बोला नाम के व्यक्ति द्वारा की गई। इस खोज के पश्चात् इस तरह के 50 और पषाण-कालीन गुफायें फ्रांस के दक्षिण-पश्चिम लार्यो और स्पेन के उत्तर-पूर्व में खोजी गई हैं, जिनमें पाषाणकालीन चित्रों की शृंखलायें मिलती हैं। इन चित्रों के विस्तृत विश्लेषण से पुरातत्त्ववेत्ताओं और वैज्ञानिकों को ज्ञात हुआ कि यह बहुत प्राचीन कलाएं हैं। जो डार्विन के उत्क्रान्तिवाद सिद्धान्त के अनुसार कई लाख वर्ष पुराने मानव अवस्था के अंतिम श्रेणी के प्रतीत होते हैं। इन गुफाचित्रों में कुछ ऐसे जानवरों के चित्र भी प्राप्त हुए हैं, जो उस समय घटती पर विद्यमान थे, परंतु हिमयुग के उत्त हिमाच्छादन रुपी अंतिम देला में विलुप्त हो गये। इन तथ्यों से गुफाचित्रों के अत्यंत प्राचीन होने की पुष्टि होती है। इन गुफाचित्रों के प्राचीनकालीन होने के प्रमाण अंतिम हिमनदी की बापसी के समक

वहीं छोटे गये हिमयुगीन चित्रित पदार्थों से भी मिलते हैं, जो वहाँ के प्रवेशद्वारों में पाये गये हैं। इस तरह से स्पेन की इन गुफाओं में एक हीर के जीवन पर प्रकाश डाला है। इन कलाओं से उत्कृष्टतम मानवव्यक्ति की उत्कृष्टतम प्रवृत्ति और सृजनशीलता का पता लगता है। (रिचमित्र पं. -1)

अल्टाविरा गुफाचित्रों की शिथि - अल्टाविरा गुफाओं के विश्व संसार के सबसे प्राचीनतम भित्तिचित्र कला माने जाते हैं। वे सर्वथा मात्रा में नैसर्गिक हैं तथा गुफाओं की छत-कानड़ छतों पर चित्रित किये जाने से उनमें कुछ प्राकृतिक ठोसपन भी आ गया है। इनमें सर्व पहले गये इन भित्तिचित्रों में रंग संयोजन के लिए मिट्टी का उपयोग किया गया है, जिसमें पीला, लाल, नीला तथा काला रंग प्रमुख हैं। इन रंगीन मिट्टियों में जानवरों की चर्मा का प्रयोग किया गया है, जिससे इन रंगों का जीवन कीर्तकालीन हो गया है। इसके अलावा इनमें काले रंग हेतु कायदा व कोयले का भी प्रयोग किया गया है। स्पेन के समकालीन मेसोनेथियन जातियों की कला से तुलना करने पर अनुमान लगाया जा सकता है कि पूर्व पाषाणकालीन युग में भी प्रत्येक टोपी में एक सर्वश्रेष्ठ-निपुण कलाकार रहा होगा, जिसे उत्तरी उत्तम चित्रकारी युक्त युग के कालन देवीव चित्रित युक्त कर्म चित्र की तरह मानव विश्व ज्ञात था। अनेक रंगों से कल्पने पर अल्टाविरा के इन चित्रों में महत्ता, कला के अंसाव अन्य जानवरों की हलफों सजीव की ज्ञान पकड़ी है। इनमें देवता से देला एहसास होता है, जहाँ वे सब हीन पर्वती-सब हीन पर्वती। उत्तरी स्पेन की गुफाओं जमीन में काली महत्ता पर कई कई हैं, जिससे

कारण गुफा या धार्मिक चरित्र भी हो सकता है। हो सकता है यह सिर्फ मंत्र-संज्ञ व धार्मिक विधियों के लिए ही आरक्षित जगह होगी, जिनमें लक्ष्मण-शेखर क्षेत्र के भित्ति चित्रों को स्पष्ट दर्शाते हैं, कि वे मंत्र-विद्या के लिए ही बने हैं। विदेशों में बने कुछ चित्रों में उत्तरी ऑस्ट्रेलिया के गुफा चित्र भी इन चित्रों से समानता रखते हैं। (रेखाचित्र सं.

-2)

सिंधनपुर की गुफा - इसी तरह सिंधनपुर की गुफा न सिर्फ छत्तीसगढ़ बरन भारत की प्राचीनतम पुरातात्विक विरासत है, जिसमें विश्व के सबसे पुराने प्रागैतिहासिक कालीन भित्तिचित्र बने हुए हैं। इसे भी स्पेन के अल्टाविरा गुफा की तरह 30 हजार साल पुराना माना जाता है। सिंधनपुर की यह अति महत्वपूर्ण गुफाएं रायगढ़ जिले में अवस्थित हैं, जो कि जिला मुख्यालय से मात्र 20 किलोमीटर की दूरी पर हैं। रायगढ़ जिला भारतीय के बीच भूपदेवपुर रेलवे स्टेशन से उत्तरकर यहीं आसानी से पहुंचा जा सकता है। इस स्टेशन से गुफा की दूरी मात्र 3 किलोमीटर है। सिंधनपुर गुफा में मिले पाषाणकालीन अवशेषों से आदिमकालीन मानव के यहाँ निवास करने के पुख्ता सबूत मिलते हैं। यहाँ बने मानव आकृतियों का विश्लेषण करने पर ज्ञात होता है कि ये अल्टाविरा गुफा चित्रों की तरह ही हैं। दोनों का निर्माणकाल भी लगभग एक समान है। न सिर्फ काल में एकमेव बल्कि कला की दृष्टि से भी यहाँ के चित्र उससे मिलते-जुलते दिखते हैं। यह अनूतपूर्व आश्चर्य का विषय है कि हजारों किलोमीटर दूर होने के बाद भी सिंधनपुर की प्रागैतिहासिक कालीन कलाएं स्पेन तथा मेक्सिको की कलाओं से मिलती-जुलती हैं। जबकि इस दौर में ऐसा कोई

सामन भी नहीं था कि वे एक-दूसरे की कला को देख-सुझा पाएं या उसकी नकल कर पाएं। विश्व के अन्य क्षेत्रों में भी प्रायः प्रागैतिहासिक कालीन कलाओं में सासकर मानव आकृतियों का चित्रण करनेवाला इन से एक-दूसरे से मिलते-जुलते दिखते हैं। इन भित्तिचित्रों से स्पष्ट होता है कि गुफा निवासी मानवों के चित्रों में उनके जीवन की गहनता बर्ताव इन से कला की गई है। अर्थात् मानव आकृतियों के अलावा हर चित्र सामान्य व जीवंत है किन्तु सिर्फ मानव चित्र ही आड़ी-टोड़ी रेषा में हैं। क्या कारण है कि जानवरों के इतने स्पष्ट चित्र बनाने वाला आदिमानव-अपने ही साधियों का चित्र ठीक से न बना पाए। इसमें उसके मन में, धुंधली संज्ञ-संज्ञ की प्रेरणा से इंकार नहीं किया जा सकता है। यह कला एक ज्ञेय कि मानव आकृतियां हल्के हल्के ही ज्ञेय तो नहीं वे किसी दुर्बलता के चिह्न न हो पाएं। अपने श्रम के प्रति अनिष्ट की आसक्ति से यह संभवतः हल्के नहीं बनता था। सिर्फ मानव ही अपनी कलात्मकता का प्रदर्शन कर सकता है ऐसा नहीं है। प्रकृति में अनेक अन्य प्राणी भी हैं जो अपने कठिन रचना कीमत का प्रदर्शन करके लोगों को आश्चर्य में डाल देते हैं। परंतु वे वास्तविकता के सदृश प्रकृत नहीं कर पाते। उनकी कला किसी विशिष्ट ताली बलु की नकल या कीर्त्य ज्ञेय के हो सकती है। जैसे घोसला बनाने वाले पक्षी अनूतपूर्व पक्षियों का कार्य करते हैं। इसी तरह कीटों की अद्भुत रचना कीमत का प्रदर्शन करती है। किन्तु इन कलाओं का प्रकृत रूप बर्ताव हर कला ही ऐसा नहीं है, जिसकी प्रकृति ने श्रेणी दर्शन करित प्रदान की है जिसके परिणामस्वरूप वह वास्तविकता के सदृश आकृतियों का निर्माण कर

रके। इस ब्रह्माण्ड में सिर्फ मानव के पास ही यह कुशाग्र बुद्धि है, जिससे वह अकल्पनीय व ह्यूम कलाकृतियों का निर्माण कर सकता है। (रेखाचित्र सं.-3)

छत्तीसगढ़ के सिंचनपुर में भी मानव निर्मित ऐसे ही प्रागैतिहासिक कालीन तीन गुफाएं प्राप्त हुई हैं, जो लगभग 300 मीटर लंबी तथा 7 फीट ऊंची हैं। इस गुफा के दीवारों पर पशु एवं मनुष्य की आकृतियाँ बनी हुई हैं। शिकार के जीवंत दृश्य भी बने हुये हैं जो बहुत ही सुंदर लगते हैं। इन चित्रों से उस काल के मानव द्वारा शिकार किए जाने के तरीकों का भी पता चलता है और ऐसे ही शिकार दृश्य हमें इस दौर के हर सैलामयों से प्राप्त होते हैं। चाहे वह किसी भी देश में क्यों न स्थित हो और चाहे वह कितनी ही दूरी पर क्यों न हो। भारत में इस दौर या इसके आसपास के अनेक गुफाचित्र प्राप्त हुए हैं जिनमें मध्यप्रदेश के होशंगाबाद के चित्र भी ऐसे ही दिखते हैं। (रेखाचित्र सं.-4)

निष्कर्ष - प्रागैतिहासिक कालीन चित्रचित्रों के अध्ययन करने से ज्ञात होता है कि दुनिया भर में बनी गुफाचित्रकला कुछ मामलों में अस्वरूपजनक समानताएं रखती है। 30 हजार वर्ष पुरानी स्पेन की अल्तामिरा गुफा हो या उत्तरी ऑस्ट्रेलिया की गुफा, छत्तीसगढ़ की सिंचनपुर गुफा हो या मध्यप्रदेश की होशंगाबाद गुफा इन सभी के मानव चित्रों में एकरूपता हमें दिखाई देती है। इनमें प्थानवसों के चित्र तो स्पष्ट हैं किन्तु मानव आकृतियाँ अत्यंत ही सरल व प्रतीकात्मक हैं। हजारों किलोमीटर की दूरी में रहने के बावजूद भी इन प्रागैतिहासिक कालीन गुफाचित्रों में समानताएं रहस्यात्मक लगती हैं। इसका कारण वास्तव में उनके मन में

सुये तंत्र-मंत्र या हर का शर जान पड़ता है कि मानव आकृतियों द्वारा बना ही जाएं तो कहीं वे किसी दुर्घटना के शिकार न हो जाएं। अपने शिकारों को कौन कौन खाएगा फिर चाहे यह प्रागैतिहासिक काल हो या वर्तमान काल।

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सैलामय का चित्रित सैलामय

सैलामय चित्रें एक-दोहर, बाल-बोल्डर, एवरी इत्यादि नामों से जाना जाता है, पुरातात्विकों के लिए सदैव ही महत्वपूर्ण रहा है, क्योंकि प्रागैतिहासिक काल से ही मानव इन प्राकृतिक संरचनाओं में अथवा लेख रहा है। प्रागैतिहासिक काल के आदिमानव इन प्राकृतिक सैलामयों का उपयोग अर्थात् अथवा के रूप में करते थे तथा अपने दैनिक-सांस्कृतिक जीवन की कलात्मक प्रस्तुति इन सैलामयों पर चित्रों के रूप में करते थे। बहुत ही सैलामयों के मतलों से उस काल के उपकरण, पुस्तकें इत्यादि पुस्तकालय प्राप्त होते हैं जिसके द्वारा उस काल की संस्कृति पर प्रकाश पड़ता है।



चित्रण सं. १ : घोड़े के आकारण में शक्ति विधि

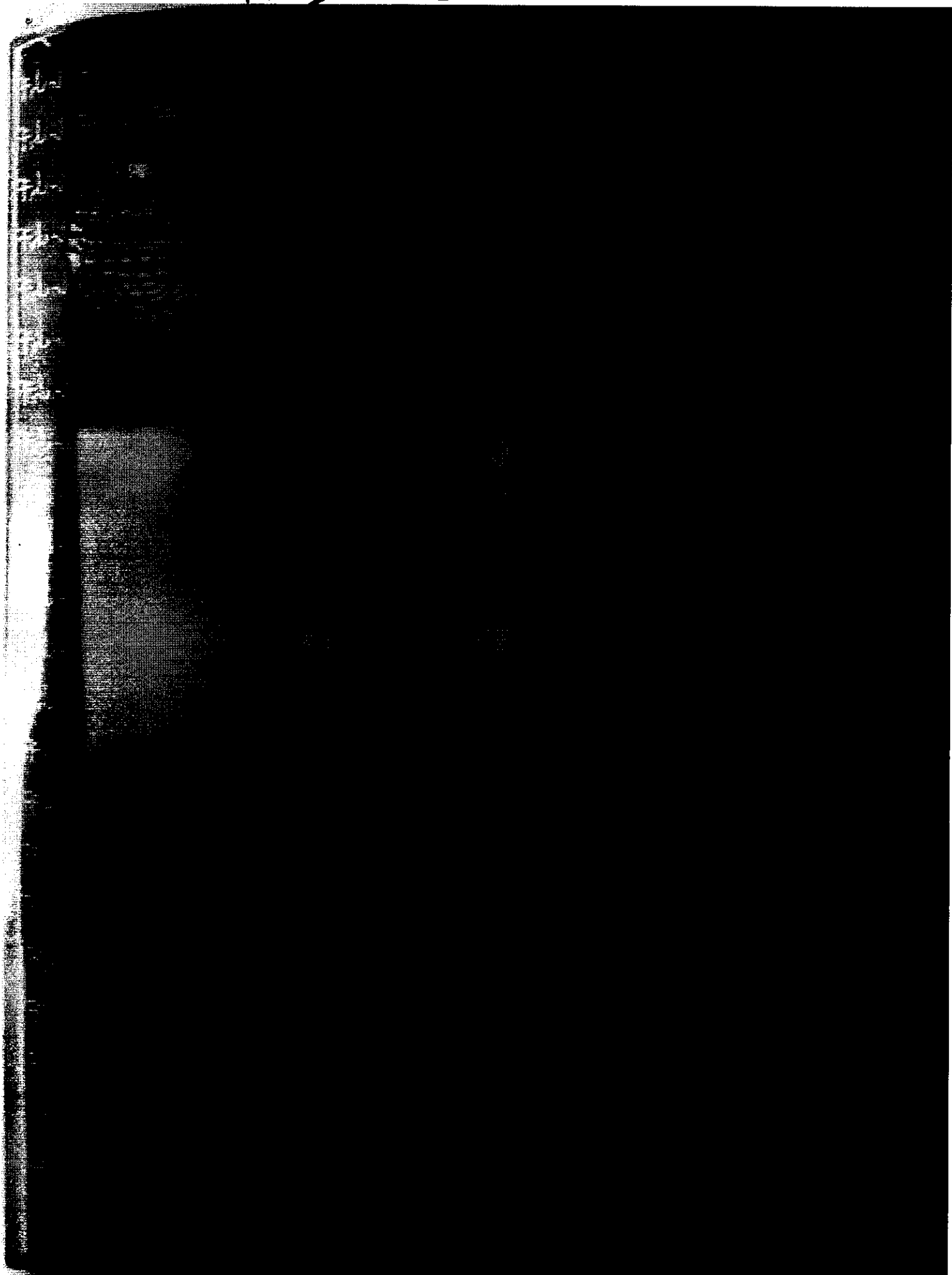


चित्रण सं. २ : सभी जानवरों के चित्रण

वेदांग एवं चित्रण : प्राचीन भारतीय चित्रण विधियों में एकलक्षण

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15

बस्तर की शिल्पकला में गणेश प्रतिमा का स्थान (बड़े डोंगर के विशेष संदर्भ में)

डॉ. नितेश कुमार मिश्र
सहायक प्राध्यापक
ढालसिंह देवांगन
शोध छात्र
मेनू ठाकुर
शोध छात्र
प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व अध्ययनशाखा
पंडित रविशंकर शुक्ल विश्वविद्यालय
रायपुर, छत्तीसगढ़

भारतीय समाज सदा से धर्म प्रधान रहा है अतः कला में मुख्यतः धार्मिक विषय वस्तु एवं विभिन्न सम्प्रदायों से सम्बन्धित देवों की ही अमूर्त अभिव्यक्ति मिलती है। जब हम कला के संदर्भ में बात करते हैं, तो आमतौर पर इनका अभिप्राय ललित कला या दृष्टिमूल कला से होता है। ललित कला के अंतर्गत वास्तुकला, चित्रकला एवं मूर्तिकला के साथ-साथ नृत्य, संगीत तथा साहित्य को भी सम्मिलित किया जाता है।¹ मूर्तिकला को तक्षण कला भी कहते हैं, इनके अंतर्गत विभिन्न प्रकार के पाषाण, धातु, काष्ठ एवं मिट्टी से बनी मूर्तियों का निर्माण किया जाता है। भारत में देवपूजा का प्रारंभ कब से हुआ स्पष्ट नहीं है एवं देव-मूर्तियों के निर्माण के संबंध में भी कुछ कह सकना कठिन है। इस संदर्भ में अनेक सम्प्रदायों द्वारा विभिन्न कालखण्डों में देवी-देवताओं का प्रतिमांकन किया गया।

भारत के अन्य राज्यों की तरह छत्तीसगढ़ का ऐतिहासिक एवं पुरातात्विक दृष्टिकोण से महत्वपूर्ण स्थान है। यह स्थल भारत के मध्य परिक्षेत्र में स्थित मध्य प्रदेश के दक्षिण-पूर्व भाग में है। यह क्षेत्र नदियों, पहाड़ियों एवं सघन वनों से अच्छाण्डित है। यहाँ की प्रकृति एवं जलवायु जीव-जन्तु एवं मानव के निवास के लिए अनुकूल स्थिति उत्पन्न करती है। छत्तीसगढ़ के रायगढ़ जिले में स्थित कबरा पहाड़ी और सिंघनपुर की गुफाओं में चित्रित शैलचित्रों के आधार पर मानव सभ्यता के प्रारंभिक जीवन का पता चलता है।²

प्राचीन काल से ही इस भू-भाग में मौर्य, कुषाण, गुप्त, वाकाटक, नल, शरमपुरीय, पाण्डु-वंशी, कलचूरि एवं नाग वंश के शासकों ने प्रत्यक्ष एवं अप्रत्यक्ष रूप से शासन किया। अपने इस शासन के दौरान इन्होंने विभिन्न कला को आश्रय दिया। यहाँ शैव, वैष्णव, शाक्त, जैन एवं बौद्ध धर्म के साथ-साथ क्षेत्रिय कला का भी प्रसार देखने को मिलता है तथा इन शासकों के द्वारा निर्मित स्थापत्य एवं मूर्तियाँ प्राप्त होती हैं। यहाँ मूर्तियों का निर्माण मुख्य रूप से मंदिरों के गर्भ गृह में मुख्य देवता के रूप, मंदिरों के बाह्य भित्ति या मूर्तियों स्वतंत्र

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DEGREE COLLEGE, PRAYAGRAJ
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16

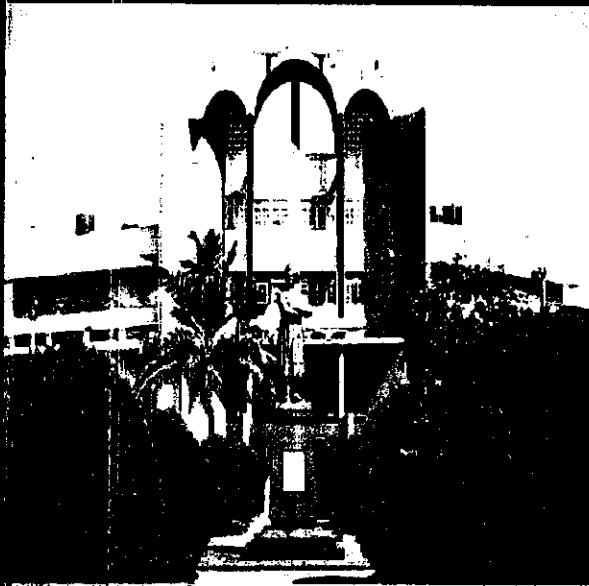
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16

The Cultural Study of Tribes and Prehistoric Rock Paintings of Simdega District

Nitesh Kumar Mishra^{1,*}, Anshu Mala Tirkey², Baleswar Kumar Besra³

^{1,2,3} School of Studies in Ancient Indian History, Culture and Archaeology; Pt. Ravishankar Shukla University, Raipur, C. G. (India)

*Corresponding Author: niteshmishra2011@gmail.com

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ABSTRACT:

This research paper will mainly consist of the unreported Neolithic site and rock art sites of Simdega district. In this paper there will be the detailed information about the rock paintings. The detailed study will be done of the various figures of the paintings. This paper will also describe the associated remains found along with the rock paintings. The research paper also consists of the developing phase of the rock art which can be seen in the tribal communities. Paper will also consist of the study of saddle quern, its various uses and how it is related to the tribal community. There will be the content about the importance of the rock art in the tribal society. Various rituals are performed on the rock art site by the tribal people till today. This research paper will describe these rituals which are performed by the tribal people. The paper will consist of the study of correlation between the rock art and the various arts forms and cultures present in the tribal community.

Keywords: Rock Art, Tribes, Anthropomorphic, Tradition, Simdega, Chhota Nagpur, Mountain, Worship, Buru, Hadia, Tahri, Ancestor, Quern, Microlith

(17)

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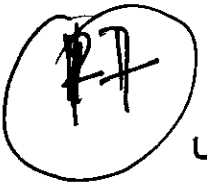
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समाज विज्ञान विकास संस्थान
बरेली (उ.प्र.)



छत्तीसगढ़ की सांस्कृतिक सरिता खारुन : ग्राम खोरपा से नव अन्वेषित प्रतिमाओं के विशेष संदर्भ में

□ डॉ. नितेश कुमार मिश्र

♦ डालसिंह देवांगन

सूक्त शब्द - नदी, खोरपा, मूर्ति, पुरातत्त्व, उत्खनन
 छत्तीसगढ़ राज्य, जिसे प्राचीन काल में

जैसे पुरास्थलों का उल्लेख आवश्यक है। पाषाण काल के बाद महापाषाणिक संस्कृति के भी अवशेष यहाँ से प्राप्त

खोस के नाम से जाना जाता था, भारत के कुछ क्षेत्रों में एक है। इनकी अपनी बहुत समृद्ध संस्कृति रही है। समृद्धता की वजह से बहुत सारे राज्यों की वजह से किन्तु उनका संरक्षण नहीं हो सका और समय के साथ-साथ संस्कृतिक विग्रह समाप्त होना चला गया। किन्तु सर्वेदित है कि छत्तीसगढ़ एक कन्यामो बहुल्य राज्य है और इन कन्यामो कन्याओं में अनेक अपनी सांस्कृतिक विग्रह को सुरक्षित रखा है।

छत्तीसगढ़ राज्य ऐतिहासिक एवं पुरातात्विक दृष्टि से एक सम्पन्न प्रदेश है। प्रायः सभी स्थापत्य खण्ड, प्राचीन मंदिर, प्रतिमा एवं भग्नावशेष नदियों के तट पर ही प्राप्त होते हैं एवं कहीं न कहीं इनका संबंध किसी प्राचीन मानवीय सभ्यता से होता है। अतः हम कह सकते हैं कि मनुष्य के क्रमिक एवं सांस्कृतिक विकास में नदी घाटियों की महत्वपूर्ण भूमिका रही है। इसी संदर्भ में छत्तीसगढ़ प्रांत के मध्य भू-भाग में प्रवाहित होने वाली प्रमुख नदी खारुन के दाहिने तट पर स्थित ग्राम खोरपा का पुरातात्विक दृष्टि से विशेष स्थान है। खोरपा गजपुर जिले के अभनपुर तहसील के अंतर्गत एक ग्राम पंचायत है। यहाँ से कुछ प्राचीन प्रतिमाएं प्राप्त हुई हैं इन प्रतिमाओं में शैव, वैष्णव एवं शाक्त धर्म के अतिरिक्त कुछ अन्य मूर्तियाँ प्राप्त हुई हैं जो ऐतिहासिक एवं पुरातात्विक महत्व की हैं। ये मूर्तियाँ प्रतिमा लक्षण एवं जिनके विशेषताओं के अनुरूप बनी हैं जिनके कारण अध्ययन की दृष्टि से इनका महत्व और बढ़ जाता है। प्रस्तुत शोधपत्र में मुख्य रूप से पुरातात्विक ग्राम खोरपा की प्रतिमाओं का पुरातात्विक अध्ययन किया गया है एवं इसके माध्यम में इस ग्राम के प्राचीन इतिहास एवं पुरातत्त्व के क्षेत्र में नई कड़ी जोड़ने का प्रयास किया गया है।

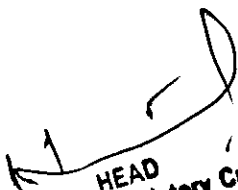
हुये हैं। ऐतिहासिक काल में यह क्षेत्र मौर्य, कुषाण, वाकाटक, गुप्त, नल, शरभपुरिय, पाण्डुवंशी एवं कलचुरि जैसे राजवंशों से प्रत्यक्ष तथा अप्रत्यक्ष रूप से शासित रहा। ऐतिहासिक काल में यहाँ पर अनेक मंदिरों तथा मूर्तियों का निर्माण शासकों के द्वारा कराया गया इसीलिये कला पुरातत्त्व के अध्येताओं के लिए यह प्रदेश स्वर्ण से कम नहीं है।

संस्कृति एवं सभ्यता के विकास में नदियों की प्रमुख भूमिका होती है। नदियों के तट पर प्रायः नगर बसते हैं। यह बात सत्य है कि बड़ी नदियों की तुलना में सहायक या छोटी नदियों के तट पर प्रायः ज्यादा बसाहट देखने को मिलती है इसके पीछे कारण यह है कि बड़ी नदियों की तुलना में प्रायः सहायक नदियों में बाढ़ आदि का खतरा कम रहता है। इसी क्रम में बताना उचित होगा कि छत्तीसगढ़ में प्रवाहित होने वाली अधिकांश नदियाँ छोटी नदियों की श्रेणी में आती हैं और प्रत्येक सरिता सांस्कृतिक रूप से बहुत समृद्ध है। इसी प्रकार की एक नदी खारुन है जिसके तट पर बहुत सारे पुरास्थल खोजे गये हैं

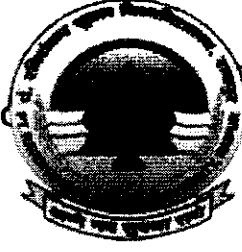
छत्तीसगढ़ राज्य पर प्रकृति की कृपा है यहाँ का अद्वितीय वातावरण बनाकरदित है, यहाँ पर पहाड़ों की श्रृंखला भी उपलब्ध है साथ ही महानदी, खारुन, खारुन, जोक, हसरो एवं इन्द्रावती जैसी नदियाँ भी उपलब्ध हैं। अपनी इसी अद्वितीय वातावरण के कारण यह क्षेत्र प्राचीनकाल से ही मानव की कृपा प्राप्त रहा है। पूरे जगत से अनेक संस्कृतिक कलाओं की प्राप्ति हुई है इनमें

और अभी बहुत पुरास्थलों के मिलने की प्रबल संभावना

□ डॉ. नितेश कुमार मिश्र, प्रवीण राष्ट्रीय इतिहास, संस्कृति एवं पुरातत्त्व अध्ययनकार, पं.वि.के.के. मुक्त विश्वविद्यालय, रायपुर (छ.प्र.)
 ♦ डॉ. डालसिंह देवांगन, प्रवीण राष्ट्रीय इतिहास, संस्कृति एवं पुरातत्त्व अध्ययनकार, पं.वि.के.के. मुक्त विश्वविद्यालय, रायपुर (छ.प्र.)



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Author(s): नितेश कुमार मिश्र (search.aspx?key=नितेश कुमार मिश्र)

Email(s): niteshmishra2011@gmail.com (mailto:niteshmishra2011@gmail.com)

Address: प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

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18



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छत्तीसगढ़ की महापाषाणिक संस्कृति : एक दृष्टि में

डॉ. नितेश कुमार मिश्र

प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व अध्ययनशाला, पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

niteshmishra2011@gmail.com

Email ID: niteshmishra2011@gmail.com

संक्षेपिका

छत्तीसगढ़ एक नवगठित राज्य है जिसे प्राचीन काल में दक्षिण कोसल कहा जाता था। इसके अंतर्गत वर्तमान रायपुर, बस्तर, सरगुजा तथा बिलासपुर सम्भागों के अलावा वर्तमान उड़ीसा राज्य के सम्बलपुर जिले का अधिकांश भू-भाग भी सम्मिलित था जो मेकल, रायगढ़ और सिहावा की पहाड़ी श्रृंखलाओं से घिरा हुआ है। छत्तीसगढ़ की प्रमुख नदी महानदी है। छत्तीसगढ़ राज्य भारत के कुछ सौभाग्यशाली राज्यों में से एक है जिसकी एक लम्बी सांस्कृतिक परम्परा रही है। यह क्षेत्र प्रागैतिहासिक काल से लेकर ऐतिहासिक काल तक पुरा सम्पदा को अपने में समेटे हुये है। इसी क्रम में छत्तीसगढ़ की महापाषाणिक संस्कृति का अपना विशेष महत्व है। महापाषाणिक अथवा वृहत्पाषाणिक समाधि शब्द अंग्रेजी भाषा के मेगालिथ (Megalith) शब्द का हिन्दी रूपान्तर है। मेगालिथ शब्द की व्युत्पत्ति यूनानी भाषा के मेगास (Megas) और लिथॉस (Lithos) इन दो शब्दों के संयोग से हुयी है। मेगास का अर्थ विशाल और लिथॉस का अर्थ पाषाण है। अतः इस संज्ञा से ऐसे स्मारक का बोध होता है जिसके निर्माण में बृहत्पाषाण खण्डों की भूमिका होती है। विशिष्ट प्रकार के इन स्मारकों का निर्माण या तो शवों को दफनाने के लिये अथवा मृत व्यक्ति की स्मृति को स्थायी बनाये रखने के लिये किया जाता था। विश्व तथा भारत के विभिन्न क्षेत्रों से इस प्रकार की समाधियों की प्राप्ति होती है छत्तीसगढ़ राज्य इस दृष्टिकोण से महत्वपूर्ण है चिरचरी, धनौरा, करकाभाट, बरतियाभाटा, गोदमा, मोधे, गम्मेवाड़ा, तिम्मेलवाड़ा, केतार, आरा आदि पुरास्थलों से महापाषाणिक संस्कृति के अवशेष मिले हैं।

संकेत शब्द :- छत्तीसगढ़, महापाषाणिक, समाधियों, अवशेष, शिलाखण्ड

भूमिका

छत्तीसगढ़ राज्य की स्थापना 1 नवम्बर 2000 को भारत के एक नये राज्य के रूप में हुयी, किन्तु इसकी पहचान एक भौगोलिक एवं सांस्कृतिक इकाई के रूप में अत्यन्त प्राचीन काल से "कोसल" जनपद के रूप में रही है।⁽¹⁾ सामान्यतः इसे दक्षिण कोसल के नाम से सम्बोधित किया जाता रहा है। इसके अंतर्गत वर्तमान रायपुर, बस्तर, सरगुजा तथा बिलासपुर सम्भागों के अलावा वर्तमान उड़ीसा राज्य के सम्बलपुर जिले का अधिकांश भू-भाग सम्मिलित था जो मेकल, रायगढ़ और सिहावा की पहाड़ी श्रृंखलाओं से घिरा हुआ है। छत्तीसगढ़ की प्रमुख नदी महानदी है जिसकी सहायक नदियाँ शिवनाथ, मांद, खारून, जोंक, हसदो आदि है।⁽²⁾ छत्तीसगढ़ राज्य का अधिकांश भू-भाग वनाच्छादित है इस प्रदेश से प्रागैतिहासिक काल से लेकर ऐतिहासिक काल तक के सांस्कृतिक अवशेषों की प्राप्ति होती है। उसी क्रम में छत्तीसगढ़ से प्राप्त महापाषाणिक संस्कृति के अवशेष प्रमुख है।

जीवन-मरण का चक्र एक निश्चित प्रक्रिया है अर्थात् जो पृथ्वी पर आया है उसकी मृत्यु निश्चित है। अत्यंत प्राचीन काल से मानव के लिये मृत्यु जिज्ञासा, रहस्य, भय, आस्था और श्रद्धा का विषय रही है। मृतक के अंतिम संस्कार की शुरुआत निअण्डर्थल मानव (1,00,000-35,000 ई.पू.) ने सम्भवतः किया था।⁽³⁾ जैसे-जैसे समय व्यतीत होता गया, मानव की अन्त्येष्टी सम्बन्धी विधियों में विविधता तथा जटिलता का समावेश होता गया। उच्च पुरा पाषाण काल में मृतकों के साथ अन्त्येष्टी सामाग्री के रूप में पाषाण और हाड्डियों आदि के बने हुये अस्त्र शस्त्र तथा आभूषण आदि रखे जाने लगे। नव पाषाण काल में मिट्टी के बर्तनों में खाद्य पदार्थ भर कर मृतक के साथ दफनाने की प्रथा का प्रारंभ हुआ। इसी क्रम में अपने पूर्वजों के प्रति आस्था व्यक्त करने तथा उनकी याद में 1000 ई.पू. के लगभग भारत के कई क्षेत्रों में महापाषाणिक समाधियों का निर्माण किया गया।

साहित्य समीक्षा

पुराविदों के द्वारा समय-समय पर छत्तीसगढ़ की महापाषाणिक संस्कृतिक पर शोध कार्य किये गये हैं। इस क्रम में सर्वप्रथम पद्मश्री अरूण कुमार शर्मा जी का नाम उल्लेखनीय है, इन्होंने छत्तीसगढ़ के बालोद जिले में स्थित विश्व प्रसिद्ध महापाषाणिक पुरास्थल करकाभाट का उत्खनन कराया तथा इस उत्खनन पर एक पुस्तक **Excavation at Karkabhat Chhattisgarh** प्रकाशित है। इसके अलावा अरूण कुमार शर्मा जी कि एक और पुस्तक छत्तीसगढ़ की महापाषाणिक संस्कृति पर है जिसका नाम “**Chhattisgarh Megalith**” है। डॉ. वी.सी. उपाध्याय के द्वारा भी छत्तीसगढ़ की महापाषाणिक संस्कृति पर कार्य किया गया है इनके द्वारा “**Megalithic Culture of Chhattisgarh**” नाम से एक पुस्तक का प्रकाशन भी किया गया है। डॉ. टी.आर. भोई ने भी छत्तीसगढ़ की महापाषाणिक संस्कृति पर प्रकाश डालते हुये **Ethnography of Megalithic Culture in Chhattisgarh** शीर्षक पर एक पुस्तक का लेखन किया है। इसके अलावा डॉ. नितेश कुमार मिश्र के द्वारा भारतीय इतिहास अनुसंधान परिषद्, नई दिल्ली से उत्तरी छत्तीसगढ़ की महापाषाणिक संस्कृति पर एक प्रोजेक्ट प्राप्त कर उस पर कार्य किया जा रहा है।

अध्ययन का उद्देश्य

भारतीय पुरातत्व सर्वेक्षण एवं छत्तीसगढ़ राज्य संस्कृति एवं पुरातत्व विभाग तथा विभिन्न विश्वविद्यालयों एवं व्यक्तिगत प्रयत्नों के माध्यम से छत्तीसगढ़ के पुरातत्व के विभिन्न पहलुओं पर पर्याप्त लिखा गया है किन्तु जहाँ तक महापाषाणिक संस्कृति का प्रश्न है इस विषय पर अपेक्षाकृत कम शोध कार्य हुये है। इसी को ध्यान में रखते हुये छत्तीसगढ़ की महापाषाणिक संस्कृति पर यह शोध पत्र लिखा गया है जिससे अध्येताओं को छत्तीसगढ़ अंचल की इस अनूठी संस्कृति के विषय में जानकारी प्राप्त हो सके।

शोध पद्धति

इस शोध कार्य में मुख्य रूप स्रोत के रूप में दो पद्धतियों का प्रयोग किया गया है।

(1) **ऐतिहासिक पद्धति** – इसके अन्तर्गत शोध पत्र के विषय से सम्बन्धित पुस्तकों का अध्ययन कर एक अवधारणा बनायी गयी जिसके आधार पर शोध पत्र का लेखन किया गया है।

(2) **स्थल सर्वेक्षण** – प्रस्तुत शोध पत्र में आकड़ों का संग्रह करने के लिये महापाषाणिक संस्कृति से सम्बन्धित पुरास्थलों का व्यक्तिगत सर्वेक्षण किया गया साथ ही गांव के लोगों से व्यक्तिगत साक्षात्कार के माध्यम से जानकारी प्राप्त की गयी है इस शोध कार्य में आधुनिक तकनीकों जैसे— Net, GPS, GIS एवं कम्प्यूटर आदि की भी मदद ली गयी है।

विश्लेषण

बृहत्पाषाणिक अथवा महापाषाणिक समाधि शब्द अंग्रेजी भाषा के मेगालिथ (Megalith) शब्द का हिन्दी रूपान्तर है। मेगालिथ शब्द की व्युत्पत्ति यूनानी भाषा के मेगास (Megas) और लिथॉस (Lithos) इन दो शब्दों के संयोग से हुयी है।⁽⁴⁾ मेगास का अर्थ विशाल और लिथॉस का अर्थ पाषाण है अतः इस संज्ञा से ऐसे स्मारक का बोध होता है जिसके निर्माण में बृहत्पाषाण खण्डों की भूमिका होती है। मार्टीमर ह्वीलर के अनुसार मेगालिथ प्रायः विशाल, अनगढ़ पाषाण खण्डों से निर्मित उन स्मारकों को कहा जाता है जिनका मृतकों को दफनाने के लिये अथवा मृतकों के स्मारक के रूप में निर्माण किया जाता रहा है। इस प्रकार से स्मारक अंतिम संस्कार से सम्बन्धित समाधीकरण, दाह संस्कार, स्मारक या किसी धार्मिक परम्परा से सम्बद्ध माने जा सकते हैं।

महापाषाणिक समाधियों का भारत में ही नहीं अपितु विश्व के पुरातत्व में भी महत्वपूर्ण स्थान है। ब्रिटेन, फ्रांस, जर्मनी, स्पेन, इटली, स्वीडन आदि यूरोप महाद्वीप के देशों में महापाषाणिक समाधियों के अवशेष विद्यमान हैं। एशिया में भारत, पाकिस्तान, फिलिस्तीन, जोर्डन, सऊदी अरब, इण्डोनेशिया जापान तथा अफ्रीका महाद्वीप के अल्जीरिया, मिस्त्र, इथिओपिया जैसे देशों में इस संस्कृति के अवशेष प्राप्त हुये हैं।⁽⁵⁾

भारत में महापाषाणिक समाधियों मोटे तौर पर दक्षिण भारत, मध्य भारत, उत्तर भारत और विदर्भ क्षेत्र से प्राप्त होती हैं। भारत में लगभग 14 प्रकार की महापाषाणिक समाधियों की प्राप्ति होती है उनमें से कुछ प्रमुख का वर्णन करना आवश्यक है।

डोलमेन समाधि

इस प्रकार की समाधियों आयताकार मेज के आकार की होती हैं। इनका निर्माण जमीन की सतह के ऊपर ही किया जाता था। 'डोलमेन' केल्टिक भाषा का शब्द है जिसका शाब्दिक अर्थ पत्थर की मेज है। सामान्यतः मृतक को दफनाने के लिये सन्दूक के आकार की कब्र को बनाने के लिये चार या चार से अधिक शिलाओं को चारों तरफ खड़ा कर दिया जाता था। इनको "आर्थोस्टेट" कहा जाता है, आर्थोस्टेट में एक वृत्ताकार, अर्द्धवृत्ताकार अथवा चतुर्भुजाकार छेद होता है जिसे प्रवेश गवाक्ष कहा जाता है। इस छिद्र के निर्माण का प्रयोजन संभवतः मृतात्मा को समय-समय पर भेंट पूजा चढ़ाने के लिये था। शव तथा अन्त्येष्टी सामग्री रखने के लिये कब्र की फर्श पर पत्थर का एक बड़ा टुकड़ा रखा जाता था। डोलमेन को ऊपर से ढकने के लिये एक या एक से अधिक शिलाओं का उपयोग किया जाता था।

संगोरा वृत्त

इस प्रकार की समाधियों के निर्माण के लिये जमीन में गहरा गड्ढा खोदा जाता था। इस गड्ढे के फर्श पर मनुष्य के अस्थि अवशेष तथा अन्य अन्त्येष्टी सामग्री को रख कर गड्ढे को मिट्टी से भर दिया जाता था। गड्ढे को मिट्टी से भरने के बाद उसके किनारे-किनारे गोलाई में पत्थर के टुकड़े बिछा दिये जाते थे। इन पत्थर के टुकड़ों को कुछ ऊँचाई तक रखा जाता था जिससे दूर से देखने पर समाधि का आभास हो जाये।

छत्रशिला

इसके नाम से ही स्पष्ट है कि यह छाते की आकृति वाली समाधि है। दक्षिण भारत में इस प्रकार की समाधियाँ बहुतायत में प्राप्त होती हैं जिसे स्थानीय लोग टोपीकल कहते हैं। ये छत्र शिलायें प्रायः मानव समाधियों के ऊपर स्थापित की जाती हैं। इस प्रकार की समाधि के निर्माण के लिये चार खड़े आकार के पत्थर लगाये जाते हैं। जिनके ऊपर गुम्बदाकार एक बड़ा शिलाखण्ड रख दिया जाता था। दूर से देखने पर खुले हुये छाते की तरह प्रतीत होते हैं।

फणशिला

इस प्रकार की समाधियों के निर्माण में पहले एक गहरा गड्ढा खोदा जाता है। गड्ढे में मानव आस्थियाँ और अन्त्येष्टी सामग्री को रख कर मिट्टी से भर दिया जाता था। उसके बाद कब्र के ऊपर गोलाकार एक शिलाखण्ड आँधा कर रख दिया जाता था। दूर से देखने पर इस प्रकार की समाधियाँ साँप के फँसे हुये फण की तरह प्रतीत होती हैं।

मैनहीर

इस प्रकार की समाधियों के निर्माण के लिये सर्वप्रथम एक गहरा गड्ढा खोदते हैं उस गड्ढे में शव या अस्थि अवशेषों को रख कर गड्ढे को मिट्टी से भर देते हैं गड्ढा भर देने के पश्चात प्रायः सिरहने पर एक एकात्मक पत्थर का बना हुआ स्तम्भ लगा देते हैं इसी स्तम्भ को मैनहीर कहते हैं।

स्टोन सीट्स

स्टोन सीट्स नाम से ही स्पष्ट है कि इस प्रकार की समाधियों के निर्माण में पाषाण की बड़ी-बड़ी पट्टिकाओं का प्रयोग किया जाता था। शवों को दफनाने के पश्चात उसे सुरक्षा तथा अलग पहचान देने की दृष्टिकोण से पत्थर की आयताकार या वृत्ताकार पट्टियों से ढक दिया जाता था।

छत्तीसगढ़ के महापाषाणिक पुरास्थल

छत्तीसगढ़ राज्य भारत के कुछ सौभाग्यशाली राज्यों में से एक है जो प्राकृतिक रूप से काफी समृद्ध है। यहाँ महानदी, शिवनाथ, हसदो, जोंक, इन्द्रवती जैसी नदियाँ प्रवाहित होती हैं तथा मेकल एवं दण्डकारण्य का पठार यहाँ अवास्थित है। यहाँ का अधिकांश भू-भाग वनाच्छादित है इन सब प्राकृतिक सुलभता के कारण यह क्षेत्र प्रागैतिहासिक काल से लेकर अभी तक मानवों द्वारा आबाद है। अरण्य प्रदेश होने के कारण बहुत सारी प्राचीन जनजातियाँ आज भी यहाँ निवास कर रही हैं यहाँ की कुल जनसंख्या का 32 प्रतिशत हिस्सा जनजातियों का है। यहाँ की प्रमुख जनजातियों में गोड़, उरॉव, माड़िया, मुरिया, पहाड़ी कोरबा, अगरिया आदि प्रमुख हैं। छत्तीसगढ़ राज्य में इन्हीं जनजातियों के द्वारा अपने मृतकों के प्रति आदर भाव व्यक्त करने के लिये विभिन्न प्रकार की महापाषाणिक समाधियों का निर्माण किया जा रहा था जो छत्तीसगढ़ के विभिन्न क्षेत्रों से प्राप्त होते हैं।⁽⁶⁾

छत्तीसगढ़ के महापाषाणिक पुरास्थलों पर अब तक जो कार्य किया जा चुका है उसका वर्णन यहाँ करना आवश्यक है। सर्वप्रथम डॉ. मोरेश्वर गंगाधर दीक्षित का नाम लेना उचित होगा उन्होंने 1956 से 1957 तक धनोरा का उत्खनन कराया। इसके पश्चात पद्म श्री अरुण कुमार शर्मा का नाम उल्लेखनीय है इन्होंने बालोद जिले में स्थित करकामाट नाम पुरास्थल का उत्खनन 1990-91 में कराया। इसके पश्चात डॉ. एस.एस. यादव तथा डॉ. भारती स्त्रोती ने झरझर नाला में परीक्षण निखात 2006-07 में किया अब यहाँ पर छत्तीसगढ़ के प्रमुख महापाषाणिक पुरास्थलों का उल्लेख करना आवश्यक है।⁽⁷⁾

धनोरा

धनोरा बालोद जिले में स्थित है जो बालोद से 21 कि.मी. की दूरी पर बालोद-धमतरी रोड़ पर स्थित है। यहाँ से लगभग 500 महापाषाणिक समाधियों के अवशेष प्राप्त हुये हैं, जिनमें से कुछ का उत्खनन डॉ. एम.जी. दीक्षित के द्वारा कराया गया उत्खनन में ताम्र पात्र, मनके, कौंच की चूड़ियाँ तथा मानव अस्थि अवशेषों की प्राप्ति हुयी है। महापाषाणिक समाधि प्रकारों में कर्न हीप एवं मैनहिर प्रमुख हैं।⁽⁸⁾

करकामाट

करकामाट बालोद जिले में स्थित है जो बालोद से 16 कि.मी. की दूरी पर बालोद-धमतरी मार्ग पर अवस्थित है। यहाँ पर 3500 से लगभग समाधियाँ थी किन्तु वर्तमान में केवल लगभग 500 समाधियाँ शेष हैं। यहाँ की कुछ समाधियों का उत्खनन पद्म श्री अरुण कुमार शर्मा ने कराया था। उत्खनन में यहाँ से लौह उपकरण, ताम्र उपकरण, मनके तथा कृष्ण-लोहित पात्र प्राप्त हुये हैं। महापाषाणिक समाधि प्रकारों में मैनहिर प्रमुख है। इन समाधियों का निर्माण गोड़ जनजातियों के द्वारा किया गया था। वर्तमान में यहाँ पर शवों को दफनाने की प्रथा बन्द हो चुकी है।

बरतियामाटा

यह पुरास्थल महासमुंद जिले में स्थित है जो बसना से उत्तर की ओर 16 कि.मी. की दूरी पर बसना-सरायपाली मार्ग पर है। यहाँ की सर्वेक्षणत्मक रिपोर्ट भारतीय पुरातत्व सर्वेक्षण के द्वारा तैयार किया गया यहाँ पर लगभग 600 से 700 मैनहिर थे जो 1.0 मी. से 1.5 मी. तक ऊँचे थे किन्तु वर्तमान समय अधिकांश को नष्ट कर दिया गया है।

गम्भेवाड़ा

यह पुरास्थल दंतेवाड़ा जिले में है जो भारतीय पुरातत्व सर्वेक्षण के द्वारा संरक्षित है। यहाँ से मेनहिर की प्राप्ति होती है, यह अभी भी जीवित परम्परा में है।

मोथे

यह बस्तर क्षेत्र का पुरास्थल है यहाँ से 16 मेनहिर तथा 10 कर्न सर्किल प्राप्त हुये है। साथ ही यहाँ से मध्य पाषाण तथा नव पाषाण काल के उपकरण प्राप्त हुये है।

गेदमा

यह बस्तर क्षेत्र का पुरास्थल है यहाँ से मध्य पाषाणिक उपकरणों की प्राप्ति हुयी है साथ ही कर्न सर्किल तथा मेनहीर भी प्राप्त हुये है।

खलारी

यह पुरास्थल राजनांदगांव जिले में स्थित है जो डोंगरगढ़ से 10 कि.मी. दक्षिण-पूर्व में है यहाँ से कर्न सर्किल की प्राप्ति हुयी है। इसकी खोज पदम श्री अरुण कुमार शर्मा जी ने किया था।

केतार

यह पुरास्थल जशपुर जिले में स्थित है जो जिला मुख्यालय से 30 कि.मी. की दूर पर है। यहाँ से लगभग 30 मेनहीर और 60 स्टोन सीट प्राप्त हुये है। इसके अलावा पूर्व दिशा में दो ऐसे पाषाण स्तम्भ खड़े है जिन्हें देखने से द्वार होने का आभास होता है। ये समाधियों उरोंव जनजाति की है जो अब जीवित परम्परा में नहीं है यह बिल्कुल नव अन्वेषित पुरास्थल है जिसकी खोज पं. रविशंकर शुक्ल विश्वविद्यालय के प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व विभाग की शोध छात्रा अंशु माला तिर्की ने किया है।

जयमर्गा

यह पुरास्थल भी जशपुर जिले में स्थित है जो छत्तीसगढ़ तथा झारखण्ड की सीमा पर स्थित है। यहाँ से मेनहीर की प्राप्ति हुयी है ये अगरिया जनजाति का महापाषाणिक पुरास्थल है। यहाँ की सतह से लाल पात्र, कृष्ण-लोहित पात्र तथा काले पात्रों की प्राप्ति हुयी है साथ ही लौह धातु मल बहुतायत में प्राप्त हुआ है।

निष्कर्ष

निष्कर्ष रूप में यहाँ उल्लेख करना अति आवश्यक है कि छत्तीसगढ़ अंचल पुरातात्विक रूप से अत्यंत समृद्ध है जहाँ महापाषाणिक संस्कृति का प्रश्न है दक्षिण भारत की तरह यहाँ से भी बहुत अधिक संख्या में महापाषाणिक समाधियों की प्राप्ति होती है। छत्तीसगढ़ राज्य की अधिकांश जनसंख्या वनवासी है, वनवासी बंधुओं की यह विशेषता है कि वो हजारों वर्ष प्राचीन अपनी संस्कृति को आज भी सुरक्षित रखे हुये है इस अंचल में महापाषाणिक समाधियों के निर्माता यही वनवासी लोग है। बहुत सारी जनजातियाँ ऐसी भी है जो आज भी अपने मृतकों के प्रति आदर व्यक्त करने के लिये इन महापाषाणिक समाधियों का निर्माण किसी न किसी रूप में कर रही है।

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19

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NEW EXPLORED ARCHAEOLOGICAL SITE "JAIMARGA"

Dr. Nitesh Kumar Mishra*
Anshu Mala Tirkey**
Baleshwar Kumar Beera***

ABSTRACT

Jaimarga is the village which is located in Manora block, district Jashpur in Chhattisgarh state. This village is one of the important prehistoric as well as habitation sites of ethnic groups. Jaimarga consists of the remains of various types of archaeological sites. There is rock painting cave located in the Garh pahar and microliths are the associated materials along with the rock art. There are also the remains of the kiln made by the ancestors of the Agaria tribe. This site named Hehdarn also consists of the menhirs along with the earliest kilns. There are also the remains of various pot shreds, tuyeres, iron ores and iron slags, which points that the iron smelters survived there for a longer duration. This paper will consist of the information of the unreported sites of Jaimarga village. The paper will also describe the present condition of the remains found in this region.

Keyword – Gar pahar, Menhir, Iron slag (Garda pakhna), iron ore (Bicchi pathar), Kiln, tuyere, Agaria, Microliths

Jaimarga is situated in the Jashpur district in Chhattisgarh state. The village Jaimarga is situated in the Manora block. Jaimarga is located 13km away from the sub district headquarter Manora. It is 31km away from the district headquarter Jashpur Nagar. The gram panchayat of Jaimarga is Dadgaon. The geographical area of the village Jaimarga is 585.14 hectares. The name Jaimarga is derived from the word Garhpahar, there are about seven stone placed on the top of the mountain. The word Jaimarga means the "mountain god". The tribal people worship the mountain as because they get stones for making tools and making of megalithic stones, food and for the iron smelters the mountain provide iron ore. According to the folklore of the villagers the seven stone was symbolized as stone of the achievement of their ancestors. Geographically the village Jaimarga is very rich for flora and fauna. There are mountains as the fortification wall of the

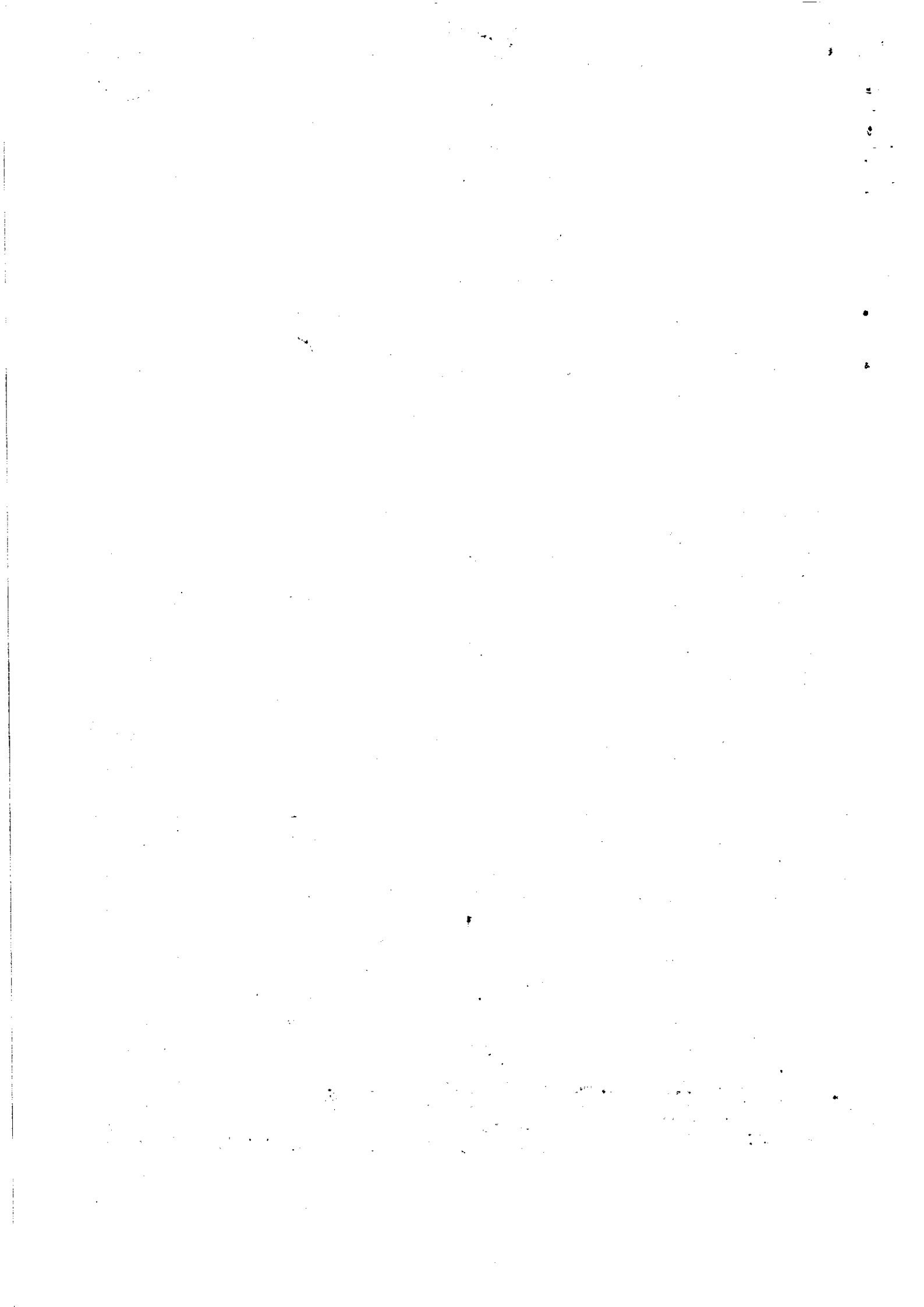
village. Village is surrounded from all four sides. The mountain ranges in the village runs from west to east. The mountains are mostly located on the north side. On the eastern side there is Surya pahar, western side consists of Hadi pahar and on the north side there is Khukhara pat pahar. There is "Benjora Nala" flowing animals found in in Jaimarga village. There are wild boar, monkey, jackal, elephant, deer, fox, bear, in this region and it joins the river Lawa River in the south. This village is the bordering part of the Chhattisgarh state. In this region laterite soil is found. There is dense forest in this village. Sakhuwa tree is the main tree which is found in this forest. There are many other trees found in this region like Kusum, Mahuwa, Char and Sal. There are many wild animals like pangolins, snake and porcupine etc.

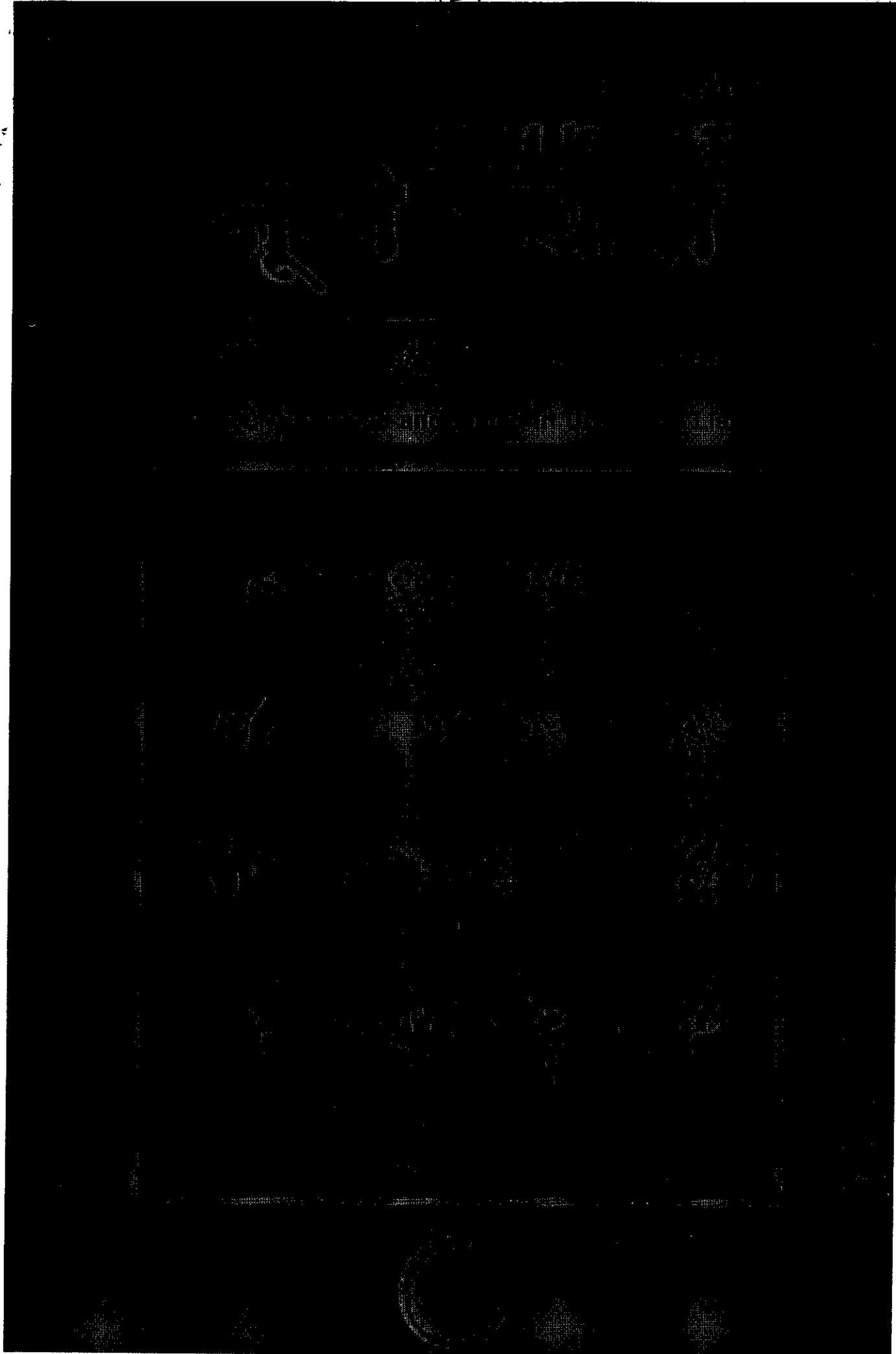
Jaimarga is the highly tribal populated region. There are various tribes found in this

*Assistant Professor - SOS in AIHCA, Pt. Ravi Shankar Shukla University, Raipur (CG)

**Research Scholar - SOS in AIHCA, Pt. Ravi Shankar Shukla University, Raipur (CG)

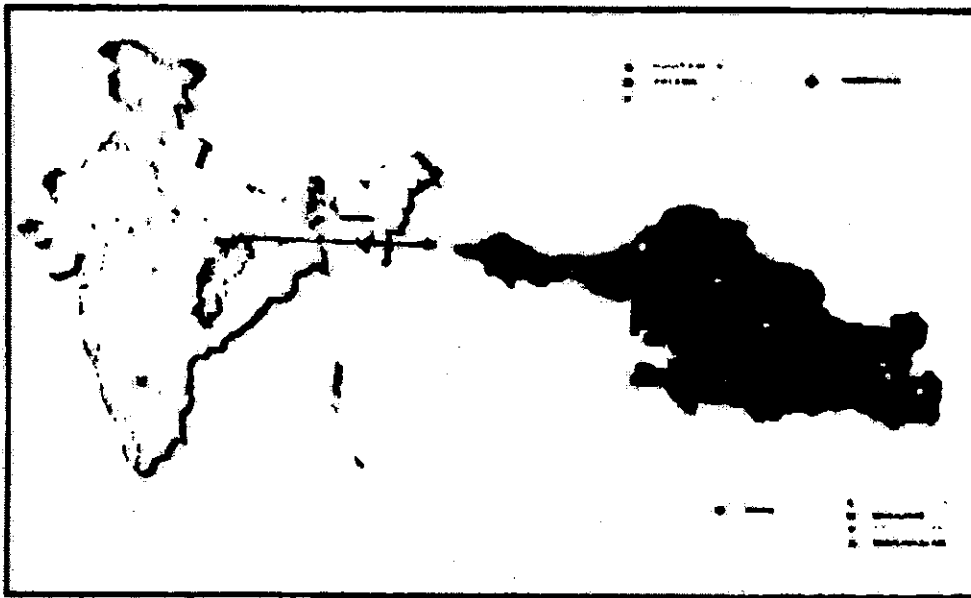
***MA. In Archaeology & Museology Ranchi, University (Ranchi)





The Unexplored Megalithic Sites and Burial Practices of Balrampur Region (Chhatisgarh)

**Dr. Nitesh Kumar Mishra • Anshu Mala Tirkey
• Baleshwar Kumar Besra**



Abstract

This paper is related to the megalithic culture and the burial practices of various tribes in Balrampur region. It consists of the definition of megalith. The paper deals with the geographical features of the region. As Balrampur region consists of various mountains, rivers and forest, which promotes the survival of various tribal communities. There are detailed information about the burial practices of various tribes and unreported sites. The

31

10

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सिनेमा एवं समाज : एक सामाजिक-मानवशास्त्रीय अध्ययन

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सारांश: इंटरटेनमेन्ट... इंटरटेनमेन्ट और इंटरटेनमेन्ट डर्टी फिल्म में विद्या बालन का यह संवाद (डायलॉग) वास्तव में फिल्मों को लेकर वर्तमान समय की आवश्यकता है। दैनिक धारावाहिक, नाटक और फिल्मों में दिखाए जाने वाली कई घटनाएँ और कभी-कभी संपूर्ण फिल्म समाज की एक चलचित्र या तस्वीर होती है। कई फिल्मों में दिखलाई जाने वाली घटनाओं में तो दर्शकों द्वारा महसूस किया जाता है कि उक्त घटना तो मेरी जिंदगी में भी घटी है या घट सकती है। साथ ही फिल्मी जगत एक बहुत बड़े दर्शकगण को बांधे रखने का कार्य करती है। यही कारण है कि फिल्मों को उनके सकारात्मक और नकारात्मक प्रभाव को लेकर अनेक समीक्षात्मक मापदंडों से होकर गुजरना पड़ता है कि कहीं हमारे समाज या समाज का कोई वर्ग विशेष पर किसी फिल्म विशेष का नकारात्मक प्रभाव तो नहीं पड़ रहा, इत्यादि। उपरोक्त संपूर्ण प्रकार की बातों से स्पष्ट है कि फिल्म जगत का हमारे मानव समाज में महत्वपूर्ण भूमिका होती है। परंतु इसके साथ ही एक और महत्वपूर्ण सच्चाई यह है कि यदि फिल्मों के सकारात्मक प्रभाव से हमारे समाज को जागरूक करने और उसके प्रभाव को व्यवहार में लाना है तो जिम्मेदारी दोनों तरफ से निभाया जाना आवश्यक है जहाँ फिल्मों को जमीनी स्तर पर अपने प्रभाव को रखना होगा वहीं दर्शकगण (मानव समाज) को भी सकारात्मक चीजों को ग्रहण करके व्यवहार में लाना होगा। उपरोक्त प्रकार के प्रभाव को जानने का प्रयास प्रस्तुत अध्ययन में विभिन्न शोध-तकनीकों द्वारा किया गया है। जिसमें प्राप्त परिणाम अपेक्षाकृत नकारात्मक प्राप्त हुआ। जैसे, अधिकांश दर्शक फिल्म में दिखाए जाने वाले संदेशों के व्यवहार में नहीं लाते।

कुंजी शब्द : सिनेमा, समाज, सिनेमा का मनोवैज्ञानिक प्रभाव, सिनेमा के वर्तमान स्वरूप।

1. **प्रस्तावना :** फिल्मी जगत और मानव समाज में एक गहरा संबंध होता है या दूसरे शब्दों में कहा जा सकता है कि फिल्मी जगत मानव समाज का ही एक अंग बन चुका है। सिनेमा और समाज में पाए जाने वाले संबंधों में एक महत्वपूर्ण संबंध यह है कि समाज और सिनेमा दोनों का एक-दूसरे पर प्रभाव प्रत्यक्ष होता है। जिंदल, ए. (1960) ने सोशियोलॉजी बुलेटिन में प्रकाशित अपने लेख में स्पष्ट किया कि "आज पूरी तरह से जनसंचार के माध्यम के रूप में फिल्म अत्यधिक महत्व की है और रेडियो की तुलना में अधिक मर्मज्ञ है और संचार के अन्य दो प्रमुख मीडिया को दबाती है।" जहाँ एक ओर समाज और देश में धटित होने वाली घटनाएँ तुरंत किसी न किसी सिनेमा की कहानी या कहानी का हिस्सा बन जाती है। जैसे, कारगील पर बनी फिल्में, अन्ना हजारे के आंदोलन पर बनी सत्याग्रह फिल्म इत्यादि को लिया जा सकता है, वहीं दूसरी ओर फिल्मों में दिखाए जाने वाले घटनाओं को भी समाज के सदस्य तुरंत अपना लेते हैं। इस प्रकार के संबंध से स्पष्ट है कि सिनेमा में दिखाए जाने वाले भूमिकाएँ, फिल्मों की कहानी, फिल्मों में दिखलाई जाने वाले दृश्य इत्यादि कितनी अधिक संवेदनशील हो सकती है। यही कारण है कि फिल्मों को अनेक प्रकार के प्रमाण-पत्रों और समीक्षाओं से गुजारा जाता है जो आवश्यक भी है। इन्हीं समीक्षाओं में फिल्मों में दिखाए जाने संदेशों को, जिससे समाज को लाभ हो सके उन संदेशों को भी महत्व दिया जाता है। सामान्यतः हमारे समाज में लोगों द्वारा बहुआधिक पैसे सिनेमा पर खर्च किया जाता है परंतु उसके बाद भी समाज के लोग उन संदेशों को कितना स्वीकार करते हैं और फिल्मों के सकारात्मक संदेशों को व्यवहार में लाते हैं यह समाज के लोगों पर निर्भर करता है। वहीं फिल्मों, नाटकों में दिखाए जाने वाले घटनाओं में अनेक शोध-कार्य भी संपन्न किए जाते हैं विशेषकर शोध के अनेक पद्धतियों और प्रविधियों के अंतर्गत आने वाले अंतर्वस्तु विश्लेषण में फिल्मों, नाटकों के संवादों का प्रत्यक्ष-अप्रत्यक्ष विश्लेषण करके सामाजिक घटनाओं को समझने का प्रयास किया जाता है। उपरोक्त कारणों के कारण एक ओर फिल्मों में दिखाए जाने वाले घटनाओं को समाज और लोगों के प्रति सकारात्मक होना आवश्यक है दूसरी ओर लोगों को भी फिल्मों में दिखलाई जाने वाले सकारात्मक तथ्यों को अपनाने का प्रयास किया जाना चाहिए और यह प्रभाव दीर्घकालीक होना चाहिए। वर्तमान समय में लोग जब पान सिंह तोमार, बॅडिट क्वीन जैसे फिल्मों से जिनमें आम जनता, आदिवासियों के साथ होने वाले अत्याचारों को दिखाया

Nutritional Status of Baiga women of Chhattisgarh, India: An Anthropological Insight

*Sunil Kumar Mehta and **Dr. Moyna Chakravarty

**Research Scholar, School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh), India.*

***Professor, School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh), India.*

Corresponding Author: Sunil Kumar Mehta, DE-20 Indraprasth Colony Raipura, Raipur (Chhattisgarh). Pin Code 492013,

Abstract

The prevalence of undernutrition was assessed in Baiga women of Bilaspur, Kabirdham and Mungeli district of Chhattisgarh. The present study was conducted in three pre dominantly Baiga inhabited villages and the study revealed that the highest mean BMI was found to be 18.6 kg/m². Only 26.36 % women were reported to be normal. 73.64% of women were categorized under underweight category and the health workers (ANMs) are playing a crucial role in providing antenatal checkups to pregnant women in the area under study with complete immunization. Institutional delivery was high but the consumption of calcium and folic tablets was observed to be low.

Key Word: *Nutritional Status, BMI, Women, Maternal health, Baiga tribe, Anthropological.*

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I. Introduction

According to Article 342 of the Indian Constitution, the Scheduled Tribes are the tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a public notification. Understanding the variation/distribution of nutritional status in terms of malnutrition/undernutrition (a deficiency of calories or of one or more essential nutrients) among vulnerable populations is very essential in developing countries like India. India accounts highest occurrence of childhood malnutrition in the world. Moreover, this is expected to be higher among lower socioeconomic sections of the country, specifically the tribal community. Three of the eight Millennium development goals (MDGs) emphasize on health focuses on reduction of child mortality, improved maternal health and combating some diseases. Development of a nation depends largely upon maternal health and ill health of the mother indirectly affects the health of the child. Several factors such as social, cultural, economic, availability of health facility, utilization and accessibility of health facility influence the health of the mother and child. Utilization of maternal health care services depends on the socio-economic characteristics of a population have been highlighted by several authors (Kavita & Audinarayana, 1997; Bloom, Wypij and Gupta, 2001; Navaneetham and Dharmalingam, 2002; Gymiah, Tykui and Addai, 2006 and Dey, 2009). Some of them have focused on the importance of availability and accessibility of services (Develay, Saverborn & Diesfeld, 1996; Becker, Peters, Gray and Gultiano, 1993).

The government of India has implemented several programmes and event in order to strengthen and enhance the quality of health and the earlier studies have shown that Infant and prenatal mortality rates were lower and birth weight was higher among women who received ANC services. Social scientists and researchers have been able to identify some factors which are responsible for the poor utilization of the health services viz. poor accessibility, lack of infrastructures, poor quality of health care and lack of faith in the delivery services are few of them. Nutrition status on the other hand has major effect on health which enables one to lead a socially and economically sound life. Individual's nutritional level depends on nutritional knowledge, literacy, availability, awareness and utilization of governmental schemes. Poor maternal nutrition status and high rate of anemia have resulted in low birth weight, stunting of growth, wasting and underweight of children. Child malnutrition reflected some of the processes such as access to food, access to health service and child caring practices and the underweight is likely to be associated with morbidity or other physiological and functional impairment (James et al 1988; Shetty and James, 1999).

GROWTH AND NUTRITIONAL STATUS OF THE BAIGA ADOLESCENT GIRLS-A PRIMITIVE TRIBE OF CHHATTISGARH, INDIA

ANIKSHA VARODA, REETA VENUGOPAL, AND MOYNA CHAKRAVARTY

ABSTRACT

Nutritional problems have serious health implications impacting physical development, psychological behavioural and work performance of an individual. Healthy growth and development of a girl through adolescence helps to prepare her for healthy pregnancies during childbearing years. The present study was conducted to assess the nutritional status among the Baiga adolescent girls in three districts of Chhattisgarh. A total of 270 girls of age cohort of 10-18 years were included. The present study aimed to assess the nutritional status among Baiga girls to compare the finding with standard references, i.e. NCHS, WHO and CDC. The study reveals that the highest mean BMI was found to be 18.2 Kgm² for girls of 16 years of age; whereas the lowest mean BMI was 15.9 Kgm² for girls of 12 years of age. Present girls have low mean body weight, height and BMI than the reference populations (NCHS). It was found that 26.3% of girls were of normal category, 26.1% girls were categorized under mild thinness, 17.7 % of girls suffered from moderate thinness and 29.7% girls suffered from severe thinness category of malnutrition. The results of the present study indicate that there is a great need for the implementation of health programmes to eliminate gender inequalities and improve health of girls.

Keywords: Nutritional Status, Baiga tribe, Adolescent girls.

INTRODUCTION

Growth and development among humans have different and divergent phases, since birth. Adolescence is an important stage, which is characterized by various biological, cognitive, social and emotional changes. In general, the adolescence period begins around 10 to 12 years and lasts till 18-21 years of age. This stage has some predictable physical milestones. This is the period when the growth

Aniksha Varoda, Research Assistant, Centre for Women's Studies, and Research Scholar, School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India E-mail: aniksha1988@gmail.com (corresponding author); **Reeta Venugopal**, Professor of School of Studies in Physical Education and Director of Centre for Women's Studies, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India and **Moyna Chakravarty**, Professor, School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India.

Prevalence of Anaemia among Adolescent girls of Baiga (PVTGs) of Chhattisgarh, India

A. Varoda¹, M Chakravarty², R. Venugopal³ and A. Kumar⁴

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¹Aniksha Varoda, Research Assistant, Centre for Women's Studies, & Research Scholar, SoS in Anthropology, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India, Email: -aniksha1988@gmail.com

²Prof. Moyna Chakravarty, Professor of SoS in Anthropology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India. Email: -moynanthro@gmail.com

³Prof. Reeta Venugopal, Professor of SoS in Physical Education and Director of Centre for Women's Studies, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India. Email: -rectavenugopal@yahoo.com

⁴Dr. Arun Kumar, Post Doctoral Fellow, Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Wardha. Email: -shubh01arun@gmail.com

Corresponding Author: Aniksha Varoda, Research Assistant, Centre for Women's Studies, & Research Scholar, SoS in Anthropology, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India, Email: -aniksha1988@gmail.com

ABSTRACT : Anaemia is a global health problem which affects the health of the people as well as social & economic development. The status of anaemia among the population shows variation as per age and sex, similarly, there is a changing pattern reported by many studies viz. (Worldwide prevalence of anaemia, 1993–2005). It can be considered as anaemia among tribal and rural adolescent girls can be attributed to poor nutrition as well as lack of awareness in this regard. UNICEF, (2012) reported that in India all around 56% of adolescent girl and 30% of adolescent boy are anaemic. This scenario is more chronic among adolescent of tribal areas which lead to conduct the present anthropological investigation to assess the prevalence of anaemia among adolescent girls aged 10-18 years of Baiga's of Chhattisgarh, India. To fulfill the objectives a total of 360 adolescent girls were purposively selected from three districts Bilaspur, Kabirdham, and Mungeli of Chhattisgarh. The finding reveals that the prevalence of anaemia among Baiga adolescent girls is 94.7% which is lower than the previously studied adolescent girls of different regional area like Jaipur, Andhra Pradesh, and Odisha whereas it was higher than the cluster of studies from Rajasthan, Haryana, Madhya Pradesh, Uttar Pradesh, Maharashtra, Chhattisgarh, and Karnataka. Although, they are also lacking in proper nutrition and suffered many associated health problems which leads to chronic chances for poor level of haemoglobin. It is an alarming indicator and needs to be taken care of to make policies for their children.

Keywords – Anaemia, Adolescent girls, and Baiga tribe

66 ✓

158

FLORA AND FAUNA

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Airborne *Aspergillus* at some rural areas adjoining to Raipur city (C.B.) India

*Ritu Kunjam¹, V.K. Kanungo and S.K. Jadhav

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Govt. Nagajana P.G. College, Raipur
Rajput College
Department of Microbiology
Pandit Ravishankar Shukla University
Raipur (C.B.) India
*Corresponding Author
E-mail: ritukunjam21@gmail.com

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ABSTRACT

Increased urbanization and industrialization in recent time has made a significant impact on air quality of the area. The atmosphere is rich in propagule of different fungal species. The investigation on airborne *Aspergillus* contribution was conducted in Periphery of Raipur city from February, 2018 to March, 2019 with the help of gravity petriplate containing PDA (Potato Dextrose Agar) medium. In this study, total 11 species of *Aspergillus* were recorded. The percentage frequency and percentage contribution of different *Aspergillus* species were different in different seasons. *Aspergillus niger* was most frequent throughout the year followed by *Aspergillus fumigatus*, *A. flavus*, and *A. nidulans* etc. While *Aspergillus clavatus*, and *A. versipellis*, *A. boletus* were the least frequent species. The result indicated the highest percentage contribution of *Aspergillus niger* (45.18 percent) followed by *A. fumigatus* (9.02 percent), *A. flavus* (6.42 percent) while *A. clavatus* (0.21 percent). The objective of the study was to determine a seasonal variation in concentrations of *Aspergillus* on the basis of meteorological parameters.

Figure 00

References 12

Table 01

KEY WORDS Airborne, *Aspergillus*, Raipur city, Rural Area.

Introduction

Fungal spores constitute a major component of air-spores. Qualitative and quantitative variations depend on the meteorological factors and geographical conditions. Fungal spores that are transported by air currents cause many plant diseases and knowledge of their periodicity is of great value in terms of predicting plant epidemics. *Aspergillus* is a universal fungus. The great majority of species are saprophytes, commonly or occasionally found in soil, decaying vegetation, seeds and grains. The aim of present work was to analyse the behaviour of *Aspergillus* spore type at some rural areas adjoining to Raipur city and to study the relationship between the fungal spore levels and the main environmental factors.

Materials and Methods

In present study, four different sites were selected in Raipur city, Chandraiah, Zora, Borikela, and Khandaj, Raipur (C.B.) India. The study was carried out from March 2018 to February 2019. The culture plate method was adopted for trapping the mycoflora. Potato Dextrose Agar (PDA) was used as culture medium. The agar medium was aseptically

poured in petriplates and allowed to solidify. The petriplates containing potato dextrose agar (PDA) medium were exposed in the air for 5-10 minutes at 1 meter above the ground level at the above-mentioned sites. The study was conducted at interval of 15 days. After exposure, the exposed petridishes were sealed and brought to laboratory and incubated for 5 to 7 days at 25°C. After incubation fungal colonies were observed and identified with the help of literature. The colonies were recorded separately for each species. Percentage frequency and percentage contribution of fungal flora will be calculated using the following formula:-

% Contribution = Total No. of colonies of species X / Total number of colonies of all species X 100

Result and Discussion

The investigation of airborne *Aspergillus* concentration was conducted at four sites adjoining to Raipur city, 2018. Out of 11 fungal colonies of *Aspergillus* were recorded (Table-1).

DIVERSITY OF SOIL AND LEAF SURFACE MYCOFLORA: A SOURCE OF AEROMYCOFLORA

¹SHRIRAM KUNJAM AND ²SHAILESH KUMAR JADHAV

1. DEPARTMENT OF BOTANY, GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG
(CHHATTISGARH) INDIA-491001

2. SCHOOL OF STUDIES IN BIOTECHNOLOGY

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (CHHATTISGARH) INDIA-492010

Email: shriramkunjam07@gmail.com, jadhav9862@gmail.com

150

Microorganisms are introduced into the air from various sources. The important sources of these microorganisms are soil and vegetation of that area. Microorganisms, which are found on plants' surface either as pathogens or as saprophytes, also get suspended in the air. Man-made actions like digging or ploughing the soil may also release soil-borne microbes into the air. The surrounding atmosphere plays an important role as the sources of organisms in the experimental area. The studies were carried out from February 2006 to March 2007. In the present study, aeromycoflora, mycoflora were observed from soil and plant near the experimental sites as their sources. The Potato Dextrose Agar medium containing plates were used for the isolation of mycoflora from their sources around the Panabaras of Rajnandgaon district. During the present study, a total of 22 fungal species of 120 fungal colonies belonging to 14 genera were reported from the soil. While 24 fungal species of 166 fungal colonies belonging to 16 genera were isolated from the leaf surface. *Aspergillus fumigatus* (10.00%) showed the maximum percentage contribution, followed by *Fusarium oxysporium* and *Khuskia oryzae* (8.33%), *Aspergillus japonicus* and *Paecilomyces variotii* (7.5%) and *Alternaria radicina*, *Penicillium notatum* (5.83%) in the soil mycoflora. It is also shown that *Cladosporium cladosporioides* (11.44%) followed by *Aspergillus niger* (9.63%), *A. fumigatus* (6.62%), *Monodictys fluctuata* (6.02%), *Curvularia lunata* (5.42%) and *Aspergillus fumigatus* (4.81%) were the most contributed to leaf surface mycoflora.

Key Words: Fungal diversity, aeromycoflora, sources, soil, leaf surface.

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INTRODUCTION

Fungi are very successful inhabitants of soil due to their high plasticity and their capacity to adopt various forms in response to adverse or unfavorable conditions¹. The diversity and activity of fungi are regulated by multiple biotic (plants and other organisms) and abiotic (soil pH, moisture, salinity, structure, and temperature) factors^{2,3}. Fungi can be found in almost every environment and can live in a wide range of pH and temperature⁴. Fungal populations are strongly influenced by the diversity and composition of the plant community and in return, affect plant growth through mutualism, pathogenicity, and their effect on nutrient availability and cycling⁵⁻⁷. The contribution of soil organisms is very significant in many soil functions such as supporting the growth of plants, absorbing, neutralizing and transforming com-

pounds that might otherwise become pollutants in the environment. Soil is a complex habitat for microbial growth and these microbes generally exist as micro-colonies or biofilms on mineral particles, organic matter, and roots. Currently, microorganisms are exploited to get valuable products that include enzymes, secondary metabolites, therapeutic agents and industrial products. Such potential microorganisms are usually isolated from the soil sample. Among such microbes, filamentous fungi dominate our globe as sources of food, plant and animal pathogens, and other worthy products' biosynthesis.

The phylloplane, the surface of plant leaves, is a complex terrestrial habitat, characterized by a variety of microorganisms, including bacteria, filamentous fungi and yeast. Pathogens, saprobes and epiphytes occur in

SEASONAL DISTRIBUTION OF AIRBORNE FUNGI AT THE PERIPHERY OF RAIPUR CITY, CHHATTISGARH, INDIA

*RITU KUNJAM, V.K. KANUNGO AND *S.K. JADHAV

DEPARTMENT OF BOTANY, GOVT NAGARJUNA P.G. COLLEGE OF SCIENCE, RAIPUR, C.G.

*SOS IN BIOTECHNOLOGY, PANDIT RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR, C.G.

*CORRESPONDING AUTHOR: ritukunjam21jun@gmail.com/ ritukunjam21@gmail.com

Raipur is the capital city of Chhattisgarh state. The city is located centrally in the state of Chhattisgarh. Fungal spores are widely distributed all over the world, which constitute the major component of the air-borne microflora. Various environmental factors affect the distribution of fungi in a particular area. Occurrence and the type of fungal species change with the season and geographical location. Seasonal variation affects the distribution of fungi in a particular area. To investigate this fact, a Survey of air-borne fungi was carried out from March 2018 to February 2019 by using the Gravity petri-plates method containing PDA (Potato Dextrose Agar) medium. The study recorded a total of 35 fungal species belonging to 14 fungal genera. The dominant species noted were *Aspergillus niger*, *A. flavus*, *A. fumigatus*, *A. oryzae*, *Alternaria alternata*, *Cladosporium* sp. *Curvularia lunata*, *Fusarium* sp. and *Phoma pomorum*. It was observed that medical and phytopathological consequences are associated with fungal spores. In that respect, study elucidated the distribution and occurrence of air-borne fungi during the year 2018-2019 at the periphery of Raipur city.

Key Words: Airborne fungi, Seasonal distribution, Phytopathological, Fungal spores.

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INTRODUCTION

Raipur is the capital city of Chhattisgarh state in India. It is situated between 22° 33'N to 21° 14'N Latitude and 82° 6' to 81° 38'E Longitude. The city is located centrally in the state of Chhattisgarh, and now serves as a regional hub for trade and commerce for a variety of local agricultural and forest products. Increased urbanization and industrialization in recent time has made a significant impact on air quality of the area. Seasonal variation affects aero-mycoflora of the area. The microbial population of the atmosphere at any place constitutes its aero-spora. Fungal spores are not equally distributed in the environment; their distribution varies according to geographical location and metrological conditions. The concentration of airborne fungal spores has been linked to wind, humidity, temperature, rainfall, altitude, vegetation and various specific reservoirs of contamination. Also, fungal propagative units may be dispersed in the air by insects¹. Fungal spores are part of air quality depending on the time of the day, weather, season, climatic conditions, and local source of spores². Based on the microbiological analysis of air samples from inhabited areas, it was reported that airborne fungi

are among the most common organisms correlated with the air pollution that have adverse effects on human health as well as causing plant diseases. In light of the above knowledge, the present investigation on airborne fungal flora is essential to understand the deposition and dissemination of fungal spores at the periphery of Raipur city.

MATERIALS AND METHODS

Description of the study site

The study was conducted at the periphery of Raipur city, Chhattisgarh, India. 4 different villages in surrounding of Raipur city, were selected viz. Chandanidih (21° 15'NL and 81° 32'EL), Zora (21°v23'NL and 81° 71'EL), Boriakala (21° 19'NL and 81° 64'EL) and Dhaneli (21° 33'NL and 81° 65'EL). The present study was conducted for a period of one year that is from March 2018 to February 2019.

Sampling and calculation

The culture plate exposure method was adopted for trapping the airborne fungi. PDA (Potato, Dextrose and Agar) was used as a culture medium. 10 ml of sterilized

160



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Research article

Carbon dot induces tolerance to arsenic by regulating arsenic uptake, reactive oxygen species detoxification and defense-related gene expression in *Cicer arietinum* L



Vibhuti Chandrakar^a, Bhumika Yadu^a, Jyoti Korram^b, Manmohan L. Satnam^b, Amit Dubey^c, Meetul Kumar^d, S. Keshavkant^{a,e,*}

^a School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur, 492 010, India

^b School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, 492 010, India

^c Central Laboratory Facility, Chhattisgarh Council of Science and Technology, Raipur, 492 010, India

^d Directorate of International Cooperation, Defence Research and Development Organization, New Delhi, 110 001, India

^e National Center for Natural Resources, Pt. Ravishankar Shukla University, Raipur, 492 010, India

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ABSTRACT

The scientific and technological applications of one of the nanomaterials viz.; carbon dot (C-dots), having extraordinary properties, is becoming an emerging and ongoing research area in recent times. In the present study, we have evaluated the effectiveness of C-dots in reducing arsenic (As) toxicity by analyzing physiological, biochemical and molecular parameters in *Cicer arietinum* L. The results revealed that As decreased the germination rate, growth, biomass, and membrane stability of the cell to a significant extent. Further, As was taken up by the growing seeds which eventually caused cell death. Levels of reactive oxygen species (ROS), stress markers (malondialdehyde), activities of defensive enzymes (glutathione-S-transferase and pyrroline-5-carboxylate synthetase) and non-enzymatic antioxidant contents (proline and glutathione) were increased under As stress. Moreover, As treatment resulted in the up-regulation of expressions of NADPH oxidase and defense-related genes in *Cicer arietinum* L. However, application of C-dots along with As improved the germination and growth of *Cicer arietinum* L. Exogenous application of C-dots, enhanced the expressions of defense-related genes and, contents of proline and glutathione, thereby causing considerable reductions in ROS, and malondialdehyde levels. Overall, this study suggests the possible involvement of C-dots in lowering the toxic effects of As on biomass by reducing As uptake and, inducing the activities/gene expressions and contents of enzymatic and non-enzymatic antioxidants.

Author contribution

Vibhuti Chandrakar Bhumika Yadu Jyoti Korram Manmohan L. Satnam Amit Dubey Meetul Kumar S. Keshavkant.

1. Introduction

Arsenic (As) is a non-essential metalloid, which instigates many toxic effects in the living systems (Kidwai et al., 2019). The plant roots absorb As predominantly in its inorganic forms: arsenate (As^V) and arsenite (As^{III}). As^{III} is considered to be more toxic to plants, since it permeates the membrane and reacts with the sulfhydryl groups of plant proteins

and enzymes, disconcerting energy flow, causing leaking of electrolytes and generating reactive oxygen species (ROS) (Singh et al., 2015). A membrane localized enzyme NADPH oxidase (NOX) is also responsible for the production of ROS in plant cells (Reddy et al., 2015). These ROS oxidize/damage most major cellular bio-polymers such as lipid, protein, etc., resulting in the dysfunction, and sometimes death of the cells. A product of lipid peroxidation reaction; malondialdehyde (MDA) leads to disintegration of cellular organelles, oxidation and dysfunction of proteins and nucleic acids (Singh et al., 2015).

To counter the As stress, plants detoxify this metalloid by promptly converting it into As^{III}, in the cytosol, by arsenate reductase. This As^{III} is then expelled outside of the cell or sequestered into the vacuoles

* Corresponding author. National Center for Natural Resources, Pt. Ravishankar Shukla University, Raipur, 492 010, India.
E-mail addresses: skeshavkant@gmail.com, keshav_91@rediffmail.com (S. Keshavkant).



Amelioration of Ageing Associated Alterations and Oxidative Inequity in Seeds of *Cicer arietinum* by Silver Nanoparticles

Jeabunnisha Khan¹ · Jipsi Chandra¹ · Roseline Xalxo¹ · Jyoti Korram² · Manmohan L. Satnami² · S. Keshavkant¹

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Abstract

Metal-based nanoparticles (NPs) have recently been accomplished a great attention worldwide, in various sectors including agriculture due to their beneficial impacts in plant growth, development and stress tolerance. However, it shows dose-dependent response and may vary with type of metal and synthesis procedure followed. Among many, silver nanoparticles (AgNPs) are most frequently used NP in agricultural sector. In the present study, AgNPs were synthesized following both green (gAgNP) and chemical (cAgNP) synthesis processes, characterized by standard methods and were applied to artificially aged *Cicer arietinum* seeds. Initial characterization of synthesized NPs was done by UV–Visible spectroscopy, and concentrations were calculated as 2.7 nmol for gAgNP, while, 5.8 nmol for cAgNP. Furthermore, the presence of different functional groups in synthesized AgNPs was evaluated by fourier transform infrared spectroscopy (1000 and 4000 cm^{-1}). However, the particle size of synthesized AgNPs was estimated by dynamic light scattering/ zetasizer (90–120 nm) and transmission electron microscopy (15–60 nm). Synthesized NPs were then assessed for their ameliorative efficiencies against accelerated ageing-induced injuries in *Cicer arietinum* seeds. Experimental results revealed various physiological and biochemical alterations due to accelerated ageing in seeds of *Cicer arietinum* including the over accumulation of reactive oxygen species and consequent decline in the expressions/ activities of key defensive genes. However, exogenous application of AgNPs provided tolerance against ageing-induced damages by compensating the cellular redox homeostasis via up-regulating the levels/ gene expression of antioxidants in *Cicer arietinum*.

✉ S. Keshavkant
skeshavkant@gmail.com

¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur 492 010, India

² School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur 492 010, India



Molecular strategies to enhance stability and catalysis of extremophile-derived α -amylase using computational biology

Nisha Gupta¹ · Esmil Beliya^{1,2} · Jai Shankar Paul¹ · Shubhra Tiwari¹ · Shriram Kunjam³ · Shailesh Kumar Jadhav¹

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Abstract

α -Amylase is the most significant glycoside hydrolase having applications in various industries. It cleaves the α ,1–4 glucosidic linkages of polysaccharides like starch, glycogen to yield a small polymer of glucose in α -anomeric configuration. α -Amylase is produced by all the three domains of life but microorganisms are preferred sources for industrial-scale production due to several advantages. Enormous studies and research have been done in this field in the past few decades. Still, it is requisite to work on enzyme stability and catalysis, as it loses its functionality in extreme. As the enzyme loses its structural and catalytic property under extreme environmental conditions, it is mandatory to confer some potential strategies for enhancing enzyme behaviour in such conditions. This limitation of an enzyme can be overcome up to some extent by extremophiles. They serve as an excellent source of α -amylase with outstanding features. This review is an attempt to encapsulate some structure-based strategies for improving enzyme behaviour thereby enabling researchers to selectively amend any of the strategies as per requirement during upstream and downstream processing for higher enzyme yield and stability. Thus, it will provide some cutting-edge strategies for tailoring α -amylase producing organism and enzyme with the help of several computational biology tools.

Keywords α -Amylase · Computational biology · Extremophiles · Glycoside hydrolase · Structural insights

Introduction

Enzymes are the most vital bio-product needed for sustaining life on earth. In recent years, α -amylase has significantly replaced the chemical hydrolysis of starch in industries. α -Amylase (α -1,4-glucan 4-glucanohydrolase, EC 3.2.1.1) is an endo-acting hydrolyzing enzyme responsible for the breakdown of α ,1–4 glucosidic linkages of starch and other related polysaccharides to yield maltooligosaccharides,

glucose, and limit dextrin in an α -anomeric form (Machius et al. 1995; Yadav 2012; Al-Dhabi et al. 2020; Abd-Elaziz et al. 2020; Janeček and Zámocká 2020). The total contribution of α -amylases in the enzyme market is about 30% and hence occupies the second position after proteases (Wu et al. 2018; Allala et al. 2019; Wang et al. 2019a; Abd-Elaziz et al. 2020). It is synthesized by microorganisms, plants, and animals. But for large-scale production, microorganisms are generally selected. Microorganisms are preferred because they offer cheaper large-scale production, ease of genetic engineering approaches, enormous strain availability etc. (Abdel-Fattah et al. 2013; Abd-Elhalem et al. 2015; Afrisham et al. 2016). It is extensively used in several industries and plays a substantial role in them (Table 1).

Despite having lots of industrial applications there are certain shortcomings related to the use of α -amylase. They tend to drop their structural conformations, stability, and catalysis when allowed to work in extreme conditions (Ahmed et al. 2020). To overcome this sensitivity of α -amylase towards harsh conditions, researchers are seeking sources living in extreme environmental conditions. Extremophiles are the organism inhabiting such harsh environment

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Nisha Gupta, Esmil Beliya have contributed equally as first author.

✉ Jai Shankar Paul
jaishankar_paul@yahoo.com

¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur, CG 492010, India

² Department of Botany, Govt. College, Bichhua, Chhindwara, MP 480111, India

³ Department of Botany, Govt. VYPT PG Autonomous College, Durg, CG 491001, India



Aspects and Recent Trends in Microbial α -Amylase: a Review

Jai Shankar Paul¹ · Nisha Gupta¹ · Esmil Beliya^{1,2} · Shubhra Tiwari¹ ·
Shailesh Kumar Jadhav¹

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Abstract

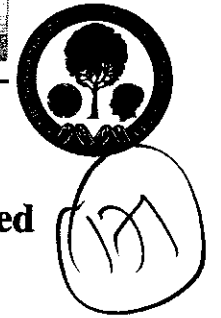
α -Amylases are the oldest and versatile starch hydrolysing enzymes which can replace chemical hydrolysis of starch in industries. It cleaves the α -(1,4)-D-glucosidic linkage of starch and other related polysaccharides to yield simple sugars like glucose, maltose and limit dextrin. α -Amylase covers about 30% shares of the total enzyme market. On account of their superior features, α -amylase is the most widely used among all the existing amylases for hydrolysis of polysaccharides. Endo-acting α -amylase of glycoside hydrolase family 13 is an extensively used biocatalyst and has various biotechnological applications like in starch processing, detergent, textile, paper and pharmaceutical industries. Apart from these, it has some novel applications including polymeric material for drug delivery, bioremediating agent, biodemulsifier and biofilm inhibitor. The present review will accomplish the research gap by providing the unexplored aspects of microbial α -amylase. It will allow the readers to know about the works that have already been done and the latest trends in this field. The manuscript has covered the latest immobilization techniques and the site-directed mutagenesis approaches which are readily being performed to confer the desirable property in wild-type α -amylases. Furthermore, it will state the inadequacies and the numerous obstacles coming in the way of its production during upstream and downstream steps and will also suggest some measures to obtain stable and industrial-grade α -amylase.

Keywords α -Amylase · Biocatalyst · Drug delivery · Glycoside hydrolases · Glycosidic linkage

Jai Shankar Paul and Nisha Gupta these authors contributed equally as first author.

✉ Shailesh Kumar Jadhav
jadhav9862@gmail.com

¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur, CG 492010, India
² Department of Botany, Govt. College, Bichhua, Chhindwara, MP 480111, India



Nanotechnology: an efficient approach for rejuvenation of aged seeds

Rasleen Kaur¹ · Jipsi Chandra¹ · S. Keshavkant¹

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Abstract Modern agricultural efforts are now in search of an efficient, eco-friendly and sustainable approach for enhanced crop production. Nearly 50–60% of seeds lost occurs due to improper technical handling. Seed deterioration manifests itself as reduction in the rate of germination and growth with increased susceptibility to biotic and abiotic stresses. Furthermore, seed ageing is another economic and scientific issue that is associated with an array of internal (structural, physiological and genetic) and external (storage temperature and relative humidity) factors. Reactive oxygen species (ROS) are believed to be a key player in ageing phenomenon. However, hydrated storage, or ROS blockers are a few of the conventionally used methods to minimize the ageing process. Recently, exogenous applications of different inorganic nanoparticles (metal and metal oxide) are suggested to revitalize and revive aged seeds. Owing to their special properties of nano-size with high surface area they easily penetrate the seed coat. Exposure of nanoparticles has been suggested to neutralize the excess of ROS to a level that initiates hormonal signaling to support early emergence of radicles from the seeds. Nanotechnology has been well explored to enhance the crops nutritional quality, livestock productivity, plant protection from various stressors and in enhancement of seed quality via nanopesticides and nanofertilizers. Aiming at sustainable agriculture practices with fewer inputs, maximum benefits, ecologically safe and compatible technique the nanotechnology is an efficient approach to counteract problems of seed ageing incurring during

storage, which is relatively less explored and unresolved conventionally, in general.

Keyword Ageing · Deteriorative reactions · Nanoparticles · Oxidative stress · ROS

Introduction

Seeds represent reproductive stage in the life cycle of plants. It is used as major planting material for the production of next season crop; therefore, high yield and, production of viable and vigorous seeds are necessary. Followed by harvesting, crop seeds are stored under ambient conditions for few weeks to years, depending upon requirement. Germination is the very first step to determine seeds viability and vigor, consequently growth in the soil for successful crop establishment (Panda and Mondal 2020). Seed vigor is an important determinant for rapid and homogeneous radicle emergence. Longevity determines the vigor index (VI) that depends upon seeds physiology, genetic makeup and pace of deterioration that prevails during storage (Zinsmeister et al. 2020). Additionally, numerous other factors regulating vigor of seeds, directly or indirectly, includes environmental temperature, relative humidity (RH), moisture and oil content, pathogen attack, mechanical damage, storage time, and gaseous exchange (Solberg et al. 2020).

Generation and accretion of reactive oxygen species (ROS) has widely been known as the key issues leading to seed deterioration during ambient storage (Chandra et al. 2018; Kurek et al. 2019). Inequity in growth hormones and enzymes, impaired metabolism, disturbed cellular membranes and cytoplasmic glassy state during storage is caused by over-produced ROS. These physiological

✉ S. Keshavkant
 skeshavkant@gmail.com

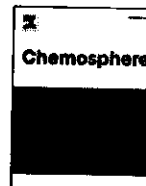
¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur 492010, India



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Mechanisms underlying the phytotoxicity and genotoxicity of aluminum and their alleviation strategies: A review

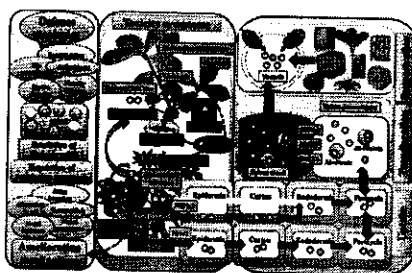
Jipsi Chandra, S. Keshavkant*

School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur, 492 010, India

HIGHLIGHTS

- Trivalent cationic form of Al is potential toxicants to plant in acidic environment.
- Al disturbs cell metabolism and redox homeostasis, leading to oxidative stress.
- Plants have various inherent defence strategies to circumvent Al toxicity.
- Modulation in gene expressions under Al stress is a key mechanism of its tolerance.
- Exogenously added elements and nanoparticles also act as toxicity ameliorant.

GRAPHICAL ABSTRACT



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ABSTRACT

Aluminum (Al) is considered as a potential limiting factor for plant growth in acidic environment. At lower concentration, Al promotes plant growth by facilitating the phosphorous availability, while, at higher concentration, it causes rhizotoxicity by inhibiting the nutrient transportation system. Cellular membrane is identified as the first site of Al toxicity, which is consequent to Al-induced reactive oxygen species prompted lipid catabolism. Among all the soluble forms, the trivalent cationic form (Al^{3+}) of Al is most toxic. Though, the ability to ascribe Al-tolerance is very complex, exclusion is an extensively established process contributing to Al^{3+} detoxification. Alteration in pH at root apex/rhizosphere, exudation of chelating agents, cell wall immobilization, and Al efflux have been recognized as probable methods for exclusion of Al, which is highly dependent on concentrations of organic acids, and plant species. Additionally, exogenous applications of boron, silicon, calcium, etc., in Al-stressed plant species can form a conjugate with it, thereby reducing its bioavailability/toxicity. Moreover, nanoparticles (NPs) are emerging tools in agricultural sector, which are found to be relatively more effective in mitigation of metal stress compared to their bulk materials. This review exhibits the fundamental approaches of Al phytotoxicity and endows with a comprehensive knowledge of the cellular and metabolic processes underlying toxic impacts along with ameliorative efficiencies of various potential agents including NPs. Additionally, it also elucidates the molecular mechanisms, future research prospects and challenges in effective alleviation mechanisms for enhancing plant Al-tolerance, to improve the growth and yields of susceptible-species on acidic soil.

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* Corresponding author.

E-mail address: skeshavkant@gmail.com (S. Keshavkant).



Vitrification-Based Cryopreservation of In Vitro-Grown Apical Meristems of *Chlorophytum borivilianum* Sant et Fernand: A Critically Endangered Species

Ravishankar Chauhan^{1,2} · Vikram Singh³ · S. Keshavkant¹ · Afaque Quraishi¹

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Abstract This article reports the cryopreservation of apical meristems of *Chlorophytum borivilianum*, a tropical and IUCN critically endangered species. Initially, in vitro cultured shoots were pre-adapted on 12% (w/v) sucrose for 2-months and were found appropriate stock material for further experimentations. Furthermore, the preculture of meristems excised from pre-adapted in vitro shoots on 12% (w/v) sucrose containing MS medium with 50 mg/l abscisic acid for 48 h, followed by treatment with loading solution (LS), and plant vitrification solution (PVS2) was found crucial for recovery following cryostorage. Thereafter, durations of exposure to the LS and PVS2 were optimized to enhance the regeneration efficiency of apical meristems. Treatment with LS for 20 min followed by 30 min exposure to PVS2 was standardized for the vitrification of the apical meristems before plunging them into liquid nitrogen. Moreover, after cryoexposure thawing was performed for 1 min at 38 °C ± 2 in a water-bath followed by the treatment with unloading solution for 10 min resulted in enhanced recovery up to 33% on 2 mg/l

6-benzyladenine (BA) and 0.2 mg/l α -naphthalene acetic acid containing MS medium.

Keywords Abscisic acid · Liquid nitrogen · PVS2 · Sucrose · Vitrification

Introduction

Chlorophytum borivilianum Sant et Fernand is a tropical and vegetatively propagated species. Its tuberous root contains steroidal saponins, which vary considerably among the genotypes and ranges between 2 and 17% of its dry weight [1]. A number of reports are there revealing the impact of this herb on diabetes, arthritis, rheumatism and its aphrodisiac potential [2, 3]. Huge commercial and pharmaceutical importance is one of the major causes of overexploitation of this species from its natural habitats [3]. Moreover, seed germination rate is very poor i.e., 8–16% only [4]. Therefore, it has been documented as a critically endangered herb in the Red List of the IUCN [5] and as a rare plant species by the Botanical Survey of India [6]. A number of literatures are available for in vitro propagation of this herb; however, conservation through cryopreservation was not attempted till now.

The conventional method of germplasm conservation includes maintenance of whole plants in the field [7]. Field maintenance of plant materials not only carries the risks of infections of viral, fungal, bacterial diseases and insect-pests, but also includes losses due to environmental disasters, which has led to the erosion of valuable germplasm resources [8]. The most appropriate method suggested for long-term ex situ conservation of any species is storage of their seeds. However, in the case of vegetatively propagated species or of species with low germination rate,

Significance Statement: For the cryopreservation of *Chlorophytum borivilianum* abscisic acid was found crucial that helps in freeze tolerance. Moreover, the exposure times to cryoprotectants were optimized which minimizes the toxicity and helps in regeneration of meristems.

✉ Afaque Quraishi
drafaque13@gmail.com

¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur 492 010, India

² National Center for Natural Resources, Pt. Ravishankar Shukla University, Raipur 492 010, India

³ School of Life Sciences, Pt. Ravishankar Shukla University, Raipur 492 010, India

211

Exploring Spectroscopic Insights into Molecular Recognition of Potential Anti-Alzheimer's Drugs within the Hydrophobic Pockets of β -Cycloamylose

Authors

Srishti Sharma^a, Manoj Kumar Banjare^b, Namrata Singh^{c,h}, Jan Korábečný^{d,e,f}, Zdeněk Fišar^g, Kamil Kuča^h, and Kallol K. Ghosh^{a,*}

Affiliations

^aSchool of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur-492010 (C.G.), India

^bMATS University, Pagaria Complex, Pandri, Raipur-492001 (C.G.), India

^cRamrao Adik Institute of Technology, DY Patil University, Nerul, Navi Mumbai, India

^dBiomedical Research Center, University Hospital Hradec Kralove, Sokolska 581, 500 05 Hradec Kralove, Czech Republic

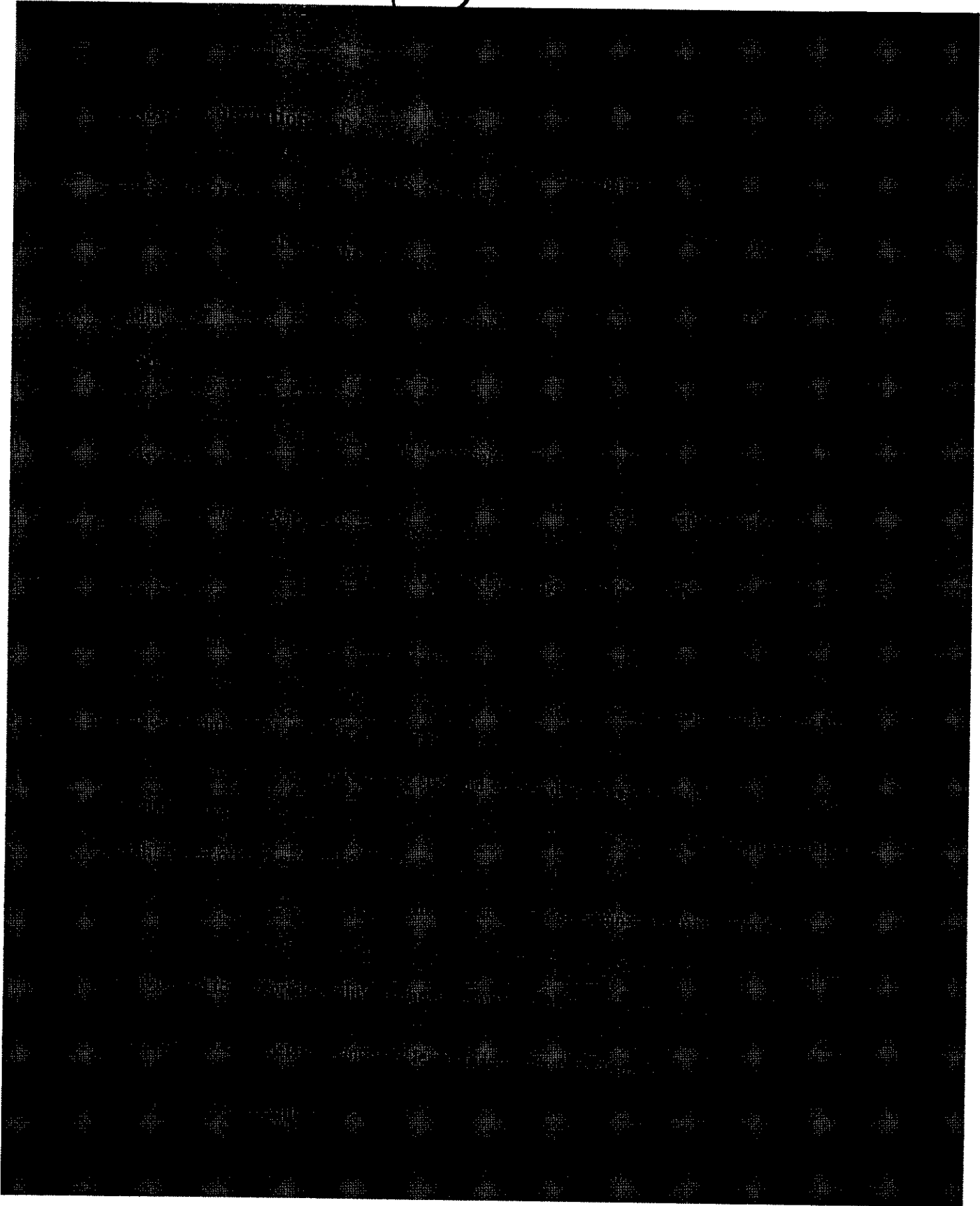
^eDepartment of Toxicology and Military Pharmacy, Faculty of Military Health Sciences, University of Defence, Trebesska 1575, 500 01 Hradec Kralove, Czech Republic

^fNational Institute of Mental Health, Topolova 748, 250 67 Klecany, Czech Republic

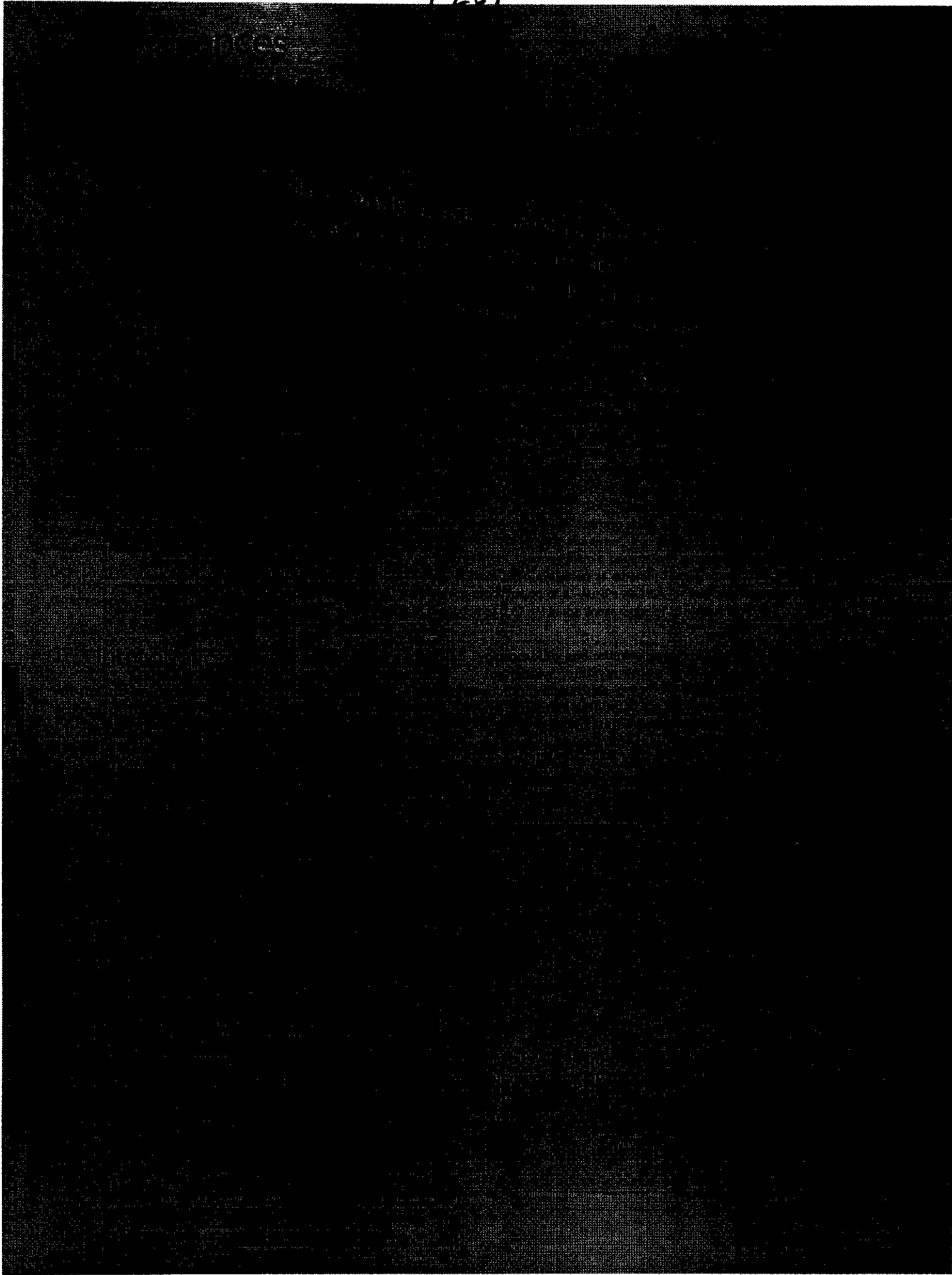
^gDepartment of Psychiatry, Charles University and General University Hospital in Prague, First Faculty of Medicine, KeKarlovu 11, 120 00 Prague 2, Czech Republic

^hDepartment of Chemistry, Faculty of Science, University of Hradec Kralove, Rokitanskeho 62, 50003 Hradec Kralove, Czech Republic

28



98



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Multi-spectroscopic monitoring of molecular interactions between an amino acid-functionalized ionic liquid and potential anti-Alzheimer's drugs†

Srishti Sharma,^a Manoj Kumar Banjare,^{ab} Namrata Singh,^{cf} Jan Korábečný,^{de} Kamil Kuča^{*df} and Kallol K. Ghosh^{†*a}

Inhibiting the formation of amyloid fibrils is a crucial step in the prevention of the human neurological disorder, Alzheimer's disease (AD). Ionic liquid (IL) mediated interactions are an expedient approach that exhibits inhibition effects on amyloid fibrils. In view of the beneficial role of ILs, in this work we have explored complexation of anti-Alzheimer's drugs (*i.e.*, tacrine and PC-37) and an amino acid-functionalized IL [AIL (4-PyC8)]. Maintaining standard physiological conditions, the binding mechanism, thermo-dynamical properties and binding parameters were studied by employing UV-vis, fluorescence, FTIR, ¹H NMR, COSY and NOESY spectroscopy. The present investigation uncovers the fact that the interaction of anti-Alzheimer's drugs with 4-PyC8 is mediated through H-bonding and van der Waals forces. The Benesi–Hildebrand relation was used to evaluate the binding affinity and PC-37 showed the highest binding when complexed with 4-PyC8. FTIR spectra showed absorption bands at 3527.98 cm⁻¹ and 3527.09 cm⁻¹ for the PC-37 + 4-PyC8 system which is quite promising compared to tacrine. ¹H-NMR experiments recorded deshielding for tacrine at relatively higher concentrations than PC-37. COSY investigations suggest that anti-Alzheimer's drugs after complexation with 4-PyC8 show a 1 : 1 ratio. The cross-peaks of the NOESY spectra involve correlations between anti-Alzheimer's drugs and AIL protons, indicating complexation between them. The observed results indicate that these complexes are expected to have a possible therapeutic role in reducing/inhibiting amyloid fibrils when incorporated into drug formulations.

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1. Introduction

In the last few decades, targeted drug delivery has become a crucial issue in the bio-medical field as it provides the undeniable advantage of minimizing the associated after-effects of

drugs like psychotic illness, overstimulation and other dysfunctions.^{1,2} Generally, drugs interact with surfactants, ionic liquids (ILs), cyclodextrins and other carriers to promote their controlled and specific delivery.^{3–5} Earlier ILs were recognized only as better alternatives to volatile organic solvents with superior properties.⁶ However, the better biodegradability and non-toxic profile of functionalized ILs have attracted biochemists, ecologists and medical scientists worldwide. Recent studies conducted on ILs with incorporated functional groups have proved their biological efficacy, inhibiting or enhancing enzyme activities.⁷ Garcia *et al.* have studied such biodegradable and amino acid-functionalized ILs (AILs), which possess a superior surface activity and a very low critical micelle concentration (CMC).⁸ Functionalization of ILs with amide groups leads to the elevation of their thermal stability and enhancement of their self-aggregation properties due to the elongation of the alkyl chain and escalated antimicrobial activity. Recently, our research group has reported the synthesis of a series of unique ILs derived from an amphiphilic pyridinium oxime moiety, which were examined on the grounds of biodegradability using a closed bottle test.⁹ In addition to the aforementioned interesting properties, reports also evidence ILs' remarkable inhibitory effects for amyloid fibrils (nearly

^aSchool of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur-492010, C.G., India. E-mail: kallolkghosh@gmail.com

^bMATS School of Sciences, MATS University, Pagaria Complex, Pandri, Raipur-492009, C.G., India

^cRamrao Adik Institute of Technology, DY Patil University, Nerul, Navi Mumbai, India

^dBiomedical Research Center, University Hospital Hradec Kralove, Sokolska 581, 500 05 Hradec Kralove, Czech Republic. E-mail: kamil.kuca@uhk.cz

^eDepartment of Toxicology and Military Pharmacy, Faculty of Military Health Sciences, University of Defence, Trebesska 1575, 500 01 Hradec Kralove, Czech Republic

^fDepartment of Chemistry, Faculty of Science, University of Hradec Kralove, Rokitanskeho 62, 50003 Hradec Kralove, Czech Republic

† Electronic supplementary information (ESI) available: Fig. S1: Absorbance spectra (A and C) and Benesi–Hildebrand plots (B and D) for the interaction of anti-Alzheimer's drugs (1.0 mM) (A and B) tacrine and (C and D) PC-37 in the presence of increasing concentrations of 4-PyC8 at physiological conditions. Fig. S2: Plots of log[(*I*₀ - *I*)/*I*] against log[4-PyC8], respectively, for (A) tacrine and (B) PC-37 at different concentrations of 4-PyC8 (0.1 mM) at pH 7.4 and 37 °C. Fig. S3: ¹H NMR spectra of the complexes of [A] PC-37 + 4-PyC8 and [B] tacrine + 4-PyC8. See DOI: 10.1039/d0ra06323a





25

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Atmospheric Pollution Research
Volume 11, Issue 7, July 2020, Pages 1127-1141

Influence of fireworks emission on aerosol aging process at lower troposphere and associated health risks in an urban region of eastern central India

Mithlesh Mahilang^a, Manas Kanti Deb^{a, R, B}, Jayant Nirmalkar^{a, b}, Shamsh Pervez^a

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<https://doi.org/10.1016/j.apr.2020.04.009>

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Highlights

- Size distribution of metals shows significant enhancement loading in 0.43–1.1 μ m size range during DDP.
- Potential penetration of metal aerosols into human respiratory system and possible health problems are discussed.
- Fireworks derived metals were dominated during DDP while industrial and biomass burning were high during other events.
- Significant coarse mode loading observed indicates mineral dust as significant contributor towards aerosols.

FEEDBACK

<https://www.sciencedirect.com/science/article/abs/pii/S1309104220300945?via%3Dihub>

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Environmental Research
Volume 195, April 2021, 110802

Biogenic secondary organic aerosol formation in an urban area of eastern central India: Seasonal variation, size distribution and source characterization

Mithlesh Mahilang ^a, Manas Kanti Deb ^a & Shamsheer Pervez ^a, Swapnil Tiwari ^a, Vikas Kumar Jain ^b

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Highlights

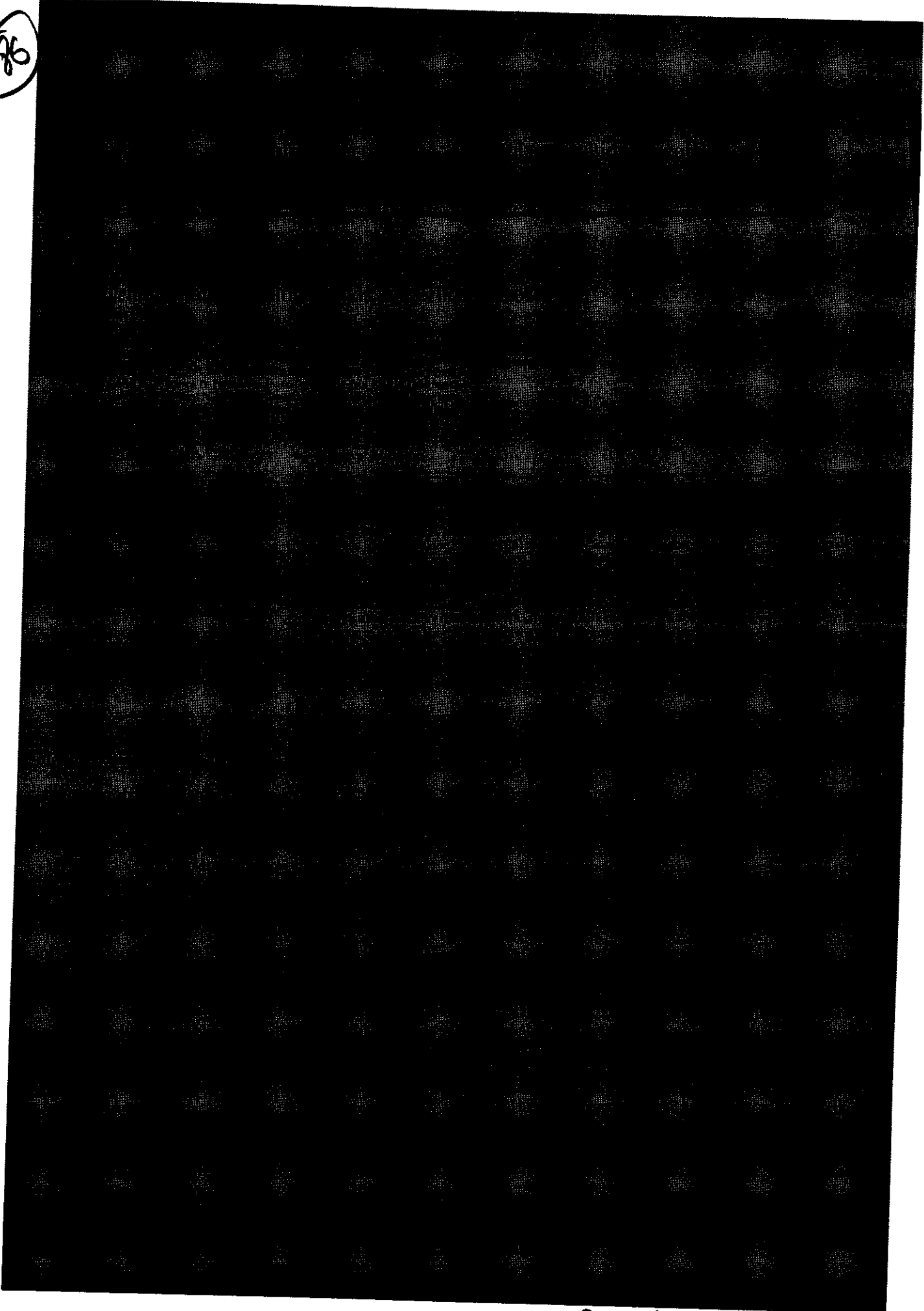
- Size distribution and seasonal variation of biogenic SOA was studied.
- Sources of biogenic SOA were identified.
- Enhanced BSOA effect due to NO₂ and SO₂ were found.
- The bimodal size distribution is obtained for most of the BSOA tracers.
- The cis-pinonic acid was found to be enriched in the coarse mode, due to its volatile nature.

FEEDBACK

84

85

96



Cite this: *RSC Adv.*, 2020, 10, 24190

CdTe QD-based inhibition and reactivation assay of acetylcholinesterase for the detection of organophosphorus pesticides†

 Jyoti Korram,^a Lakshita Dewangan,^a Indrapal Karbhal,^a Rekha Nagwanshi,^b Sandeep K. Vaishnav,^{ac} Kallol K. Ghosh^{ab} and Manmohan L. Satnami^{ab*}

An enzyme immobilized glutathione (GSH)-capped CdTe quantum dot (QD)-based fluorescence assay has been developed for monitoring organophosphate pesticides. In principle, GSH-capped CdTe QDs exhibit higher sensitivity towards H₂O₂ produced from the active enzymatic reaction of acetylcholinesterase (AChE) and choline oxidase (ChOx), which results in the fluorescence (FL) "turn-off" of the GSH-capped CdTe QDs. A "turn-on" FL of the CdTe QDs at 520 nm was recovered in the presence of organophosphate (OP). The FL changes of the GSH-capped CdTe QD/AChE/ChOx biosensor reasonably correspond to the amount of OP pesticides. The detection limit of the CdTe/AChE/ChOx biosensor towards paraoxon, dichlorvos, malathion and triazophos was 1.62 × 10⁻¹⁵ M, 75.3 × 10⁻¹⁵ M, 0.23 × 10⁻⁹ M and 10.6 × 10⁻¹² M, respectively. The GSH-capped CdTe QDs/AChE/ChOx biosensor was applied as a FL nanoprobe for assaying the enzymatic activity of AChE. The inhibited AChE was reactivated up to 94% using pyridine oximate (2-PyOx⁻), and functionalized pyridinium oximates (4-C₁₂PyOx⁻ and 4-C₁₈PyOx⁻) of varying chain lengths. It was found that the reactivation potency of the tested oximes varied with the chain length of the oximes. This biosensing system offers the promising benefit for the determination of the OP pesticides in food, water and environmental samples.

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Introduction

In the current scenario, the determination of acetylcholinesterase (AChE) activity is of paramount importance due to pharmacological and toxicological concerns.¹ AChE is the major enzyme that hydrolyzes acetylcholine, a key neurotransmitter for synaptic transmission, into acetic acid and choline. Mild inhibition has been shown to have therapeutic relevance in Alzheimer's disease (AD), myasthenia gravis, and glaucoma among others.^{2,3} In contrast, the strong inhibition of AChE can lead to cholinergic poisoning.⁴ To combat this, AChE reactivators have been developed to remove the offending AChE inhibitors, restoring acetylcholine levels to normal.^{5,6} It is really challenging to design a nanoprobe for monitoring AChE activity in the presence of reversible (carbamate, acridine) and irreversible (organophosphorus) inhibitors. The probe reported thus far can determine the inhibition⁷ of AChE, and is limited to

monitoring percentage reactivation of organophosphorus-inhibited enzyme.

With high sensitivity and simplification, fluorescence-based sensors have been widely applied as one of the most commonly used sensing candidates for environmental monitoring,⁸ food safety⁹ and quality control.¹⁰ Quite recently, many optical^{11–13} and electrochemical^{14–16} methods/biosensors have been applied to determine pesticide residues in food samples. Various kinds of materials have been widely employed for the fabrication of a fluorescence (FL) sensing platform, including fluorescent dyes,¹⁷ semiconductor nanomaterials,¹⁸ metal nanomaterials,^{19,20} carbon quantum dots (CQD),²¹ and rare earth materials.²² It is also very critical to design a proper recognition unit that can be combined with the FL probe for responding to the fluorescent "turn-off", "turn-on", or "ratiometric" signal. Carbon quantum dots have been extensively investigated for probing AChE and the detection of organophosphorus (OP) pesticides.^{23–25} We have developed a FRET-based CQD–AuNP system for the detection of pesticides, along with monitoring the inhibition and reactivation of AChE.²⁶

Biosensors based on CdTe QDs have been developed due to their unique electronic and optical properties, such as their broad absorption spectra, narrow and symmetric emission bands, less environmental sensitivity, and high quantum yield.^{27–32} These advantages of the CdTe QDs in the narrow emission band have enabled the sensitive detection of trace

^aSchool of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, 492010, India

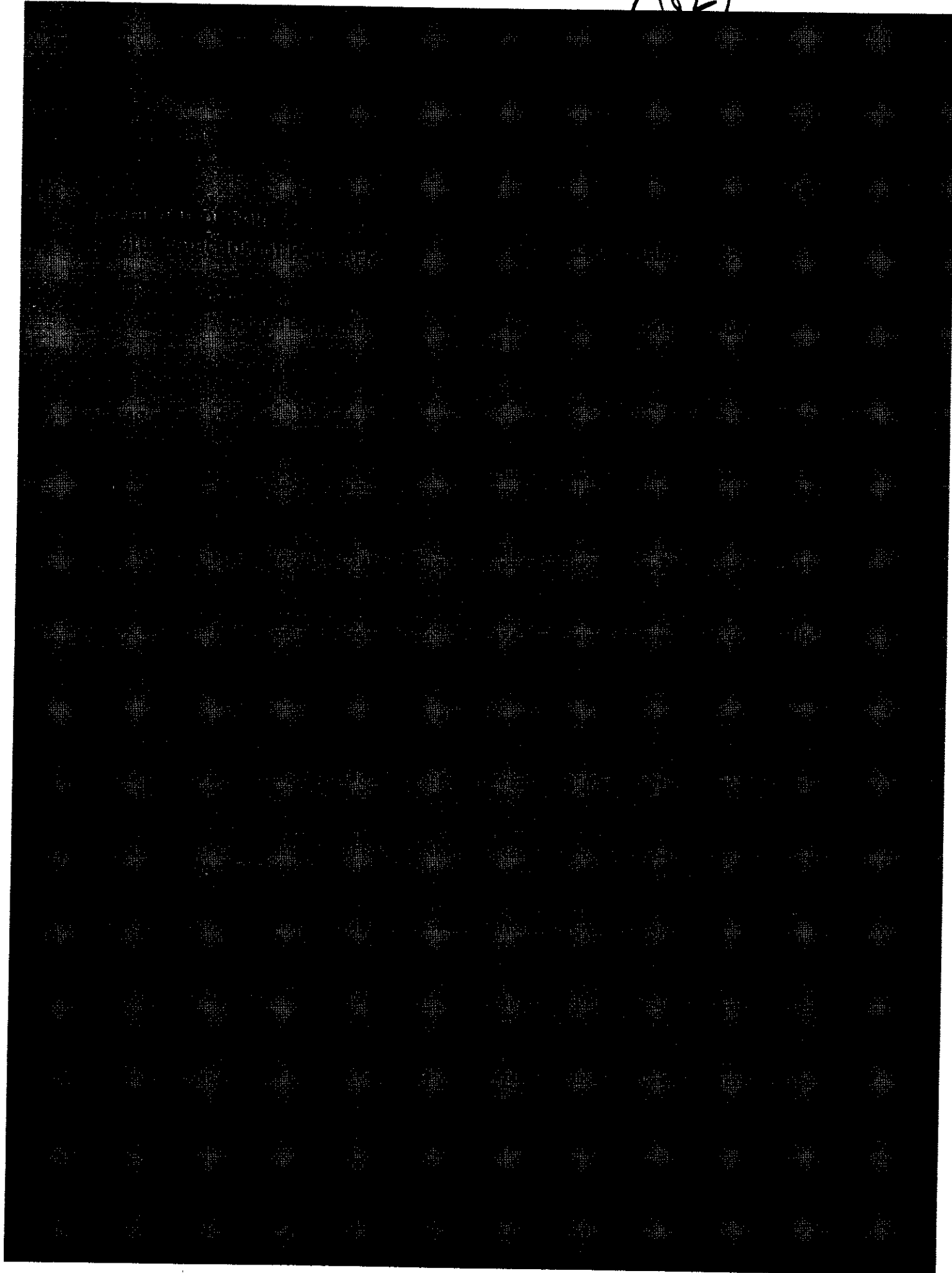
^bDepartment of Chemistry, Govt. Madhav Science P. G. College, Ujjain, Madhya Pradesh, 456010, India

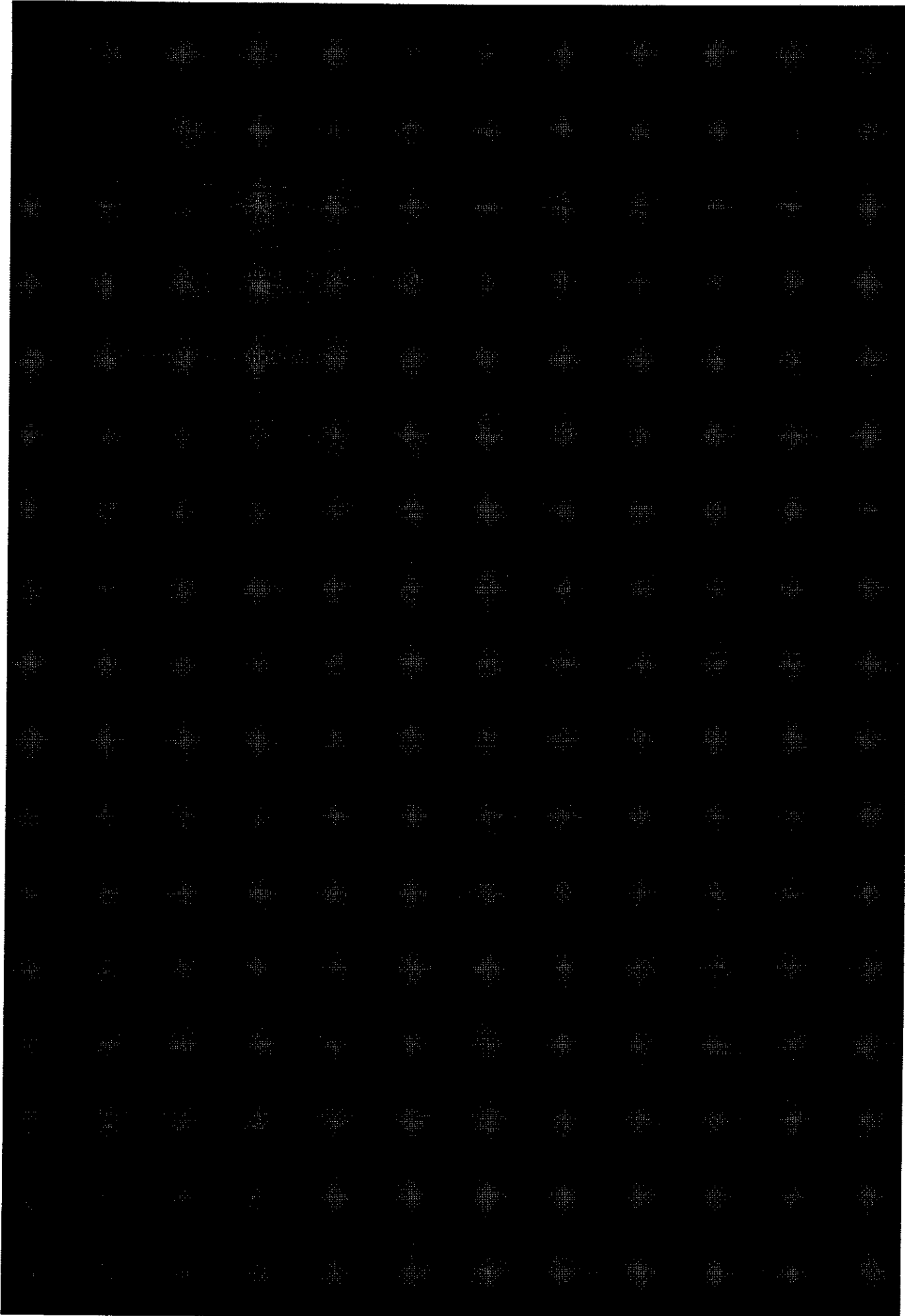
^cState Forensic Science Laboratory, Raipur, Chhattisgarh, 492010, India. E-mail: manmohanchem@gmail.com

† Electronic supplementary information (ESI) available: Data relating to the optical properties, fluorescence lifetimes, and reactivation of AChE are available. See DOI: 10.1039/d0ra03055d



(702)







Amelioration of Ageing Associated Alterations and Oxidative Inequity in Seeds of *Cicer arietinum* by Silver Nanoparticles

Jeabunnisha Khan¹ · Jipsi Chandra¹ · Roseline Xalxo¹ · Jyoti Korram² · Manmohan L. Satnami² · S. Keshavkant¹

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Abstract

Metal-based nanoparticles (NPs) have recently been accomplished a great attention worldwide, in various sectors including agriculture due to their beneficial impacts in plant growth, development and stress tolerance. However, it shows dose-dependent response and may vary with type of metal and synthesis procedure followed. Among many, silver nanoparticles (AgNPs) are most frequently used NP in agricultural sector. In the present study, AgNPs were synthesized following both green (gAgNP) and chemical (cAgNP) synthesis processes, characterized by standard methods and were applied to artificially aged *Cicer arietinum* seeds. Initial characterization of synthesized NPs was done by UV–Visible spectroscopy, and concentrations were calculated as 2.7 nmol for gAgNP, while, 5.8 nmol for cAgNP. Furthermore, the presence of different functional groups in synthesized AgNPs was evaluated by fourier transform infrared spectroscopy (1000 and 4000 cm^{-1}). However, the particle size of synthesized AgNPs was estimated by dynamic light scattering/ zetasizer (90–120 nm) and transmission electron microscopy (15–60 nm). Synthesized NPs were then assessed for their ameliorative efficiencies against accelerated ageing-induced injuries in *Cicer arietinum* seeds. Experimental results revealed various physiological and biochemical alterations due to accelerated ageing in seeds of *Cicer arietinum* including the over accumulation of reactive oxygen species and consequent decline in the expressions/ activities of key defensive genes. However, exogenous application of AgNPs provided tolerance against ageing-induced damages by compensating the cellular redox homeostasis via up-regulating the levels/ gene expression of antioxidants in *Cicer arietinum*.

✉ S. Keshavkant
skeshavkant@gmail.com

¹ School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur 492 010, India

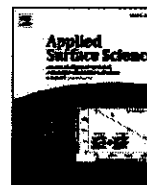
² School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur 492 010, India

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118



Applied Surface Science

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Full Length Article

Architecture of NaFe(MoO₄)₂ as a novel anode material for rechargeable lithium and sodium ion batteriesAsiya M. Tamboli^{a,b,1}, Mohaseen S. Tamboli^{a,b,1}, C.S. Praveen^c, Pravin Kumari Dwivedi^d, Indrapal Karbhal^d, Suresh W. Gosavi^e, Manjusha V. Shelke^d, Bharat B. Kale^{a,*}^a Centre for Materials for Electronics Technology (C-MET), Ministry of Electronics and Information Technology (MeitY), Government of India, Off Pashan Road, Panchawati, Pune 411008, India^b School of Chemical Engineering, Yeungnam University, 280 Daehak-ro, Gyeongsan 38541, Republic of Korea^c International School of Photonics, Cochin University of Science and Technology, University Road, South Kalamassery, Kalamassery, Ernakulam, Kerala 682022, India^d National Chemical Laboratory (NCL), Dr. Homi Bhabha Road, Pashan, Pune 411008, India^e Department of Physics, Savitribai Phule Pune University, Pune 411007, India

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ABSTRACT

In recent decades, particular focus has been given to enhance the capacity of LIBs and SIBs either by developing new materials or by modifying existing materials. Hence, we have demonstrated a new anode material i.e. sodium iron molybdate [NaFe(MoO₄)₂] for both LIBs and SIBs. NaFe(MoO₄)₂ has been successfully synthesized by solid-state combustion technique and tested as a promising new anode material for both LIBs and SIBs. A detailed analysis of the crystal structure has been performed using DFT calculations. NaFe(MoO₄)₂ crystallizes in the monoclinic phase with the space group C2/c (#15). FESEM also shows highly crystalline monoclinic shaped crystals of micron size. When evaluated as an anode material for LIBs, NaFe(MoO₄)₂ electrode exhibited electrochemical capacity of 920 mAhg⁻¹ in the second cycle at the current density of 50 mA g⁻¹. Though capacity decreases on further cycling, the coulombic efficiency was maintained at 99% for 50 cycles. Significantly, a high discharge capacity of 100 mAhg⁻¹ was maintained at a very high rate of 1 Ag⁻¹. On the other hand, we have also tested NaFe(MoO₄)₂ for SIBs which shows excellent reversible specific capacity i.e. 100 mAhg⁻¹ at the current density of 100 mA g⁻¹ even after 500 cycles. This novel system has shown good stability for LIBs and SIBs which is hitherto unattempted.

1. Introduction

Considering the anticipated future energy demands and environmental impacts, it is imperative to search for efficient, renewable, and sustainable solutions to circumvent these challenges. Attempts to develop low cost, environmentally friendly energy storage systems with high energy capacity is a topic of relentless research for the past two decades [1–3]. Amidst various promising energy storage systems, lithium-ion batteries (LIBs) stands out as a good contender for green energy storage owing to its advanced energy storage, long lifespan, and environmental friendliness [4–6]. However, natural lithium sources are very limited to compete with the rapidly developing electronics market demands. Notably, lithium and sodium have similar electrochemical properties. Hence, alternatively, Sodium-ion batteries (SIBs) attracted

huge interest, thanks to their low cost and the natural availability of sodium in the earth crust. In commercial LIBs, conventional graphite has been used as anode material since it has the advantages of relatively low cost, high energy and power density as well as very long cycle life. Unfortunately, graphite has some limitations in charge performance and operational safety, and that remain as a concern for their use in next-generation batteries [7]. Hence, developing alternative anode materials with high energy density and prolonged cyclic stability are very crucial. Even though, a lot of improvements have been made in embryonic new anode materials for LIBs, severe capacity fading, lower practical specific capacity, and high cost of these materials impede the improvement of LIBs. In this context, new generation metal oxides are considered to be potential candidates in terms of their higher energy density, rate capability as well as long term cyclic stability over graphite

* Corresponding author.

E-mail address: bbkale@cmet.gov.in (B.B. Kale).¹ These authors contributed equally.



Research Article

Laser patterning of boron carbon nitride electrodes for flexible micro-supercapacitor with remarkable electrochemical stability/capacity

Indrapal Karbhal^{a,b}, Aniruddha Basu^c, Apurva Patrike^{a,b}, Manjusha V. Shelke^{a,b,*}^a Physical & Materials Chemistry Division, CSIR-National Chemical Laboratory (CSIR-NCL), Dr. Homi Bhabha Road, Pune, 411008, India^b Academy of Scientific and Innovative Research (ASIR), Ghaziabad 201002, UP, India^c Department of Physics and Centre for Energy Science, Indian Institute of Science Education and Research (IISER), Dr. Homi Bhabha Road, Pune, 411008, India

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ABSTRACT

High performance, all solid-state planar micro-supercapacitor (MSC) with interdigitated Boron carbon Nitride (BCN) electrodes are fabricated via fast, scalable laser patterning technique. Hierarchical doping strategy enhances the electrochemical activity of carbon electrodes. This BCN based micro-supercapacitor showed comparatively very high specific capacitance of 72 $\mu\text{F cm}^{-2}$ at a current density of 0.15 mA cm^{-2} . Even at a high current density of 1 mA cm^{-2} device showed specific capacitance as high as 17 $\mu\text{F cm}^{-2}$. It has demonstrated excellent electrochemical stability when tested up to 5000 cycles without any sign of further decay in capacity/efficiency. This device showed stable capacity even after bending at 150° angle, for 1500 times during cycling showing remarkable flexibility.

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1. Introduction

Several technologies demand miniaturized and wearable electronic devices and consistent progress is observed in the development of flexible microelectronics. Consequently smaller, portable energy storage units are required to power microelectronic systems like self-powered medical implants, sensors etc [1]. In that context, lightweight, flexible, portable energy storage or conversion devices such as batteries, fuel cells and supercapacitors are seen to be essential for continuous technological advancement [2]. Commercialization of microbatteries/thin-film batteries is already realized and expanding its market rapidly [3]. However, batteries cannot deliver power quickly as required for some devices and their lifetime is comparatively shorter. Alternatively, supercapacitors (SCs) can be charged and discharged within seconds. SCs are quite stable for several years, undergo millions of charging-discharging cycles without losing specific capacity substantially [4]. Therefore,

development of flexible, wearable, stretchable, transparent MSC devices has seen rapid progress [5–8]. They can be either carbon based EDLC (Electrochemical double-layer capacitance) type; reversible redox reaction based pseudocapacitors type or a hybrid of both mechanisms.

Typically, an EDLC electrode is made up of large surface area carbons like activated carbon, graphene, carbon nanotubes and porous carbon etc. and charge is stored by adsorption/desorption of electrolyte ions on the surface of electrode material without Faradaic charge transfer. Though they can be charged and discharged very fast displaying high power density and extraordinary stability, they have comparatively lower energy density. Metal oxides (NiO , MnO_2 , Co_3O_4 , NiO etc.) and conducting polymers (polyaniline, polypyrrole, polythiophene etc.) are typical pseudocapacitive electrode materials that store charges by fast and reversible redox reactions on its surface [9]. Compared to EDLC carbons, pseudocapacitive materials have higher energy densities but are limited by intrinsic structural instability and subsequent poor cycle life [10–12]. Additionally, low electrical conductivity and structural rigidity make them less desirable for flexible devices. Therefore, hybrid electrodes are being explored in flexible MSCs to achieve both: mechanical stability and higher energy density. Another effective way to increase energy density of carbons itself is to dope

* Corresponding author. Physical & Materials Chemistry Division, CSIR-National Chemical Laboratory (CSIR-NCL), Dr. Homi Bhabha Road, Pune, 411008, India.

E-mail address: mvsheike@ncl.res.in (M.V. Shelke).

Security Issues on Cloud Based Internet of Things

Jyoti Sharma¹, Surendra Kumar Patel², V.K. Patle³

¹Ph.D. Research Scholar SoS in Computer Science & IT Pt. Ravishankar shukla university, Raipur, Chhattisgarh, India

²Assistant Professor Dept. of Information Technology Govt. Nagarjuna P.G. College of Science, Raipur, Chhattisgarh, India

³Assistant Professor SoS in Computer Science & IT Pt. Ravishankar shukla University Raipur, Chhattisgarh, India
Email: jyotisharma3081@gmail.com, surendrapatelit2004@gmail.com, patlevinod@gmail.com

Abstract: Cloud computing is the modern technology of using a network of remote servers hosted on the Internet to store, manage and process data instead of a local server or personal computer. IoT, on the other hand, is an Internet network of physical devices incorporated with electronics, software, sensors and data exchange. In the past, only cell phones and computers were connected to the Internet, but with the advent of new technologies in the new era, other things like security cameras, microwaves, cars and industrial equipment are now connected to the Internet. This network of things is called the Internet of Things. The main objective of interaction and cooperation between things and objects sent over wireless networks is the fixed objective as a combined entity. The IOT enables billions of applications, people and services to connect with others and exchange information. Due to the accumulated use of IOT devices, IOT networks are subject to various security attacks. The dissemination of effective security and privacy protocols over IOT networks is extremely necessary to ensure confidentiality, authentication, access control and integrity, among others. This research present a study of IOT and cloud computing with an emphasis on the security issues of the two technologies. More precisely, we combine two technologies (i.e., cloud computing and IOT) and present the contribution of cloud computing to IOT technology. Finally, we look at the security challenges of integrating IOT and cloud computing.

Keywords: Cloud Computing, Threats, Security Attacks, Internet of Things.

1. Introduction:

IOT is the phenomenon that connects a variety of things. The Internet of Things allows people and things to connect anytime, anywhere, with anything and anyone, ideally using any path / network and any service. Internet technology that connects devices, machines and tools to the Internet means wireless technologies. More than 9 billion things connected to the Internet. So the Internet of Things is about networks of integrated physical objects. The term Internet of Things (IOT), also known as the Internet of Things, refers to the network interconnection of everyday objects [2].

Today, the human race depends entirely on the information provided on the Internet, which is captured when taking photos or through human participation, i.e. people have limited time and less accuracy, which leads to incorrect and inconsistent data. . Therefore, such a system is needed that can automatically acquire the data and transfer it to the Internet without human interaction with the mechanism.

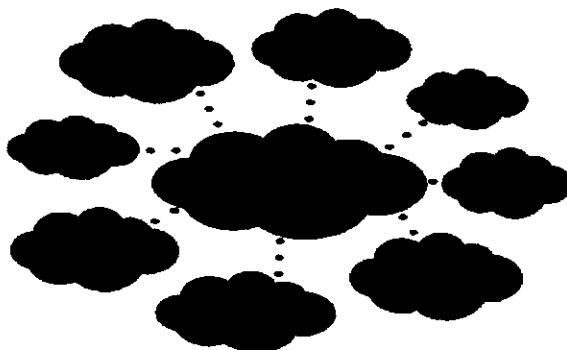


Fig.1 Cloud Computing [4]

The term Cloud refers to a network or the Internet, on the other hand, Cloud Computing refers to the manipulation, and configuration and access to online applications offers online storage, infrastructure and application of data. Cloud computing is the outsourcing of data storage and processing. Information hosted by a user resides in the global data center network rather than on a local server. It is a subscription service where the user has to pay



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Abstract: Nowadays, Multicore processor is a single processor which contains number of cores on a chip. The cores are functional units made up of computation units and caches. Mult... **View more**

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Abstract:

Nowadays, Multicore processor is a single processor which contains number of cores on a chip. The cores are functional units made up of computation units and caches. Multicore processors have used in various organizations for process their applications such a Database servers, Web servers (Ecommerce), Compilers and Scientific applications, CAD/CAM. Therefore, fast processing of multicore processors is needed. In this paper we study and analyzed the cache associativity which improves the performance of multicore processors. Experiment is performed on Multi2Sim with quad core processor, split L1 (Instruction and Data) and shared L2 caches.

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REVIEW ARTICLE

Security Issue in IoT Based Architecture for Health Care System

Manisha Chandrakar, V. K. Patle

¹School of Studies in Computer Science & IT, Pt. Ravishankar Shukla University Raipur

²School of Studies in Computer Science & IT, Pt. Ravishankar Shukla University Raipur

*Corresponding Author E-mail: Manishachandrakar00@gmail.com, patlevinod@gmail.com

ABSTRACT:

Internet of Things provides the mixing of various physical objects which communicate together automatically with intelligence. Nowadays, these IoT objects are connected through internet to supply services in various field like smart home, smart cities, smart transportation, smart healthcare etc. Health care and IoT are complimenting one another and it faces major challenging issues as compare to traditional scenario. IoT architecture-based Health care system uses smart equipment, smart sensors that track physical body in each fraction of seconds which is useful for human to watch and analyze health. Security issues and avoidance has become very significant research topic within the area of Internet of Things enables healthcare services. This paper study various IoT enabled health care services and also provides existing security issues within the IoT architecture.

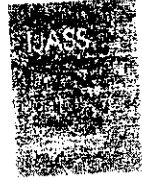
KEYWORDS: IoT, Health Care System, Security Issue, IoT Architecture.

I. INTRODUCTION:

IoT is nothing but it's a system of interrelated computing devices which are connected through internet. IoT is inclined for brand spanking new time it'll legitimately affect business by delivering IoT gadgets and its parts. IoT provide very attractive and straight forward to use application for health care. Presently everyday citizens are likewise utilizing healthcare services gadgets for observing health like smart watches. IoT devices are capable to supply more accurate result by monitor data which makes it widely and really useful. IoT can make it possible to offer much medical application for critical disease with accuracy. IoT health care devices also useful for those that want to watch their health reception. Even now there are several IoT devices which is employed by healthcare system. IoT devices are expected to scale back the value of health care or health treatment and improve the treatment experience.

From previous couple of year IoT in health attracts to researcher. There are such a big number of sensor accessible in human services which makes IoT gadgets simple to execute and straightforward to regulate. People are attracting to practical in new ways with new ideas for various disease detection or monitoring system. The sensor gadgets in Internet of things innovation can get data of urban region in time without labor watch. The technology of Internet of things is formed from a spread of data sensing devices, like frequency identification devices, sensor nodes, GPS, laser scanner, embedded communication module, camera then on. the knowledge obtained from the physical world is transmitted to the centralized information science and application platform through the transmission of the communication network. During this way, the web of things innovation can understand multi-source incorporation of sign insight and movie video knowledge in urban condition.

Security is very important in health care system. To maintain privacy and integrity is to be main aim before developing any kind of technology especially when it is about a person's personal issues are there. Health care industry continuously growing with new technologies and improving day by day. This change makes it very useful and reliable also it is cost effective but medical data is sensitive and vulnerable data in which security is very important for it[1].

**RESEARCH ARTICLE****भारतीय अर्थव्यवस्था और आत्मनिर्भर भारत**अर्चना सेठी¹, बी एल सोनेकर²¹सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पंडित रविशंकर शुक्ला विश्वविद्यालय, रायपुर.²सहप्राध्यापक, अर्थशास्त्र अध्ययनशाला, पंडित रविशंकर शुक्ला विश्वविद्यालय, रायपुर.

*Corresponding Author E-mail:

ABSTRACT:

भारत एक साथ कई मोर्चे पर चुनौतियों का सामना कर रहा है। शासन कोरोना वायरस संक्रमण को रोकने तथा लाकडाउन के चलते सुस्त हुई अर्थव्यवस्था को पटरी पर लाने और सीमा पर चीन के दबाव को समाप्त करने का प्रयास कर रहा है। वास्तव में लाकडाउन के बाद की स्थिति और चीन सेन्य तनाव से उपजे हालात को भारत एक अवसर के रूप में देख रहा है आत्मनिर्भर भारत एक ऐसा भारत जो हर क्षेत्र में अपनी स्वयं की योग्यता और क्षमता रखता है। केंद्र सरकार ने भी मनरेगा का बजट 60 हजार करोड़ से बढ़ाकर 1 लाख करोड़ कर दिया है लेकिन इतना पर्याप्त नहीं है अतः भारत शासन ने 20 करोड़ रु की आर्थिक पैकेज की घोषणा दिहाड़ी मजदूरों छोटे किसान एवं मध्यम वर्ग के लिए की है। साथ ही कुटीर उद्योग लघु उद्योग और स्टार्टअप को मजबूती मिले ज्यादा से ज्यादा रोजगार सृजन हो एवं भारतीय अर्थव्यवस्था मजबूत हो सके। इसके साथ ही साथ लोगों में vocal for local, Make in India, स्वदेशी अपनाना और चीनी उत्पादन का बहिष्कार करना आदि अभियान भारतीय अर्थव्यवस्था को मजबूती प्रदान कर रहा है। अब शासन के साथसाथ आमजनता को भी मेक इन इंडिया को अपना पसंदीदा ब्रांड बनाना होगा। पूर्ति पक्ष में सुधार के साथ ही मांग में वृद्धि के लिए आवश्यक है शासन नगद हस्तांतरण करे जिससे आय बड़े एवं मांग उत्पन्न हो।

KEYWORDS: आत्मनिर्भर भारत, मेक इन इंडिया, वोकल फार लोकल।**प्रस्तावना**

आपदा को एक अवसर के रूप में बदलने के लिए भारतीय प्रधानमंत्री माननीय नरेंद्र मोदी जी ने 12 मई 2020 को आत्मनिर्भर भारत की शुरुआत की है तथा 20 लाख करोड़ रु जो कि सकल घरेलू उत्पाद का 10 प्रतिशत है राहत पैकेज के रूप में देने की घोषणा की है ताकि भारतीय अर्थव्यवस्था आत्मनिर्भर बन सके। आर्थिक राहत पैकेज से सभी क्षेत्रों की गुणवत्ता बढ़ेगी और दक्षता भी बढ़ेगी। आत्मनिर्भरता आत्मबल और आत्मविश्वास से आती है जिसे पूर्ण संकल्पशक्ति के साथ कार्य करके प्राप्त

किया जा सकता है। आत्मनिर्भर भारत बनाने के लिए 5 चीजें जरूरी हैं। इरादा, समावेशन, निवेश, बुनियादी ढांचा, नवोन्मेष। इस अभियान का उद्देश्य 130 करोड़ भारतवासियों को आत्मनिर्भर बनाना है। 1970 तक भारत और चीन दोनों की सकल घरेलू उत्पाद समान थी। उसके बाद चीन ने अपनी आर्थिक नीतियों में सुधार कर अपनी अर्थव्यवस्था को मजबूत कर लिया आज चीन हर क्षेत्र में निर्यात करता है। सन 1990 में चीन का विदेशी व्यापार में 3 प्रतिशत योगदान था जो वर्तमान में 25 प्रतिशत हो गया है और हम हर क्षेत्र में आयात पर निर्भर हैं। अमेरिका इतनी शक्तिशाली देश है क्यों कि वह हर क्षेत्र में निर्यात करता है।

कोरोना वायरस ने इतनी बुरी तरह से दुनिया को अपने शिकंजे में जकड़ा है कि उससे जल्द छुटकारा पाना कठिन लगता है। संक्रमण से बचाव के लिए अपनाए गए लाकडाउन ने दुनिया भर के देशों की कमर तोड़ दी है। इसमें सबसे अधिक नुकसान उन गरीबों को हुआ है जिनके दिन की शुरुआत ही रोजी रोटी के तलाश से होती थी। भारत में लाकडाउन एवं अब अनलाकडाउन के दौरान करोड़ों लोगों का रोजगार चला गया जो एक बहुत बड़ा संकट है। प्रवासी मजदूर लाखों की तादाद में अपने घर वापिस लौट चुके हैं। अपने स्तर पर राज्य सरकार उन्हें रोजगार देने की व्यवस्था कर रही है। उत्तरप्रदेश सरकार ने इसके लिए डाटा बैंक तैयार किया है। उन्हें उनके कौशल के अनुसार रोजगार देने की व्यवस्था की जा रही है। केंद्र सरकार ने भी मनरेगा का बजट 60 हजार करोड़ से बढ़ाकर 1 लाख करोड़ कर दिया है। लेकिन इतना पर्याप्त नहीं है अतः भारत शासन ने 20 करोड़ रु की आर्थिक पैकेज की घोषणा दिहाड़ी मजदूरों छोटे किसान एवं मध्यम वर्ग के लिए की है। 1.16 लाख करोड़ से प्रवासी मजदूरों को मुफ्त राशन देने की व्यवस्था की गई ताकि कोई भी भूखे पेट सोने के लिए विवश न हो। शासन ने पिछले 3 माह में 20 करोड़ गरीब परिवारों के जन धन खाते में 31 हजार जमा किए तथा 9 करोड़ से अधिक किसानों के बैंक खाते में 18 हजार करोड़ जमा किया गया। गावों में श्रमिकों को रोजगार देने के लिए प्रधानमंत्री गरीब कल्याण योजना तीव्र गति से प्रारंभ किया गया। इस पर शासन ने 1.75 लाख करोड़ रु का पैकेज दिया।

लाकडाउन के दौरान शासन की सर्वोच्च प्राथमिकता रही कि कोई भी व्यक्ति भूखा ना सोये।

प्रस्तुत अध्ययन का उद्देश्य आत्मनिर्भर भारत अभियान के उद्देश्य बताना उसके प्रति विश्वास जगाना एवं उपयुक्त सुझाव देना जिससे अर्थव्यवस्था में रोजगार एवं मांग उत्पन्न हो।

आत्म निर्भर भारत चुनौतियां और समाधान और शासकीय प्रयास

भारतीय अर्थव्यवस्था की बेरोजगारी एक बहुत बड़ी समस्या है। भारत में बेरोजगारी की दर मार्च 2020 में 7.75 प्रतिशत है और 25 प्रतिशत लोग गरीबी रेखा के नीचे आते हैं। भारत की जनसंख्या की 65 प्रतिशत अर्थात 100 करोड़ लोग 16 वर्ष से अधिक आयु के हैं। इनके समक्ष बेरोजगारी बड़ी समस्या है। कोविड -19 के दौरान देश में वोकल फार लोकल एवं आत्मनिर्भरता की बात कही गई इससे निश्चित रूप से निजी निवेश में वृद्धि होगी। आपदा को अवसर में बदलना आत्मनिर्भरता की पहचान बन गई है। जैसे पहले हमारे यहां PPE Kit नहीं बनता था तथा N-95 मास्क का निर्माण बहुत कम होता था। अब हमारे देश में 4.5 लाख PPE Kit एवं 3 लाख N-95 मास्क और वेंटिलेटर का उत्पादन प्रतिदिन हो रहा है। (सोलंकी) इसी प्रकार छत्तीसगढ़ की महिलाओं ने महुआ जिससे अल्कोहल बनता है जिसका उपयोग सेनीटाइजर बनाने में कर रोजगार सृजन किये। आत्मनिर्भर भारत की दिशा में एक कदम है। यह इस बात का उदाहरण है कि कैसे हमने आपदा को अवसर में बदला।

अभी कोरोना संक्रमण बढ़ रहा है संकट अभी टला नहीं है रेल बस के पहिए रफ्तार नहीं पकड़ पाए हैं उद्योग प्रारंभ तो हुआ है लेकिन सुस्ती ने उसकी गति थाम रखी है। जिसके कारण प्रधानमंत्री ने अन्न योजना का विस्तार नवंबर तक कर दिया है अर्थात 80 करोड़ लोगों को मुफ्त अन्न गरीब परिवार को प्रत्येक सदस्य के हिसाब से 5 किलो चावल या 5 किलो गेहूँ देने की योजना अब नवंबर तक चलेगी। प्रति परिवार 1 किलो चना भी मुफ्त दिया जाएगा। गरीब तबके के लिए यह एक बड़ी और सीधी राहत है। इसमें कुल 1.5 लाख करोड़ खर्च होगा। एक देश एक राशन कार्ड योजना से इस राहत को और

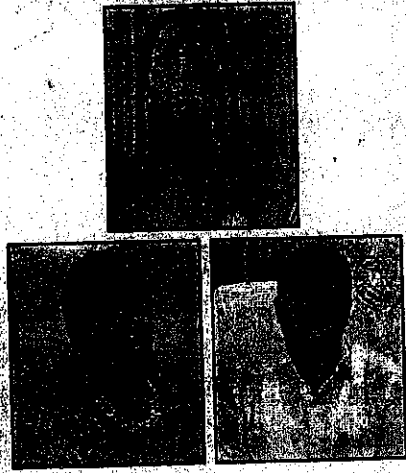
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तीसगढ़ राज्य के रायपुर शहर की मलिन बस्तियों में रसोई ईंधन का उपभोग

अर्चना सेठी, अर्थशास्त्र अध्ययनशाला,
प्रगति कृष्णन, शोधार्थी, अर्थशास्त्र अध्ययनशाला,
रविन्द्र ब्रह्म, अर्थशास्त्र अध्ययनशाला,
पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़, भारत

ORIGINAL ARTICLE



Corresponding Authors
अर्चना सेठी, अर्थशास्त्र अध्ययनशाला,
प्रगति कृष्णन, शोधार्थी, अर्थशास्त्र अध्ययनशाला,
रविन्द्र ब्रह्म, अर्थशास्त्र अध्ययनशाला,
पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर,
छत्तीसगढ़, भारत.
shodhsamagam1@gmail.com

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शोध सार

अच्छे स्वास्थ्य के लिए स्वच्छ ऊर्जा आवश्यक है। ऊर्जा सेवाओं की सस्ती और विश्वसनीय आधुनिक रूपों तक पहुंच में सुधार की आवश्यकता है जिससे विकासशील देशों में गरीबी को कम करने और आर्थिक विकास को बढ़ावा देने में सहायता होगी। महिलाओं की कार्यात्मक जरूरतों के अलावा खाना बनाने के लिए एवं आकांक्षित आवश्यकताओं की पूर्ति के लिए भी ऊर्जा अनिवार्य है। प्रस्तुत अध्ययन रायपुर शहर के 66 मलिन बस्तियों के 660 परिवारों के सर्वेक्षण से प्राप्त प्राथमिक समकों पर आधारित है। 61.66 प्रतिशत परिवार के पास पृथक से रसोई घर है प्रस्तुत शोध दर्शाता है कि आय स्तर एवं पृथक से रसोई घर है के मध्य धनात्मक सहसंबंध है। जैसे जैसे आय के स्तर में वृद्धि हो रही है पृथक से रसोई घर के प्रतिशत में वृद्धि हो रही है। साथ ही 50.75 प्रतिशत महिलाओं को स्वच्छ ईंधन उपभोग की जानकारी है, 57.88 प्रतिशत परिवार में रसोई घर में धुआं बाहर निकलने के लिए खिड़की है या धुआं बाहर निकलने की व्यवस्था है। कुल 50.76 प्रतिशत परिवारों में एक सिलेण्डर उपयोग होता है एवं कुल 49.24 प्रतिशत परिवारों में दो सिलेण्डर उपयोग होते हैं प्रस्तुत अध्ययन से यह स्पष्ट है कि रायपुर शहर के मलिन बस्ती के निदर्श सभी परिवारों में रसोई ईंधन के लिए एल पी जी गैस का उपभोग करते हैं। 76.81 प्रतिशत परिवार रसोई ईंधन के लिए केवल एल पी जी गैस का उपभोग करते हैं। एल पी जी गैस के अतिरिक्त बिजली, मिटटी तेल, उपला कंडे, कोयला एवं लकड़ी का भी उपभोग मलिन बस्तियों के परिवारों द्वारा किया जाता है। साथ ही जैसे जैसे आय बढ़ती जा रही है वैसे वैसे रसोई ईंधन हेतु प्रयुक्त सहायक ईंधन जैसे बिजली का उपभोग बढ़ता जा रहा है तथा ठोस ईंधन जैसे मिटटी तेल, उपला कंडे, कोयला, लकड़ी का उपभोग कम होता जा रहा है।

मुख्य शब्द

मलिन बस्ती, रसोई ईंधन, ऊर्जा।

आमार

ICSSR – IMPRESS के तहत लघु अनुसंधान परियोजना छत्तीसगढ़ की मलिन बस्तियों के परिवारों में ऊर्जा उपभोग की स्थिति का अध्ययन (रायपुर शहर के विशेष संदर्भ में) के लिए अनुदान प्राप्त हुआ है। प्रस्तुत अध्ययन लघु अनुसंधान परियोजना पर आधारित है।

प्रस्तावना

ऊर्जा अर्थव्यवस्था की चालक शक्ति के साथ-साथ आर्थिक विकास की कुंजी तथा सामाजिक और आर्थिक विकास के प्रमुख कारकों में से एक है (भण्डारी एवं पण्डित, 2018)। (मन्ना एवं तिमिलसिना, 2014) के अनुसार पिछले कुछ वर्षों से ऊर्जा की मांग में वृद्धि हुई है। ऊर्जा सेवाओं की सस्ती और विश्वसनीय आधुनिक रूपों तक पहुंच में सुधार की आवश्यकता है, जिससे विकासशील देशों में गरीबी को कम करने और आर्थिक विकास को बढ़ावा देने में सहायता होगी। 2011 तक लगभग 1.26 बिलियन लोगों के पास बिजली की पहुंच नहीं थी और 2.64 बिलियन लोग विकासशील देश में ग्रामीण क्षेत्र में मुख्य रूप से खाना पकाने के लिए पारंपरिक बायोमास ईंधन लकड़ी का कोयला गोबर और कृषि अवशेष पर भरोसा रखते थे (अंतरराष्ट्रीय ऊर्जा एजेंसी, 2013)। (इसरो एवं इकबोखोडे, 2014) ने स्पष्ट किया कि अच्छे स्वास्थ्य के लिए स्वच्छ ऊर्जा आवश्यक है। (कृष्णन एवं ब्रह्म, 2019) के अनुसार ग्रामीण क्षेत्र की महिलाओं में ऊर्जा और कल्याण के मध्य गहन संबंध है, साथ ही महिलाओं की कार्यात्मक जरूरतों के अलावा आकांक्षात्मक आवश्यकताओं की पूर्ति के लिए भी ऊर्जा अनिवार्य है। (बालनर, 2007) के अनुसार खाना बनाने के लिए ऊर्जा अनिवार्य है। इन्होंने बताया कि खाना बनाने के लिए ऊर्जा पर अनेक तत्व जैसे आय स्तर, गरीबी, शिक्षा आदि का प्रभाव पड़ता है।

भारतीय जनगणना 2011 के अनुसार मलिन बस्तियों के आवासीय क्षेत्र है जहाँ आवास, भीड़भाड़, गलियों की अव्यवस्था, संकीर्णता या दोषपूर्ण व्यवस्था, रोशनदान की कमी, प्रकाश या स्वच्छता सुविधाओं या किसी भी संयोजन के अभाव में मानव आवास के लिए अयोग्य है। (कुमार, 2014) ने इस बात पर प्रकाश डाला है कि तेजी से बढ़ते शहरीकरण के कारण एवं ग्रामीण क्षेत्र से होन वाले लगातार प्रवास के कारण मलिन बस्तियों का उदय होता है। छत्तीसगढ़ जनगणना 2011 के अनुसार रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 85.05 प्रतिशत लकड़ी 0.77 प्रतिशत फसल अवशेष 2.6 प्रतिशत गोबर के कंडे है। ग्रामीण क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 93.25 प्रतिशत लकड़ी 0.76 प्रतिशत फसल अवशेष 3.2 प्रतिशत गोबर के कंडे है। शहरी क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 52.28 प्रतिशत लकड़ी 0.84 प्रतिशत फसल अवशेष तथा 0.60 प्रतिशत गोबर के कंडे से प्राप्त है।

जब भी हम ऊर्जा नीति की चर्चा करते हैं तब हमारे मन में हजारों बड़ी तथा छोटी फैक्टरियां डीजल और बिजली से सिद्धाई के लिए पंपसेटों और ट्यूबवेलों का ध्यान आता है और ट्रकों बसों कारों मोटर साइकिलों और कटरों की ओर ध्यान जाता है। अतः हम वाणिज्यिक उद्देश्यों के लिए इस्तेमाल की जाने वाली ऊर्जा की बात करते हैं। हम यदा कदा ही ग्रामीण क्षेत्रों में खाना पकाने के लिए लकड़ी गोबर एवं व्यर्थ कृषि पदार्थों के बारे में सोचते हैं। वास्तव में भारत में कुल ऊर्जा के उपभोग का आधा भाग खाना पकाने के लिए होता है। अतः मानव के जीवन को बचाये रखने के लिए खाना पकाने के ऊर्जा का विशेष महत्व है परन्तु न ही देश के आर्थिक आयोजकों ने ही ऊर्जा आयोजकों ने मानव की सबसे अधिक अनिवार्य आवश्यकता को ठीक ढंग से समझा है।

देश की वर्तमान ऊर्जा नीति एक तरफी है। यह एक ओर तेल के अभाव और दूसरी ओर कोयला तथा पावर की कमी पर बल देती है। मुख्य सोच परिवहन और उद्यम की ओर केन्द्रित होती है जो शहरी क्षेत्र के मुख्य आय स्रोत से संबंधित होती है। राष्ट्रीय ऊर्जा नीति ने शहरी तथा ग्रामीण क्षेत्रों के गरीब लोगों की खाना पकाने के लिए ऊर्जा की आवश्यकता की उपेक्षा ही की है। चाहे कुछ प्रयास सोलर कुकर बायोगैस प्लांट और लकड़ी ईंधन के

66

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JUNI KHYAT जूनी ख्यात

इतिहास, कला एवं संस्कृति की शोध-पत्रिका



संपादक
डॉ. बी.एल. भादानी

3.	2002-03	2,70,170
4.	2003-04	3,51,588
5.	2004-05	5,33,815
6.	2005-06	6,82,194
7.	2006-07	7,83,949
8.	2007-08	8,52,170
9.	2008-09	9,45,588
10.	2009-10	10,46,767
11.	2010-11	12,23,457
12.	2011-12	14,18,490
13.	2012-13	15,85,646
14.	2013-14	18,03,706
15.	2014-15	19,36,470

Source : Economic Survey of Chhattisgarh, 2015-16.

benefitted and also their financial burden would be reduced. For the year 2014-15 electrification targets of 21,000 pumps for the purpose of agriculture is fixed by the state on the banks of major rivers.

On 2nd October 2000 the krishak Jeevan Jyoti scheme has been launched by the state Government with the aim of providing financial relief to the farmers. Under this scheme facility of free electricity supply of 6000 unit per year and 7500 unit per year on agricultural pumps of capacity up to 3 HP and more than 3 HP upto 5 HP has been provided to each farmer respectively.

In the year 2000 a scheme called Indira Khet Ganga Yojana has been launched by the state Government which has been renamed as Kisan Samriddhi Scheme in which farmers are provided with irrigation facilities through digging of tube wells and pump electrification in the districts which are having less rainfall throughout year. At present this scheme has been limited only to small and marginal farmers.

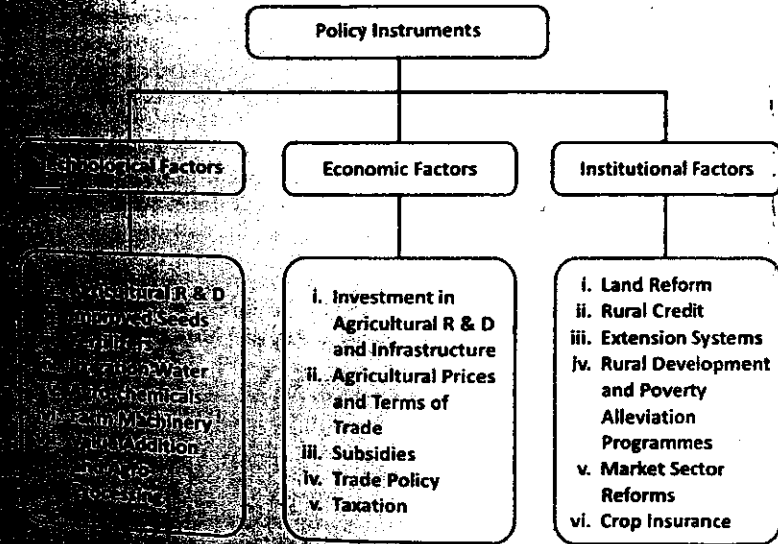
SUGGESTIONS

Policy Instruments for Agriculture Development

Considering that agriculture is the mainstay of Chhattisgarh

increasing use of inputs such as land, labour, technology, etc. and 3. Technological change (Dantawala, 1986 and Desai, 2002). However, the first two approaches are agro-economically and ecologically unsustainable in the long-run. The only sustainable strategy for growth in agriculture is continuous technological change, which shifts the production function upwards and to the right so that it avoids getting trapped into Ricardo's law of Diminishing Returns to scale (Desai, *et al.*, 2011). In order to implement this strategy, three types of policy instruments namely; technological, economic, institutional are needed. (Figure 5)

FIGURE 5



CONCLUSION

Agriculture now accounts for only 14% of Gross Domestic Product (GDP), it is still the main source of livelihood for a large majority of the rural population. As such rapid growth of agriculture is critical for inclusiveness. Despite a strong growth

... has been increased to rupees ... line extension so that more farmers are

Investment (Rs) ... Frequency ... Percentage

छत्तीसगढ़-राज्य के रायपुरशहर की मलिन बस्तियों में ऊर्जा खपत

अर्चना सेठी*, प्रगति कृष्णन**, रविन्द्र ब्रह्मे***

*सहायक प्राध्यापक,अर्थशास्त्र अध्ययनशाला,पं रविशंकर शुक्ल विश्वविद्यालय,रायपुर, छत्तीसगढ़

**शोधार्थी अर्थशास्त्र अध्ययनशाला,पं रविशंकर शुक्ल विश्वविद्यालय,रायपुर, छत्तीसगढ़

***प्राध्यापक,अर्थशास्त्र अध्ययनशाला,पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़

सारांश:

सतत विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंघ द्वारा 25 सितंबर 2015 को संवत् 2030 तक 17 लक्ष्य निर्धारित किए गए हैं उसमें से 7वें क्रम पर सतत ऊर्जा लक्ष्य है। सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुनिश्चित करना बढ़ती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बड़ा चुनौतीपूर्ण कार्य है। ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसे नवीनीकरण योग्य स्रोतों का बढ़ावा देना होगा। प्रस्तुत अध्ययन रायपुर शहर के 09 मलिन बस्तियों के 90 परिवारों का प्राथमिक समकों पर आधारित है। प्रस्तुत अध्ययन में 20 परिवारों का पायलेट सर्वे किया गया। अनुसूची में आवश्यक सुधार कर 70 परिवारों से जानकारी एकत्र की गई। इस तरह की जानकारी एकत्र की गई। अध्ययन से ज्ञात हुआ है कि 100 प्रतिशत परिवार प्रकाश के लिए उपयोग करते हैं। इसके अलावा मिटटीतेल का उपयोग किया जाता है। बिजली का उपयोग द्वारा मुख्यरूप से प्रकाश के अतिरिक्त टेलीविजन, पंखा तथा कूलर के लिए किया जाता है। ईंधन के लिए ऊर्जा के विभिन्न स्रोतों का उपयोग परिवारों द्वारा किया जाता है। प्रस्तुत अध्ययन स्पष्ट है कि सर्वाधिक 100 प्रतिशत लोग रसोई ईंधन के लिए एल पी जी गैस का उपयोग करते हैं। अतिरिक्त बिजली, कोयला एवं लकड़ी का भी उपभोग करते हैं।

शब्द कुंजी —सतत विकास लक्ष्य, छत्तीसगढ़, रायपुर, मलिन बस्ति, ऊर्जा खपत।

प्रस्तावना:

सतत विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंघ द्वारा 25 सितम्बर 2015 को 193 सदस्य देशों द्वारा 2030 तक 17 लक्ष्य निर्धारित किए गए हैं उसमें से 7वें क्रम पर सुलभ एवं स्वच्छ ऊर्जा है। सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुनिश्चित करना, विश्व की बढ़ती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बड़ा चुनौतीपूर्ण कार्य है। स्वच्छ ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसे नवीनीकरण स्रोतों पर निर्भरता को बढ़ावा देना होगा।

शहरीकरण की प्रक्रिया में मलिन बस्तियों का स्वरूप विकासशील देशों में उप-उत्पाद के रूप में देखा जा रहा है (गोस्वामी एवं मन्ना, 2013)। भारतीय जनगणना मलिन बस्तियों को आवासीय क्षेत्रों के रूप में परिभाषित करती है जहाँ आवास, भीड़-भाड़, गलियों की अव्यवस्था, संकीर्णता या दोषपूर्ण व्यवस्था, रोशनदान की कमी, प्रकाश या स्वच्छता सुविधाओं या किसी भी संयोजन के अभाव में मानव आवास के लिए आयोग्य है। ये सारे कारक सुरक्षा और स्वास्थ्य के लिए हानिकारक हैं (जनगणना, 2011)। भारत जैसे विकासशील देश में शहरीकरण बढ़ता जा रहा है, झुग्गीवासियों की संख्या में वृद्धि जारी रहने की सम्मवना है। इन क्षेत्रों में रहने की स्थिति में सुधार करने वाली महत्वपूर्ण नीतियों के अभाव में, लोग खराब स्वास्थ्य, हिंसा और गरीबी के जोखिम उठाते हैं (नाकामुरा, 2014)। घोष सजल, 2014 के अनुसार विशेष रूप से ऊर्जा और बिजली की पहुँच में सुधार करना मलिन बस्तियों के विकास के लिए महत्वपूर्ण है। अग्रवाल, वन्दना और बन्दोपाध्याय ए. 2016 ने अपना अध्ययन रायपुर शहर की ज्योतीनगर मलिन बस्ती में किया तथा बताया कि खाली भूमि जो सड़क के पास हो तथा जहाँ पर पानी की उपलब्धता हो ऐसे कारक हैं, जो मलिन बस्तियों की उत्पत्ति में महत्वपूर्ण भूमिका निभाते हैं।

विकासशील देशों में गरीबी को कम करने और आर्थिक विकास को बढ़ावा देने के लिए ऊर्जा सेवाओं की सस्ती और ऊर्जा की विश्वसनीय आधुनिक रूपों तक पहुँच में सुधार की आवश्यकता है (माल्ल और टिमिलसिना, 2014)। अधिकांश सामाजिक और आर्थिक गतिविधियों में विभिन्न रूपों और मात्राओं में ऊर्जा के उपयोग की आवश्यकता होती है। खाना पकाने, पानी उबालने, और प्रकाश व्यवस्था जैसे बुनियादी उपयोग के लिए घरों में ऊर्जा उतनी ही महत्वपूर्ण है जितना की उत्पादन के लिए बड़े-बड़े उद्योगों में। ऑटोमोबाइल कंपनियों में (अफ्रिकन रिजनल इम्पलिमेंटेशन, 2005)। आज के बदलते परिवेश में ऊर्जा क्षेत्र में छत्तीसगढ़ प्रदेश ने अपनी अलग पहचान बनायी है (अग्रवाल एवं त्रिवेदी, 2016)। छत्तीसगढ़ प्रदेश विभिन्न जिलों में प्रकाश एवं रसोई ईंधन के लिए ऊर्जा के उपभोग पर सामाजिक आर्थिक स्थिति

36

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RESEARCH ARTICLE

रायपुर शहर के मलिन बस्तियों के परिवारों की आय एवं गरीबी का अध्ययन

अर्चना सेठी^{1*}, प्रगति कृष्णन², रविन्द्र ब्रह्म³

¹सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़

²शोधार्थी अर्थशास्त्र अध्ययनशाला, पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़

³प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़

*Corresponding Author E-mail: archanasethi96@gmail.com, pragatikrishnan.8@gmail.com, ravibrahme@gmail.com

ABSTRACT:

छत्तीसगढ़ आर्थिक सर्वे 2015-16 के अनुसार कुल जनसंख्या में गंदी बस्तियों के रहवासी परिवारों की संख्या का प्रतिशत आंध्रप्रदेश के बाद छत्तीसगढ़ में 31.98% में सबसे अधिक है। मकान का अभाव, संख्या तीव्र गति से बढ़ना रोजगार के अवसरों का अभाव बेरोजगारी आदि कारण मलिन बस्ती के बनने के प्रमुख कारण है। मलिन बस्ती में निवासरत निदर्श परिवार में से 84.86 प्रतिशत सदस्य शिक्षित है एवं 15.14 प्रतिशत सदस्य अशिक्षित है। आश्रित जनसंख्या जिसमें कि 14 वर्ष आयु तक की संख्या एवं 64 वर्ष से अधिक आयु की जनसंख्या शामिल है उसका प्रतिशत क्रमशः 22.27 एवं 6.3 प्रतिशत है। निदर्श परिवार में 46.2 प्रतिशत सदस्य कार्यशील जनसंख्या है। समीति के अनुसार 2011, नगरीय क्षेत्र में पांच सदस्यीय परिवार जिनकी औसत मासिक उपभोग व्यय 7035 रु से कम है या व्यक्ति औसत मासिक उपभोग व्यय 1407 रु से कम है तब वह गरीबी रेखा से नीचे है। इस परिवार रायपुर शहर की मलिन बस्ती में निवासरत निदर्श परिवार में 40.75 प्रतिशत परिवार गरीबी रेखा से नीचे है। इनकी परिवार की औसत मासिक आय 4659.86 रु एवं 6627.67 रु है एवं प्रति व्यक्ति मासिक आय 928.25 रु एवं 1297.00 रु है ये परिवार 5000 रु तक आयवर्ग एवं 5000-10000 रु मासिक आय वर्ग में आते है।

KEYWORDS: मलिन बस्ती, आय, गरीबी.

1 प्रस्तावना

गरीबी मानव जीवन की सबसे बड़ी चुनौती होती है क्योंकि जो व्यक्ति या परिवार इस समस्या से प्रभावित होता है उसके जीवन का प्रत्येक पक्ष इससे प्रभावित होता है। इस प्रकार गरीबी व्यक्ति के विकास में सबसे बड़ी बाधा होती है। इस समस्या को दूर करने के लिए हमारे देश में योजना आयोग द्वारा गरीबी उन्मूलन के लिए पिछले छह दशकों से लगातार विभिन्न योजनाओं का क्रियान्वयन किया

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Grayscale Based Spectral Information of EEG Signals for Classification of Epileptic Seizure

S. Mandal^{#1}, K. Thakur^{#2}, B.K. Singh^{§3}

[#]*School of Studies in Electronics & Photonics, PRSU Raipur, 492010, Chhattisgarh, India*

[§]*Department of Biomedical Engineering, NIT Raipur, 492010, Chhattisgarh, India*

¹*sunandan.mandal12@gmail.com*

²*kavithakur67@gmail.com*

³*bsingh.bme@nitrr.ac.in*

Abstract— Electroencephalogram (EEG) is the regular instrument used for the treatment and diagnosing of diseases related to the brain. There are a high possibility and probability of human mistakes encountered during the diagnosis of EEG signals. An epileptic seizure is one common brain disease, which needs continuous and long-duration observations of EEG signals. The objective of the present work is to give a classification model for epileptic seizure identification using grayscale based spectral information by employing short time Fourier transform on EEG signals. In the present work, two classifiers namely support vector neural network and back propagation artificial neural network (BPANN) are utilized. The highest classification accuracy of 98.00% is achieved using the 10-fold data division protocol and BPANN.

Keywords— EEG; epileptic seizure; neural network; majority voting; spectrogram.

I. INTRODUCTION

In the human body, the brain is the most essential part. For proper working of any part of the body, necessary and essential control signals are generated from the brain [1]. Mal-functioning of the brain due to brain-related disorders causes serious effect on lifestyle and social reputation of human. Disturbances in electrical activities of the brain are indications of brain disorder, which treated and diagnosed using Electroencephalogram (EEG). An epileptic seizure is one of the malign brain disorders, which affected approximately 50 million people of the world population [2]. In this brain disorder, recurrent or sudden abnormal extreme electrical discharges take place inside of the brain. This extreme discharge may cause unexpected and uncontrolled body movement and unconsciousness [3]. For the treatment of epileptic seizures, there is a need for long time EEG recording and analysis. Analysis of long time EEG records makes this job tedious, time consuming and shot through with human error for even expert neurologists. Therefore, there is a need for an automatic epileptic seizure detection system. This may help to save the time of neurologists and make possible errors less treatment for more epileptic patients simultaneously. In the present work, we aimed to determine the relevant features for epileptic seizure detection using majority voting based algorithm with grayscale spectrogram images.

A. Related work

In this subsection, some recent researches and state of art techniques of epileptic seizure detection are cited. Higher-Order Spectra (HOS) and power spectrum based epileptic seizure detection were reported by Chua et al. (2011) [4]. In this study, the Gaussian Mixture Model (GMM) and Support Vector Machine (SVM) were used for epilepsy detection. Three features were extracted namely mean of the spectrum and two types of entropy-based features. Average classification accuracy of 93.11% was achieved with HOS based features and GMM classifier. Mustafa et al. (2011) studied EEG signal analysis with the help of spectrogram and Gray Level Co-occurrence Matrix (GLCM) [5]. A total of 51 volunteers participated in data collection for this work. In this work, spectrogram images were generated for four EEG bands namely Delta, Theta, Alpha and Beta.

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482

Performance Evaluation of Spectrogram Based Epilepsy Detection Techniques Using Gray Scale Features

Author(s): Sunandan Mandal, Kavita Thakur, Bishesh Kumar Singh, Meera Rani
Email(s): sunandan.mandal12@gmail.com
Address: School of Studies in Electronics & Photonics, PRSU Raipur, 492010, Chhattisgarh, India
Department of Biomedical Engineering, NIT Raipur, 492010, Chhattisgarh, India
Kalyan Post Graduate College, Bilal Nagar, Durg, 491001, Chhattisgarh, India
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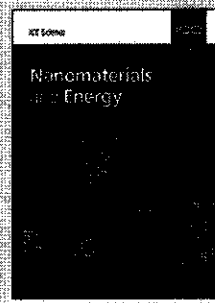
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486



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Effect of ZnO ETL and MoO3 HTL with PCDTBT:PC70BM-based BHJ organic solar cells

Authors: Anil Kumar Verma, MSc, NET; Naman Shukla, MTech, NET; Sanjay Tiwari, PhD

Author Affiliations

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Preparation, Fabrication and Characterization of Sol-Gel ZnO Thin Films for Organic Solar Cells

Author(s): Anil Kumar Verma*, Swati Sahu, Mohan Patel, Sanjay Thawar
Email(s): shverma.prsu@gmail.com
Address: Photonics Research Laboratory, School of Studies in Electronics & Photonics, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India
State Forensic Science Laboratory, Raipur-492001 Chhattisgarh, India
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Majority voting-based hybrid feature selection in machine learning paradigm for epilepsy detection using EEG

by Sunandan Mandal; Bikesh Kumar Singh; Kavita Thakur

International Journal of Computational Vision and Robotics (IJCVR), Vol. 11, No. 4, 2021

Abstract: This article presents a combination of statistical and discrete wavelet transform (DWT)-based features for the identification of epileptic seizures in electroencephalogram (EEG) signals. A total of 150 quantitative features are extracted from EEG signals. A multi-criteria hybrid feature selection is proposed by combining six feature ranking methods using the majority voting technique to identify the most relevant EEG markers. Kernel-based support vector machine is used to evaluate the proposed approach along with a hybrid classifier namely support vector neural network (SVNN) which is a combination of support vector machine (SVM) and artificial neural network (ANN). For performance evaluation of the proposed method, a benchmarked database is used. A comparative study of various types of SVM and SVNN with ten-fold and hold-out cross-validation techniques is conducted. The highest classification accuracy (CA) of 98.18% and 100% sensitivity is achieved with a fine Gaussian SVM classifier with hold-out data division protocol.

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An Improved symbol reduction technique based Huffman coder for efficient entropy coding in the transform coders

Vikrant Singh Thakur, Kavita Thakur, Shubhrata Gupta

First published: 26 December 2020 | <https://doi.org/10.1049/apr2.12081>

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Abstract

Entropy coding is the essential block of transform coders that losslessly converts the quantized transform coefficients into the bit-stream suitable for transmission or storage. Usually, the entropy coders exhibit less compression capability than the lossy coding techniques. Hence, in the past decade, several efforts have been made to improve the

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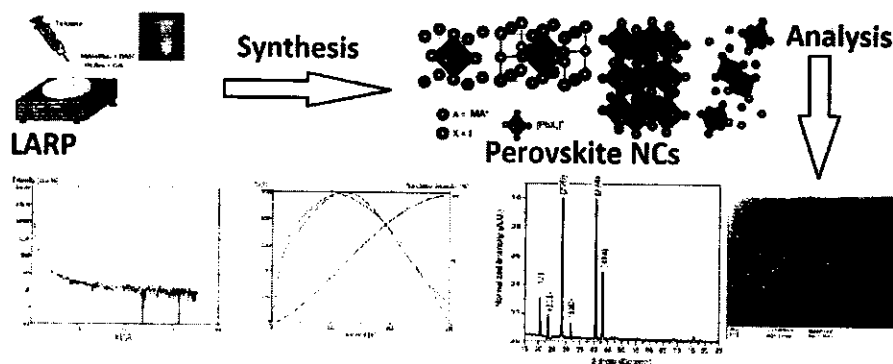
X-ray and Raman study of $\text{CH}_3\text{NH}_3\text{PbI}_3$ perovskite nanocrystals

B. Gopal Krishna,¹ Dhriti Sundar Ghosh,² Sanjay Tiwari,¹

¹Photonics Research Laboratory, School of Studies in Electronics & Photonics, Pt. Ravishankar Shukla University, Raipur, 492010, India. ²Department of Physics, Indian Institute of Technology, Bhubaneswar, 751013, India.

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ABSTRACT



Organic-inorganic hybrid perovskite nanocrystals have gained considerable attention for optoelectronics applications due to their unique properties like high light absorption coefficient, band gap tunability, and larger diffusion length. In this work, the ligand-assisted re-precipitation method (LARP) was employed to synthesize $\text{CH}_3\text{NH}_3\text{PbI}_3$ nanocrystals (NCs). The optical and structural properties of nanocrystals depend on their size. X-ray diffraction (XRD) and small-angle X-ray scattering (SAXS) techniques are used to determine the crystal structure, particle size distribution, and surface to volume ratio of $\text{CH}_3\text{NH}_3\text{PbI}_3$ nanocrystals. The organic-inorganic interactions of $\text{CH}_3\text{NH}_3\text{PbI}_3$ nanocrystals are studied by Raman spectra at room temperature. This study will provide the basis to interpret the morphological properties of perovskite nanocrystals for their full exploitation in different optoelectronics applications.

Keywords: $\text{CH}_3\text{NH}_3\text{PbI}_3$ nanocrystals, Ligand-assisted re-precipitation method, XRD, SAXS, Raman spectra.

INTRODUCTION

Metal halide perovskites have achieved incredible advances as optoelectronic materials due to extraordinary properties like excellent luminescence properties, high light absorption coefficient, and band gap tunability. The materials are used to fabricate photovoltaic cells, LEDs, and display applications. Perovskite materials have an exceptional combination of optical

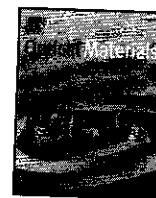
and electronic properties. The fundamental understanding of perovskite material can lead to developing many technological applications. Halide perovskites have the formula ABX_3 in which 'A', 'B' and 'X' are monovalent cation (MA or FA or Cs), divalent cation (Pb or Sn), and halides (I or Cl or Br) anions respectively.¹⁻³ In the perovskite crystal structure, 'B' is coordinated with six 'X' ions to form an octahedral structure. 'A' cation is positioned in between the octahedral structure. Perovskite can be all-inorganic or organic-inorganic material that depends upon the 'A' cation. The optical and structural properties of this material depend upon its composition.⁴ The dimensions of perovskite material can be 0D or 2D or quasi-2D or 3D structure.^{5,6} The crystal structure of a perovskite material can be known by tolerance factor 't' and an octahedral factor 'u'. The tolerance factor is given by equation as

$$t = \frac{r_A + r_B}{\sqrt{2}(r_B + r_X)} \quad (1)$$

*Corresponding Author: B Gopal Krishna, Photonics Research Laboratory, School of Studies in Electronics & Photonics, Pt. Ravishankar Shukla University, Raipur, 492010, India
Address: Pt. Ravishankar Shukla University, Raipur, 492010, India
Tel: xx
Email: krishna_burra85@yahoo.com

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Research Article

Optical properties of CsPbBr₃ perovskite nanocrystals with silver nanoparticles using a room-temperature synthesis process

B. Gopal Krishna, Sanjay Tiwari

Photonics Research Laboratory, School of Studies in Electronics & Photonics, Pt. Ravishankar Shukla University, Raipur, 492010, India

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ABSTRACT

CsPbBr₃ nanocrystals (NCs) are all-inorganic perovskite materials with unique optoelectronic properties for their use in next-generation photoluminescent, electroluminescent, and photovoltaic devices. The optical properties of CsPbBr₃ nanocrystals can be changed by compositional substitution, phase transition, doping into the perovskite nanostructures, and adding metal nanoparticles for achieving efficient optoelectronic devices. In this work, CsPbBr₃ NCs are synthesized by ligand-assisted re-precipitation (LARP) technique. Different concentrations of plasmonic silver nanoparticles are added into CsPbBr₃ NCs to get the CsPbBr₃ NCs-Ag NPs mixture. The changes in structural and optical properties of CsPbBr₃ NCs are analyzed by using XRD and PL spectral analysis. The enhancement, peak shift, and quenching in the PL spectra of CsPbBr₃ NCs is observed due to the addition of different concentrations of plasmonic silver nanoparticles. The study provides a facile strategy for tuning and manipulating optical properties of all-inorganic CsPbBr₃ NCs by adding silver nanoparticles and utilizing their properties in various future optoelectronic applications.

1. Introduction

Perovskite materials have emerged as the most promising photonic materials due to their optoelectronic properties such as bandgap tunability, large diffusion length, and better light absorption coefficient [1–4]. These materials can be used for various optoelectronic applications such as photovoltaic cells, LEDs and lasing applications. Caesium lead bromide (CsPbBr₃) perovskite nanocrystals have the incredible potential for their applications in fabricating low-cost, stable and efficient optoelectronic devices [5–7]. The addition of plasmonic nanoparticles to the perovskite material can change its optical properties [4–8]. Purcell et al. reported that luminescence properties of an atom or a molecule or a nanocrystal can be changed by varying its environmental conditions which is known as the Purcell effect [9–12]. According to Fermi's golden law, the modification of environmental conditions of nanocrystal such as local electromagnetic field can change the local density of states and spontaneous emission rate of nanocrystal [12–16]. Metallic nanoparticles such as silver nanoparticles can change or modify the local density of states, excitation, and emission rates of perovskite nanocrystals due to localized surface plasmon resonance (LSPR) property [17]. Silver nanoparticles show high local field improvement at nanocrystal locations to increase the rate of excitation of neighboring

molecules, which is known as hot spots. Therefore, the improvement of the emission property of nanocrystals happens due to the Purcell effect. The increase in the rate of excitation of nanocrystals molecules can be observed by adding silver nanoparticles. This happens due to the activation of localized surface plasmons in metal nanoparticles [18,19]. The plasmonic effect of silver nanoparticles on CsPbBr₃ nanocrystals can enhance or quench the PL intensity or shift the peak in the PL spectra. The generation of hot electrons in nanocrystals by charge transfer from silver nanoparticles or plasmon resonant energy transfer (PRET) can increase emission rate and non-radiative decay rates of the nanocrystal. Förster resonant energy transfer (FRET) from CsPbBr₃ nanocrystals to Ag nanoparticles can quench the PL intensity [20–22].

In this research, silver nanoparticles have been synthesized in the laboratory by using biological techniques. CsPbBr₃ nanocrystals have been synthesized by the ligand-assisted re-precipitation method (LARP). In the ligand-assisted reprecipitation (LARP) technique, initially the perovskite precursor salts are dissolved in polar solvents like *N,N*-dimethylformamide (DMF). Oleylamine and oleic acid are injected into the resulting mixture. This solution is rapidly injected into antisolvent such as toluene. During the synthesis of perovskite nanocrystals, each step in the LARP procedure can affect the properties of the final product. Herein, a longer stirring time is implemented to dissolve both perovskite

* Corresponding author.

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An investigation on the influence of temperature variation on the performance of tin (Sn) based perovskite solar cells using various transport layers and absorber layers

Priyanka Roy^a, Sanjay Tiwari^b, Ayush Khare^{a,*}

^aThin Film Research Laboratory, Department of Physics, National Institute of Technology, Raipur 492 010, India

^bSchool of Studies in Electronics and Photonics, Pt. Ravishankar Shukla University, Raipur 492 010, India

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Tin based perovskite solar cells
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ABSTRACT

The perovskite solar cells (PSCs) have become the fastest-growing photovoltaic (PV) cells to date. Despite its numerous merits, these cells face issues, such as poor stability, toxicity, etc. The issue of toxicity is dealt by using less-toxic substitutes of lead (Pb), such as Tin (Sn). However, the performance attained by Sn-based PSCs still lags behind Pb based PSCs to a great extent. In this work, we discuss some of the desirable electron transport layers (ETLs) and hole transport layers (HTLs) that can be used to fabricate an efficient Sn-based PSC, and report their performance. HTLs, such as "Spiro-OMeTAD", Graphene, PEDOT:PSS, Cu₂O, CuI, CuSCN and ETLs, such as ZnO, TiO₂, PCBM are used in this study. We also simulate three different Sn perovskite materials based PSCs, (i) MASnI₃ (ii) FASnI₃ and (iii) CsSn_{0.5}Ge_{0.5}I₃. We study theoretically the performance of the PSCs with various transport layers and absorber layers by varying the temperature from 300 K to 400 K.

1. Introduction

The PSCs have become the fastest-growing PV technology to date by showing a rapid increment in efficiency from 3.2% to 25.5% within past 10 years (Alta and Asu, 2020; NREL Efficiency Chart, 2019). Moller et al. in 1958 introduced lead halide perovskite for the first time with outstanding photoconductivity using all-inorganic (CsPbX₃) perovskite material (Sandor et al., 1958). Later, in 1978 Weber et al. introduced hybrid organic inorganic perovskites (Dieter, 1978). The usage of halide perovskite materials in solar cell was done by Kojima et al. in dye sensitized architecture attaining PCE of 3.8% for the first time (Kojima et al., 2009). Since then, tremendous research has been carried out in this field. The noteworthy advancement in the performance of PSCs has been obtained in short span of time owing to the following reasons: (i) the chemical engineering process enabled mixed cations and mixed anions perovskite materials to be used as absorber layers allowing enhanced stability and band-gap tunability (Jeon et al., 2015; Saliba et al., 2016; Deng et al., 2016; Prasanna et al., 2017), (ii) modifications in film deposition techniques, leading to the deposition of a uniform film with compact and large grains (Bi et al., 2013; Nie et al., 2015; Pérez-del-Rey et al., 2018), (iii) adopting different perovskite materials for better transport and absorber layer applications.

Currently, the main focus is on the efficient charge transport layers (Chen et al., 2017; Grill et al., 2017; Wang et al., 2017; Wu et al., 2017; Fang et al., 2018; Sidhik et al., 2018). The PSCs use hybrid organic-inorganic halide based perovskites as an absorber layer. MAPbX₃ (X = Cl, Br, and I) is widely used as an absorber layer in PSCs. The basic structure of PSCs is n-i-p or p-i-n type, where the perovskite absorber layer is stacked between the charge transport layers (Cheng et al., 2020). The incorporation of toxic Lead (Pb) has been a matter of concern for researchers worldwide. There are limited choices of ions available that can be used instead of Pb maintaining the perovskite structure. In PSCs, even upon replacing Pb with other elements, such as Sn, Ge, Bi, Sb, etc., performance like Pb-based PSCs could not be achieved (Shao et al., 2018). Among the various ions available as an alternate to Pb, Ge and Sn have exhibited good performance as they possess the required ionic size, coordinates, and charge prerequisites (Stoumpos et al., 2015; Li et al., 2017; Mitzi, 1996). However, Ge based PSCs have attained the lowest PCE of 0.57%. Also, not much work has been done using Ge perovskite as it suffers from drawbacks, such as its unstable behavior and low solubility in polar solvents. Currently, to address the issue of toxicity, Sn is being used by researchers widely owing to its promising performance (Abate, 2017; Stoumpos et al., 2013). The lead and tin halide perovskites pos-

* Corresponding author.

E-mail address: akhare.phy@nitrr.ac.in (A. Khare).

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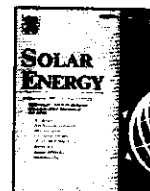
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Progress in ambient air-processed perovskite solar cells: Insights into processing techniques and stability assessment

B.Gopal Krishna^{a,*}, Dhriti Sundar Ghosh^b, Sanjay Tiwari^a^a Photonics Research Laboratory, School of Studies in Electronics & Photonics, Pt. Ravishankar Shukla University, Raipur, India^b Department of Physics, Indian Institute of Technology, Bhubaneswar, India

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Perovskite solar cells
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ABSTRACT

Perovskite solar cells are among the highly efficient devices with a power conversion efficiency of over 25% due to their outstanding optoelectronic properties like bandgap tunability, high light absorption coefficient, and long diffusion length. A highly efficient perovskite solar cell is fabricated under a controlled inert atmosphere. Perovskite solar cell's stability is influenced by ambient atmosphere parameters like air, water, light and temperature which prevent industrial deployment. The translation of lab-scale to industrial-scale production requires fabricating perovskite solar cells in an ambient environment. The morphology and crystallization of perovskite thin film is also influenced by ambient environment. Large-scale manufacturing of these solar cells requires a scientific understanding of the crystallization process, fabrication process, and industrial compatibility. The proper study of the influence of ambient environment on morphology and crystallization process is necessary to fabricate highly efficient and stable perovskite solar cell in ambient conditions. The packaging of perovskite solar cell is also an important part to prevent the degradation of device. There is a need to adopt standard protocols like ISOS protocols for stability tests and to understand the properties of perovskite solar cell properly. In this paper, the influence of water, air, temperature, light and packaging on the perovskite solar cells will be discussed. The processing techniques of air-processed perovskite solar cells will be discussed. ISOS protocols will be discussed for assessing the stability of perovskite solar cells. The standard protocols would make advancements in the perovskite solar technology and help to translate lab-scale devices to industrial scale for commercialization.

1. Introduction

Photovoltaics (PV) technology is making significant advancements to meet global energy demand and to function as a sustainable power source. Photovoltaic materials like halide perovskites are used to fabricate low-cost solar cells having high power conversion efficiency (PCE). Halide perovskites are semiconductor materials with a structural formula ABX_3 in which 'A' denotes methylammonium (MA) or formamidinium (FA) or cesium (Cs), 'B' denotes lead (Pb) or tin (Sn) and 'X' denotes iodine (I) or chlorine (Cl) or bromine (Br) (Wang et al., 2018; Krishna et al., 2020). These semiconductors have excellent optoelectronic properties like bandgap tunability, high absorption coefficient of light, and simple solution process for their use in photovoltaic devices, light-emitting diodes, photocatalysts, and photodetectors. Perovskite solar cells (PSCs) are promising candidates for next-generation solar cells with a reported efficiency of over 25% (Kojima et al., 2009; Cheng et al., 2015; Cho et al., 2015; Ball et al., 2013; Yu et al., 2018). Extensive

research exists on perovskites for their use in tandem architectures with crystalline silicon or CIGS sub-cell. Perovskite/silicon tandem solar cell with the PERL structure was reported with a record 26.7% PCE. Perovskite/silicon tandem solar cells have the potential to reach power conversion efficiencies beyond 30% (Futscher and Ehrler, 2016). Miyasaka et al. reported the first perovskite solar cell with a power conversion efficiency of 3.9% (Raga et al., 2015). Perovskite solar cells would be a competitive candidate in the solar technologies for commercialization that promises low-cost and simple fabrication techniques to produce more efficient photo-conversion efficiency. The ratio of the open-circuit voltage (V_{OC}) to bandgap (E_g) is 0.69 for perovskite solar cells. For typical excitonic organic solar cells, the ratio of the open-circuit voltage (V_{OC}) to bandgap (E_g) is 0.55. The ratio of the open-circuit voltage (V_{OC}) to bandgap (E_g) is 0.80 for amorphous silicon solar cells. Thus, the photon energy loss in perovskite solar cells is much lesser than in organic solar cells (Green et al., 2015). Perovskite solar cells have low-processing energy consumption than conventional silicon

* Corresponding author.

E-mail addresses: krishna_burra85@yahoo.com (B.Gopal Krishna), dhriti.ghosh@iitbhubaneswar.ac.in (D. Sundar Ghosh).

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Nutritional and Spectral Characteristics of Terminalia Plants

Suryakant Chakradhari¹, Keshaw P. Rajhans¹, Khageshwar S. Patel^{2*},
Erick K. Towett³, Jesús Martín-Gil⁴ and Pablo Martín-Ramos⁵

School of Studies in Environmental Science, Pt. Ravishankar Shukla University, Raipur-492010, India

School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur-492010, India
World Agroforestry Centre, P.O. Box 30677, Nairobi, 00100, Kenya

Department of Agriculture and Forestry Engineering, ETSIIIA, Universidad de Valladolid, Avenida de Madrid 44, 34004 Palencia, Spain

Department of Agricultural and Environmental Sciences - EPS, Instituto de Investigación en Ciencias Ambientales de Aragón (IUCA), University of Zaragoza, Carretera de Cuarte, s/n, 22071 Huesca, Spain

Authors' contributions

The present work was carried out in collaboration among all authors. Author KSP designed the research study and supervised the whole research work. Author SC collected the plant samples and performed experimental work. Author KPR managed the literature and statistical work. Author EKT generated the mineral data. Author JMG collected the FTIR spectra. Author PMR wrote and revised the manuscript. All the Authors read and approved the final manuscript.

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ABSTRACT

Aims: *Terminalia* spp. are medicinal plants that belong to Combretaceae family, widely used in traditional Ayurvedic medicine. In this work, the nutritional constituents of the leaves, seed kernel and seed coat from four *Terminalia* species (*T. arjuna*, *T. bellinca*, *T. catappa* and *T. chebula*) are reported.

*Corresponding author. E-mail: patelkhageshwarisinha@gmail.com, dute-khageshwarisinha@gmail.com



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Article

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Authors:



Nohar Singh Dahariya

Pt. Ravishankar Shukla University, Raipur, Chh...



Ankit Yadav

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CONTENTS

ASSESSMENT OF AVAILABILITY AND ACHIEVEMENTS OF THE PUBLIC HEALTH CARE SERVICES IN RURAL INDIA	1-24
<i>Shrikamal Sharma</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.1	
INTERNAL STRUCTURE AND FLOW PATTERN OF A PERIODIC MARKET IN THE BRAHMAPUTRA VALLEY, ASSAM	25-37
<i>Nityananda Deka and A.K. Bhagabati</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.2	
A GEOGRAPHICAL ANALYSIS ON CROP CONCENTRATION IN CHAMARAJANAGARA DISTRICT	38-48
<i>Sowmya. R and H Nagaraj</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.3	
GEOGRAPHICAL BASIS OF CONFLICT BETWEEN INDIA AND PAKISTAN	49-65
<i>Sudepto Adhikari and Mukul Kamle</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.4	
AGRICULTURAL REGIONS OF CHHATTISGARH	66-84
<i>Anusuiya Baghel and Brisaketu Panda</i>	
DOI: https://doi.org/10.32381/ATNAGI.2020.40.02.5	
COMPOSITION AND OWNERSHIP PATTERN OF LIVESTOCK IN HARYANA: SOCIO-SPATIAL ANALYSIS	85-103
<i>Ram Juwari Chauhan and M.S. Jaglan</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.6	
AVAILABILITY OF GROUNDWATER RESOURCES FROM DIFFERENT SOURCES IN BHIWANI DISTRICT, HARYANA	104-120
<i>Anju Gupta and Jitender Kumar</i>	
DOI: https://doi.org/10.32381/ATNAGI.2021.41.01.7	

21, Page 66-84

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cropping pattern and its Chhattisgarh. Ranking of ons is another important n the agricultural census ttisgarh region has been ural specialties. Paddy is thern part of the region, n found as a secondary id maize are dominant s become the main pulse h is also dominated by s oilseed has been found ith black soil, where this region. The crop Weaver's method (1954) rimposed over geology, Chhattisgarh region has ions as-Rice cropped au region, Rabi cropped n. Three-forth crops of the impact of monsoon

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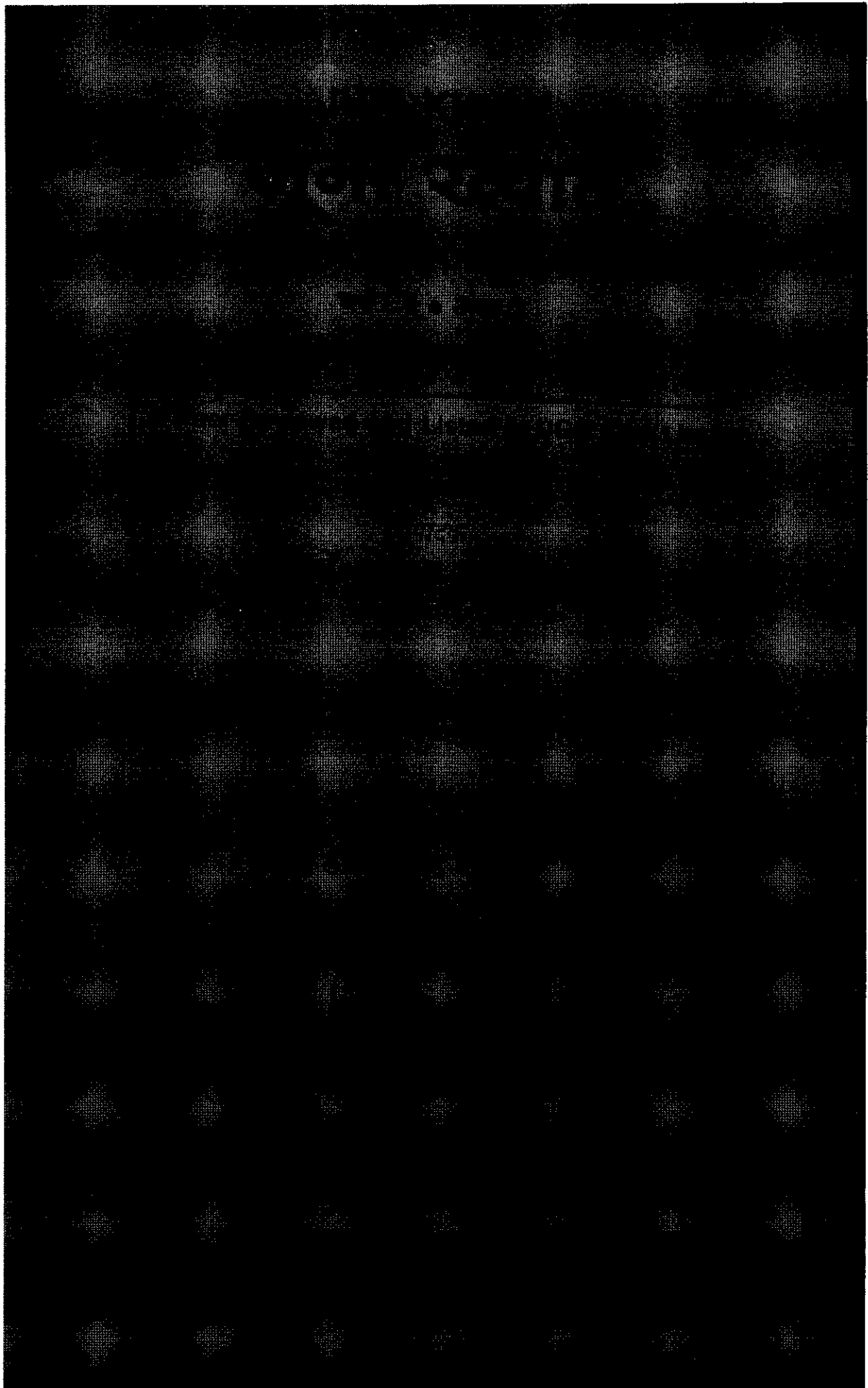
in the agriculture of this region. Due to the improvement of irrigation facilities, the cropping pattern of the plain area shows slight positive changes.

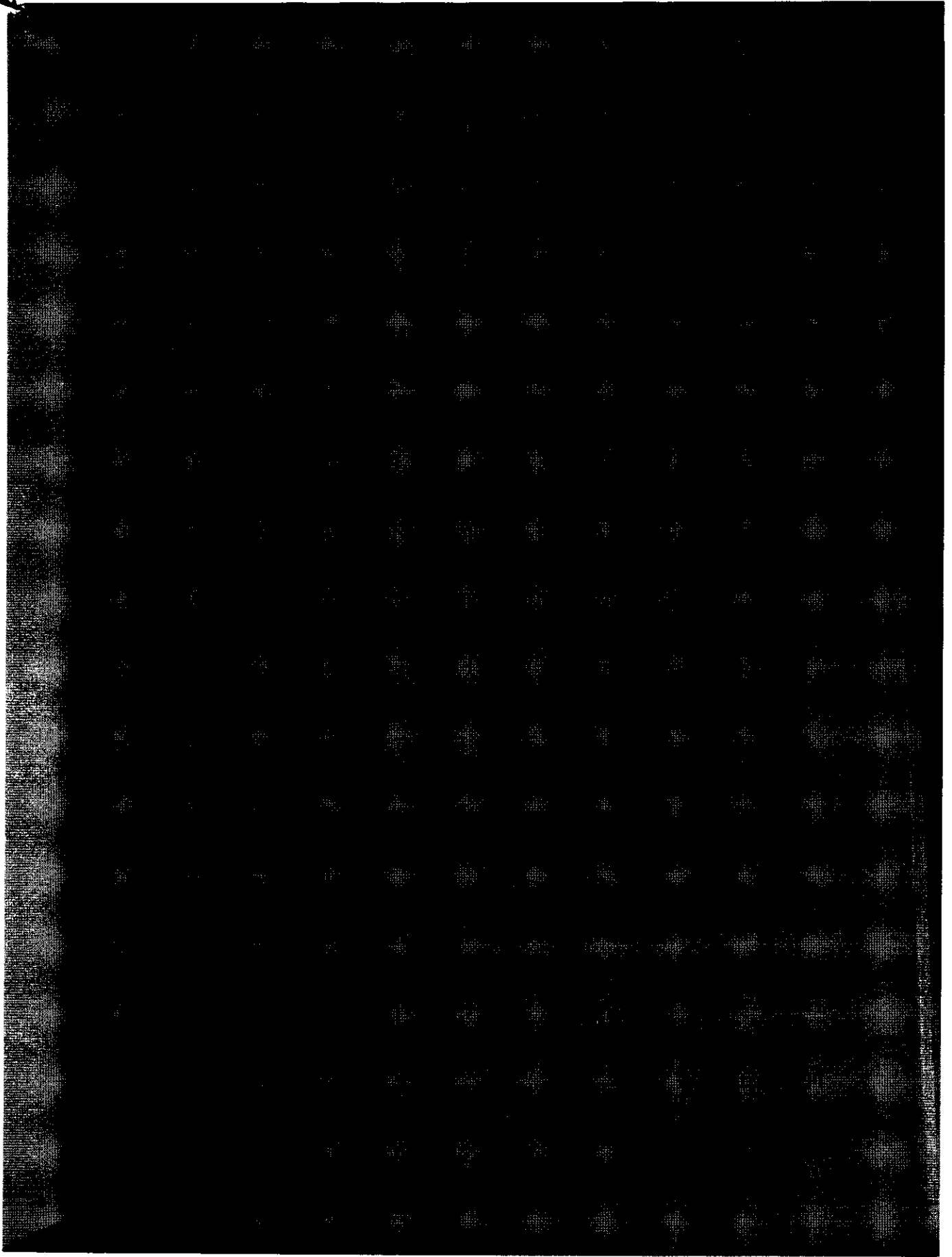
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INTRODUCTION

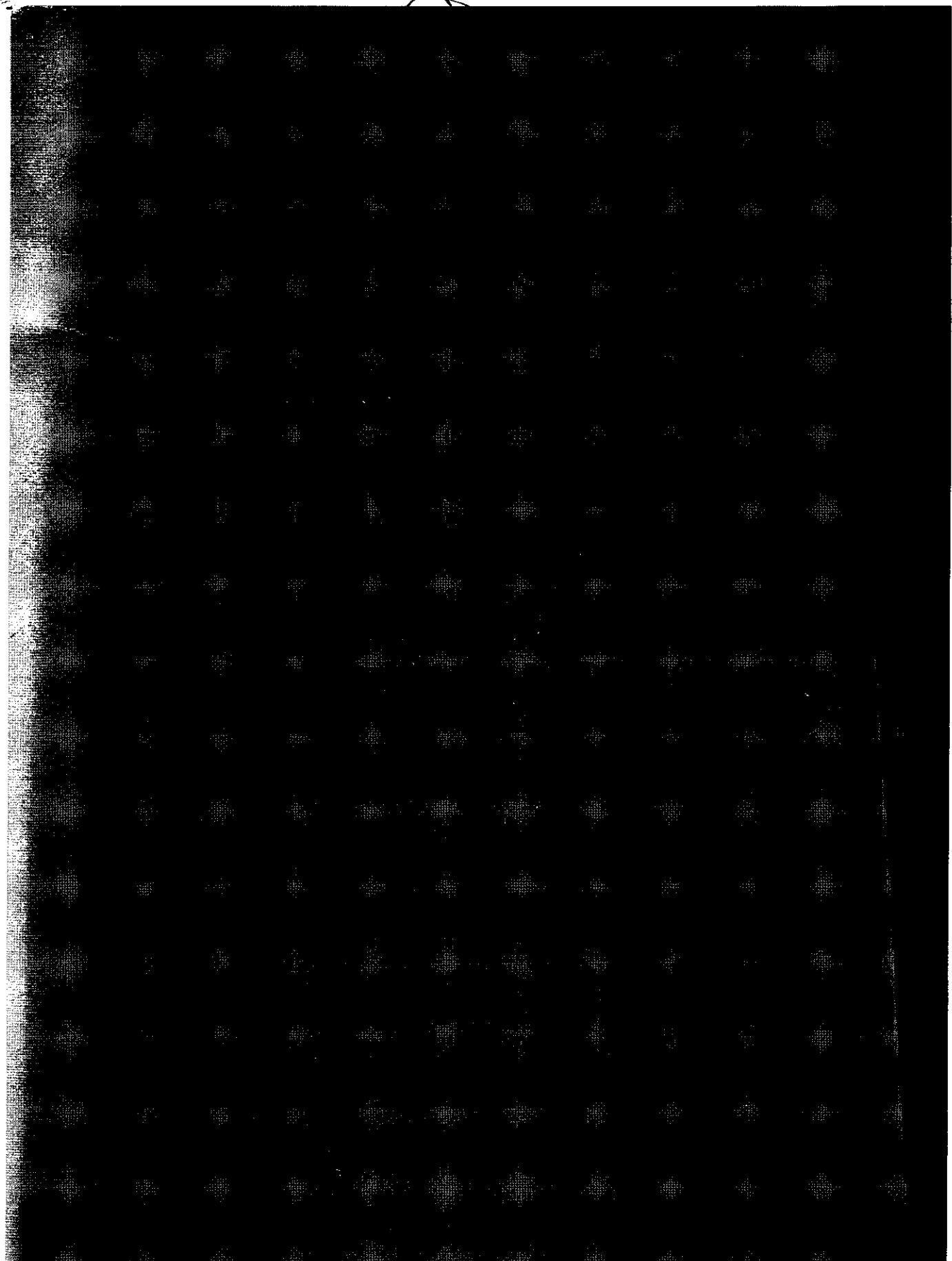
There is no other alternate of agricultural development to ensure food security for the growing population size of a country like India. However, in the context of intensive farming, the dependencies of man to nature have a greater existence even in the 21st century. In the word of Shafi (1972, p.67) "Natural factors play a vital role in the development of agriculture. The uncontrollable weather condition, the character of soil, and the biological rhythm of plant life influence the efficiency of agricultural production. Man has however tried to remove some of natural impediments with varying degree of success". That's why the regional disparities found in agriculture. Regional disparities are the outcomes of the interaction between all-natural factors and the degree of man's success. This is a very common phenomenon for a country like India with full of physiographical and socio-economic diversity. A large degree of regional differences found not the only state but also in different districts of a state in the context of agricultural pattern, crop production, agricultural regions, etc. Chhattisgarh is such an example of an agro-based state with a diversified physical and social environment. The present study is an attempt to understand the agricultural scenario of Chhattisgarh in the context of cropping patterns, agricultural regions, ranking of crops and its relation to physical as well as socio-economic factors.

Agriculture is counted as the chief economic occupation of the Chhattisgarh. The population of Chhattisgarh is associated with the intensive type of agriculture. More than 90 percent of the total cropped area is used to produce food crops. The major part of the crops is cultivated during in Kharif season. The region with favorable climatic conditions and fertile soils has been shown for a greater yield of crops. The highest crop production has been found in the plains region of Chhattisgarh. Due to diversified land surface, crop diversity is very common in this region. In the mountainous region, millets are dominant in hill slopes including kodo, kutki, jowar, bajra etc. According to the agricultural census 2015-16, the average size of landholding is 1.24 hectares, where 60.6% of farmers are marginal or small landholders concerning total landholdings. 19% of net sown area have been found as double cropped area. Irrigation facilities are not available in the major portion of the area as only 21.1% of the total cropped area having irrigation facilities. However, despite such a situation, Chhattisgarh is known as the 'rice bowl' of India due to the very high yielding of paddy. The agriculture of this region mainly depends on monsoonal rainfall which is responsible for the uncertainty of crop production.

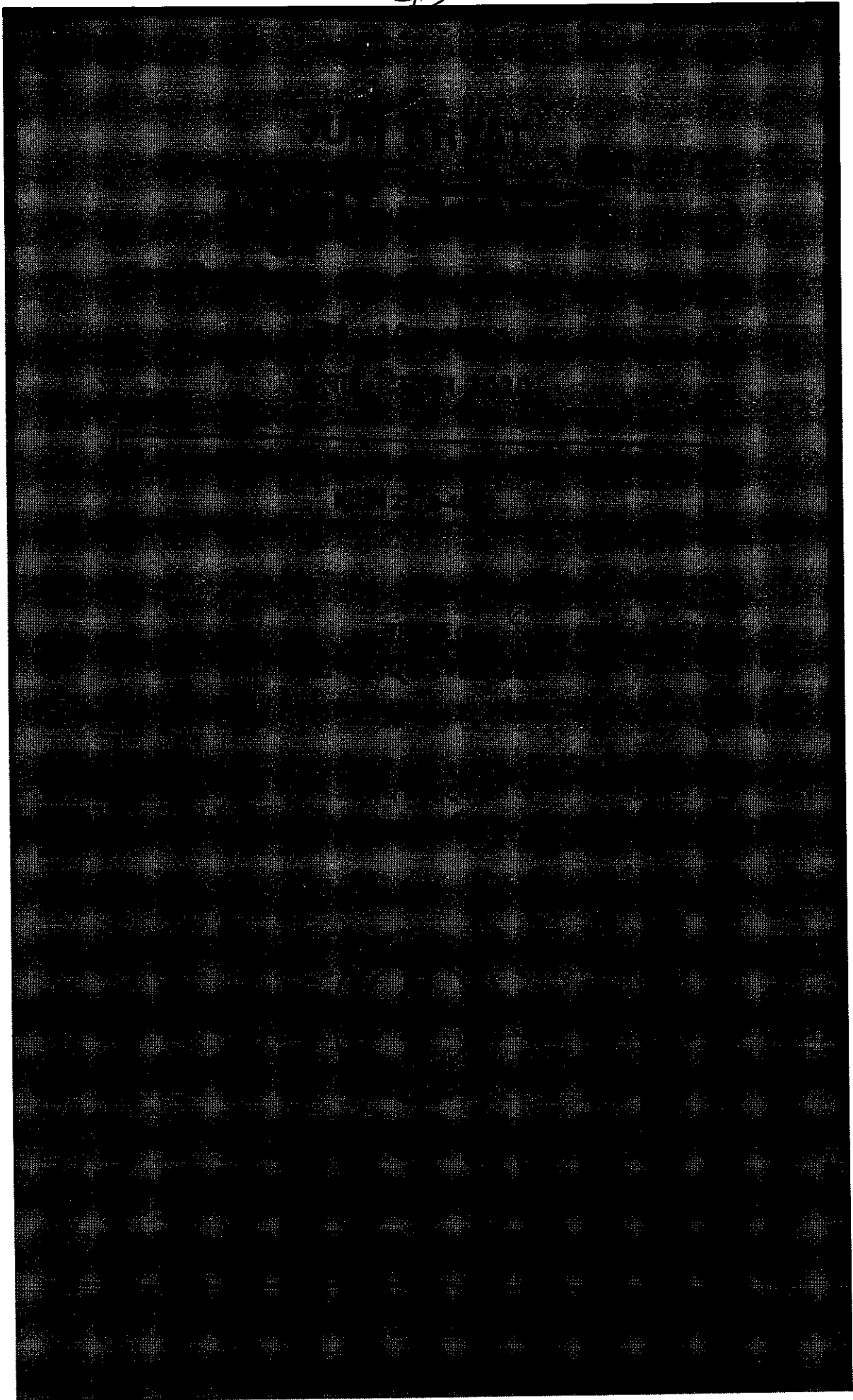


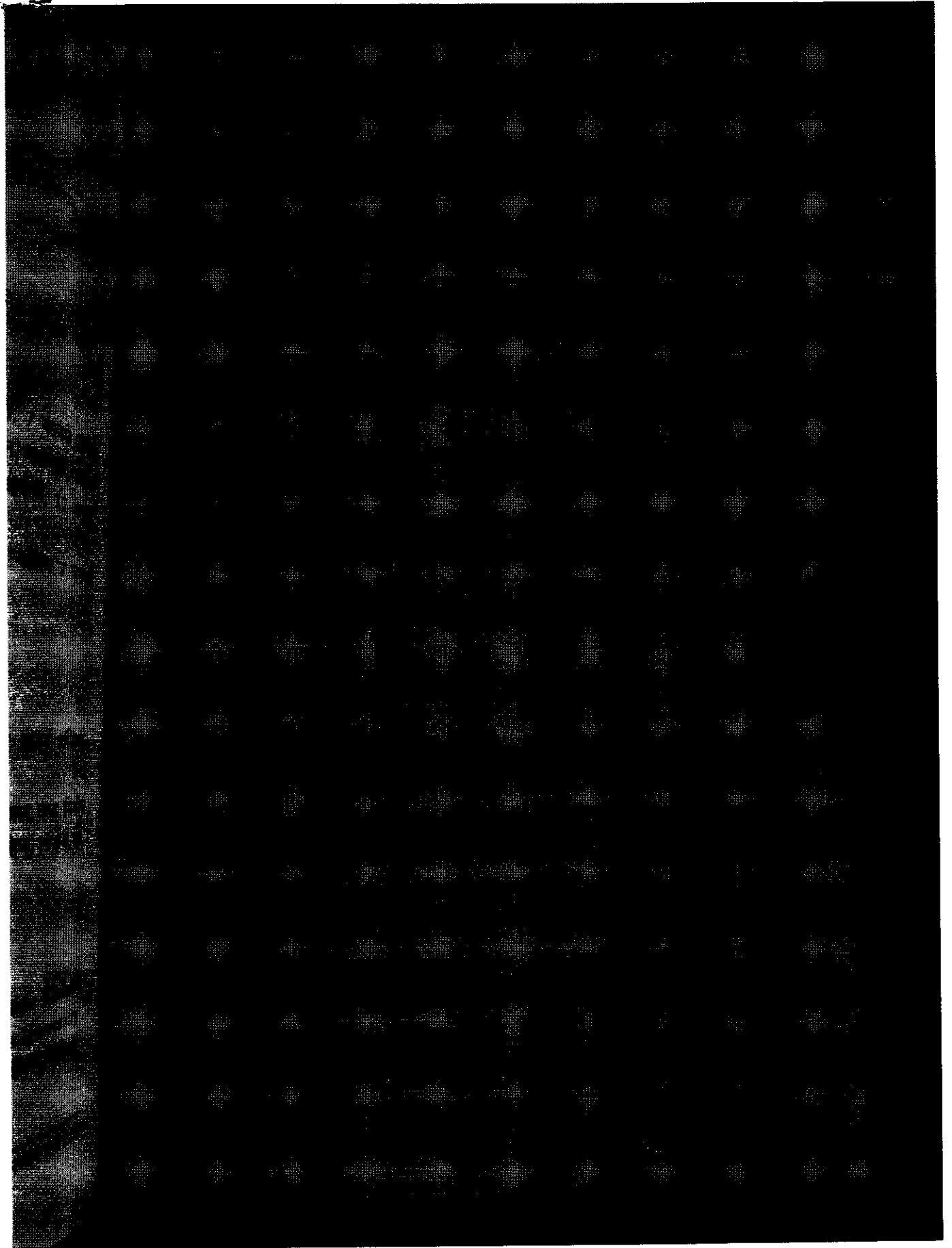


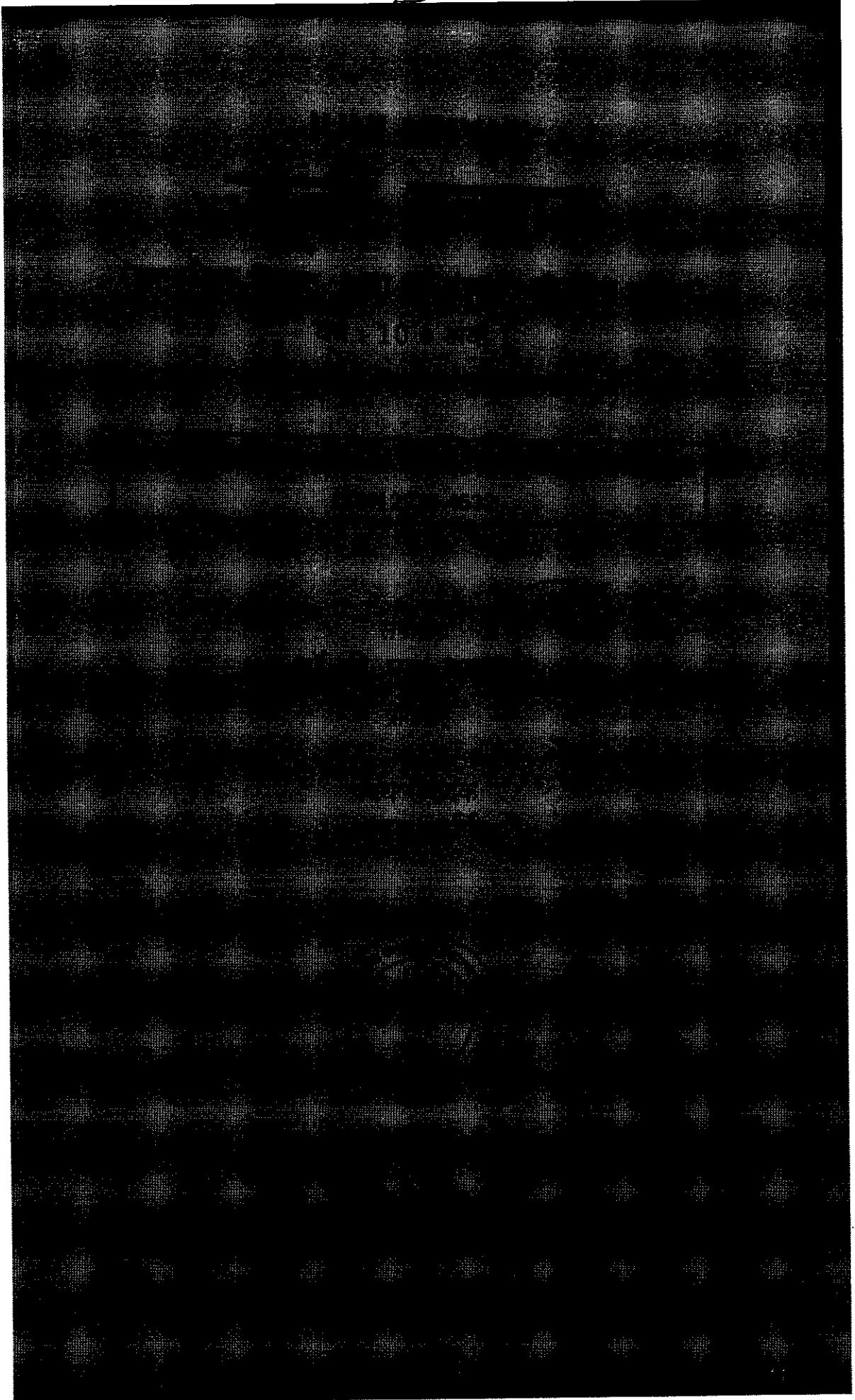
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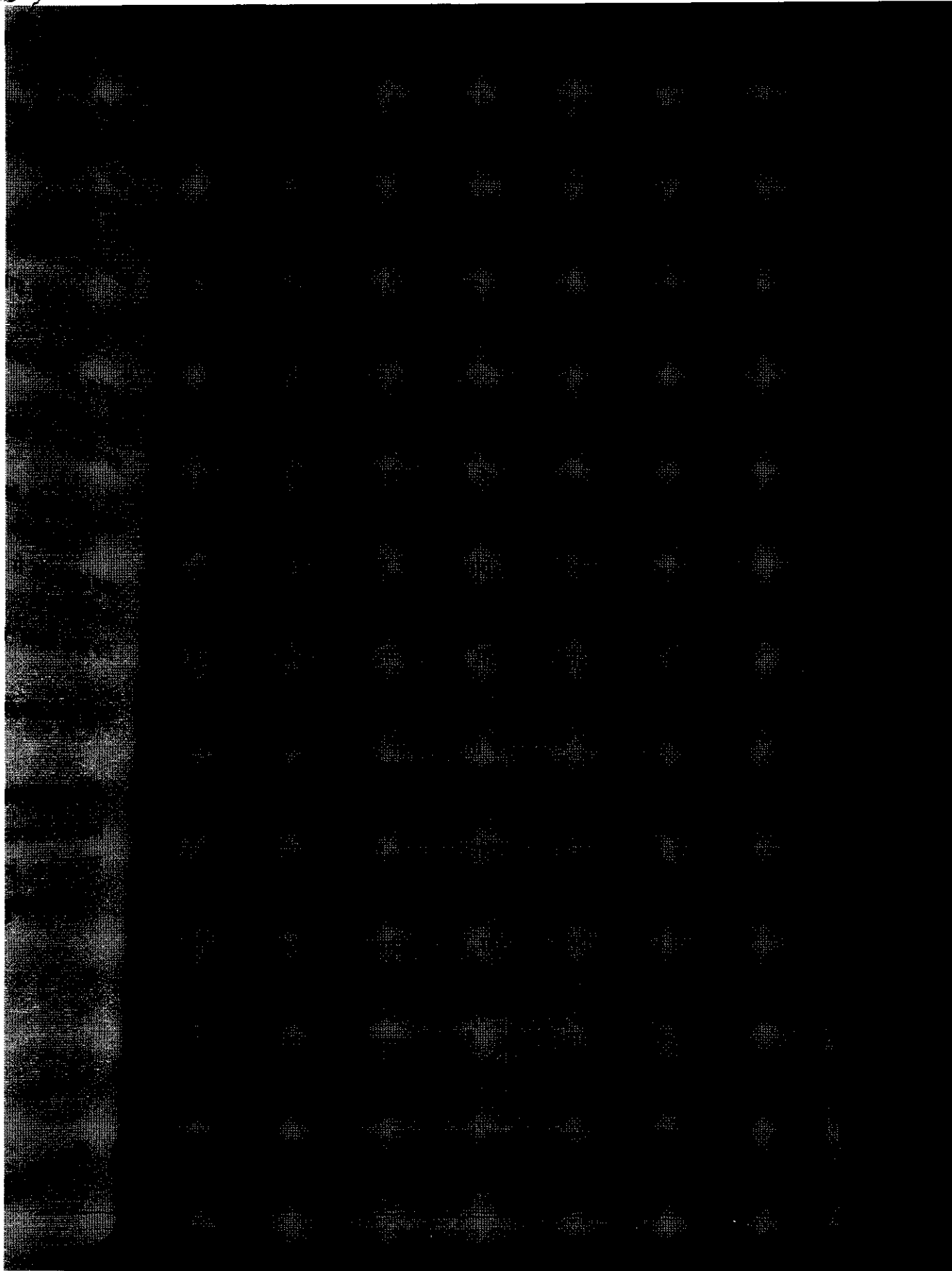


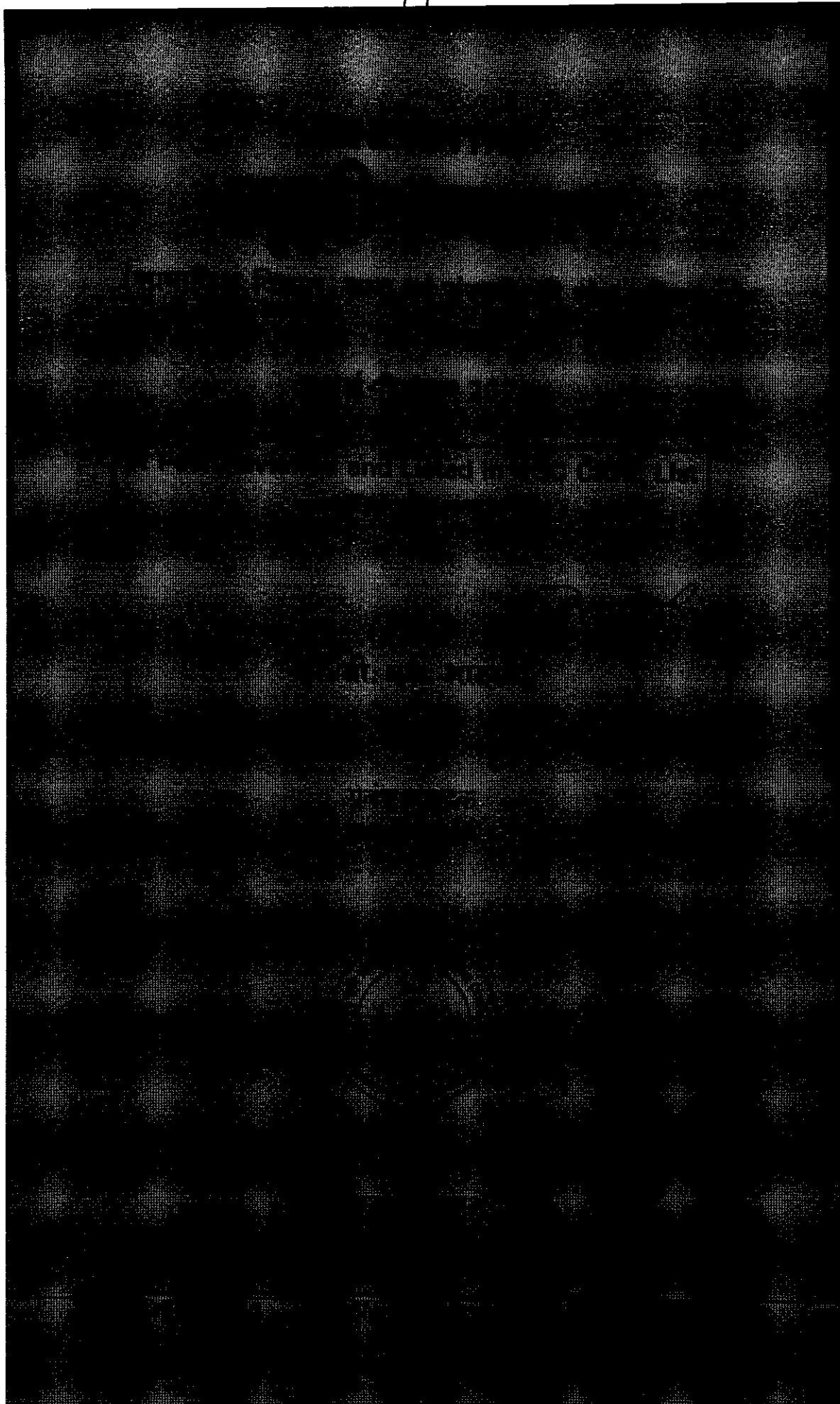
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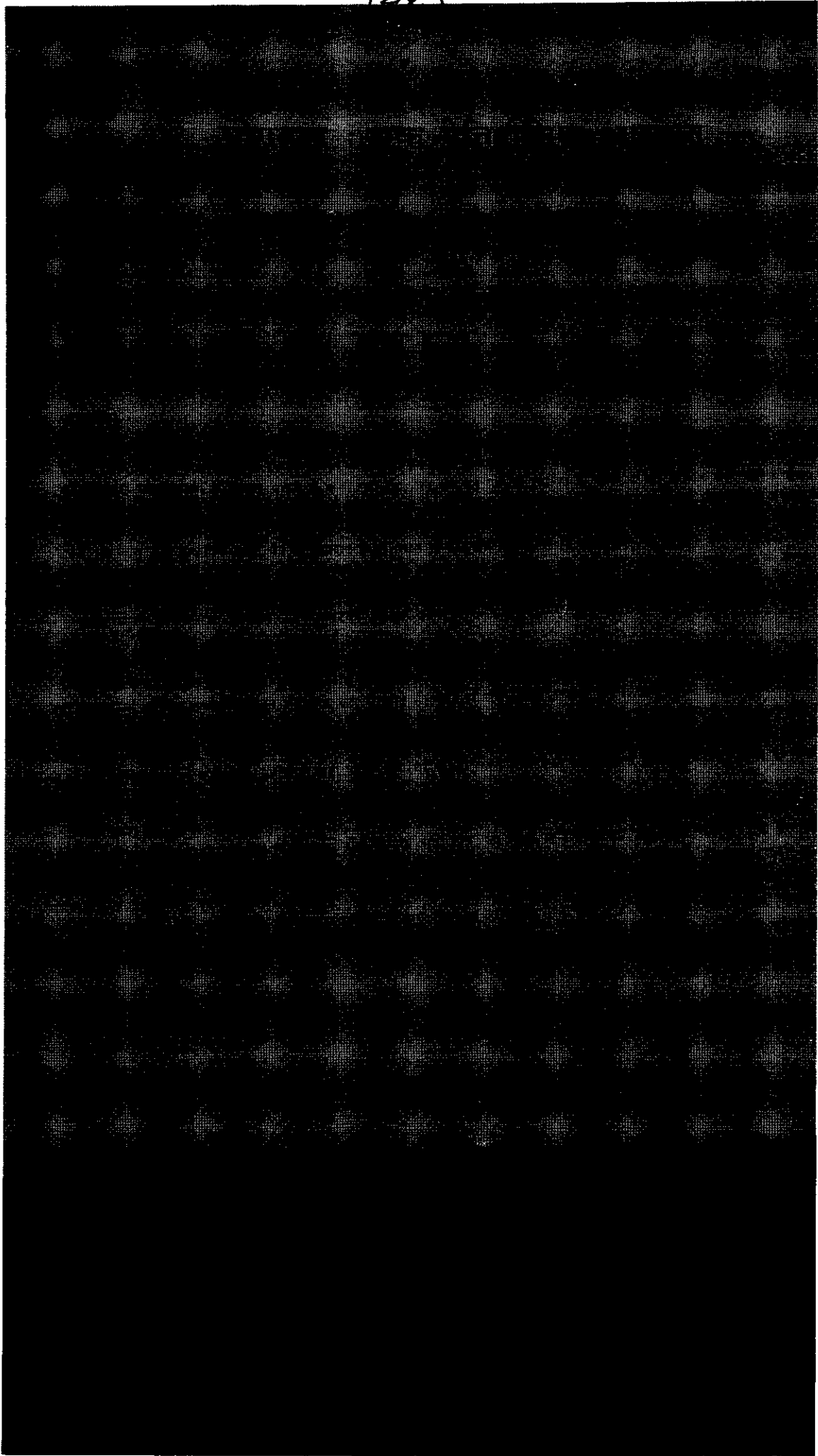






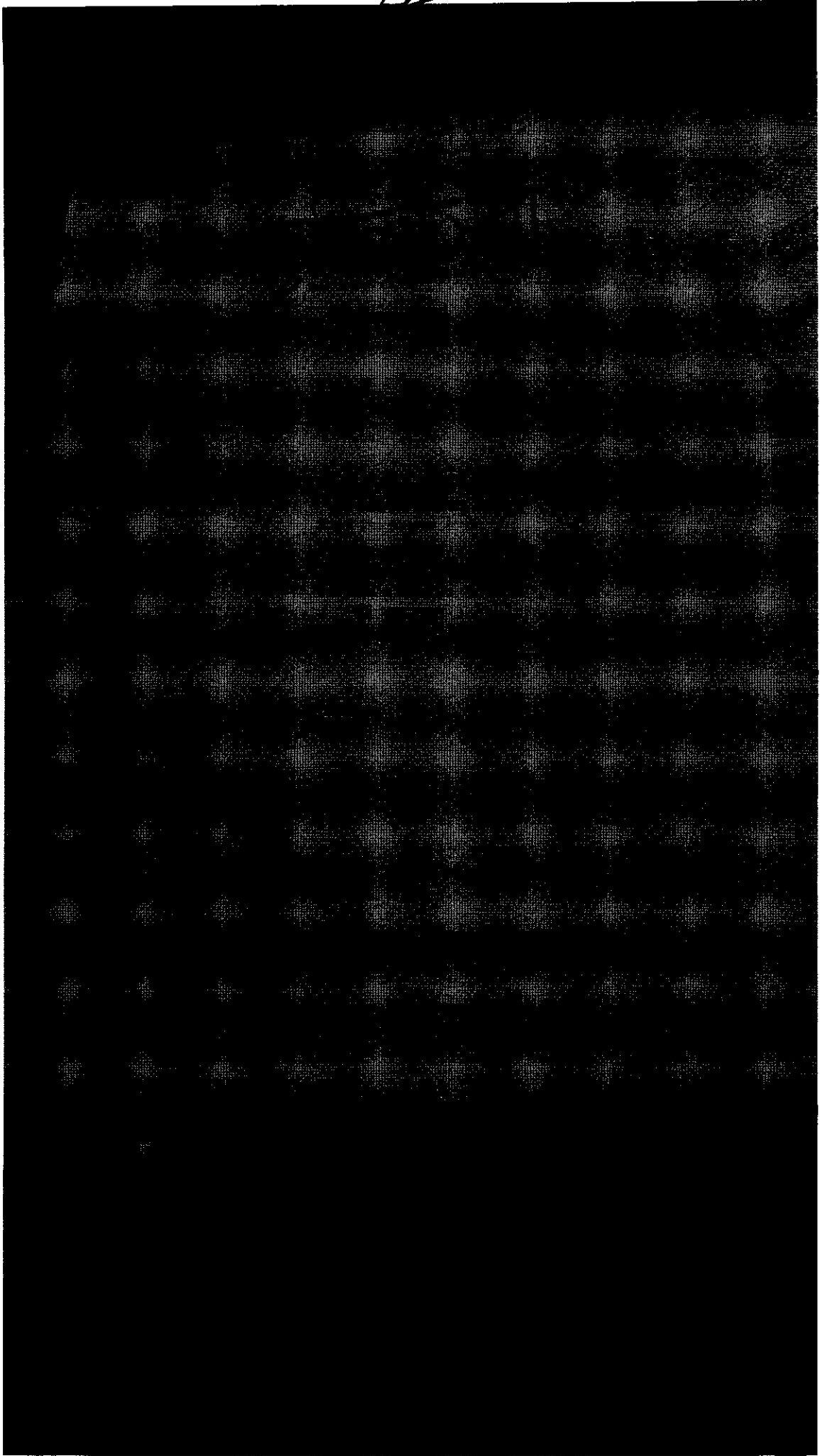






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जूनी ख्यात

Status and Role of Gond, Baiga and Binjhar Tribal Women in their community form of Amarkantak Region

Nirmala Tiwari, Research scholar Pt. Ravishankar Shukla University Raipur.
Dr. Rita Pandey, Head of Department, Department of History, Govt. MVPG College,
Mahasamund (C.G).
Prof Abha Rupendra Pal, Head of Department, SOS History, Pt. Ravishankar Shukla
University, Raipur, CG

Abstract:

Introduction: This study focuses on the status and role of tribal women in their society in Amarkantak and establishes their status in the reference of modernity scale. Amarkantak is one of the sacred religious and spiritual places in India, referred in religious epics like Ramayana and Mahabharata, classics like Puranas and literary works like Raghuvansham and Meghdootam etc. This area is geographically $22^{\circ}66.67''$ from northern latitude $81^{\circ}75.00''$. It is situated in the middle of eastern longitude. It is in Pashpurjgarh which is 55 km away from the district headquarters Anuppur. The nearest railway station is Pendra Road and the big city (division) is Shahdol 85 km away. Before 2003, Amarkantak was part of Shahdol district of Madhya Pradesh. Amarkantak is a tribal dominated area, especially Baiga, but also Gond, Binjhar and Panika tribes etc. These tribes have been subject in many previous researches. This paper focuses on the status of women belonging Gond, Baiga and Binjhar tribes, especially their customs, religion, witchcraft, marriage, and other activities. The paper also studies the contribution of these tribal women in economic and social strengthening of their respective community. This thesis hypothesizes that the role and status of Gond, Baiga, Binjhar women in their culture, customs and religious practices is noticeable as well remarkable. They own decision making capacity and authority. This is the reason I have tried to do a comparative research of them so that their actual condition can be determined that whether it is better than other tribal societies or not. This study uses method of secondary analysis which means using data that other social scientists have already collected. The use of publicly accessible information is known as secondary analysis, and is most common in situations in which collecting new data is impractical or unnecessary. The study tries to analyze whether the hypothesis is true or false.

Introduction

Gond, Baiga and Binjhar are major tribes living in Anuppur district. The Gonds and the Binjhar are a sub-group of the Baiga tribe but it is very likely that the Baiga itself is a sub-group of the greater Binjhar tribe in Chhattisgarh. They have started following Hinduism or Christianity and consequently losing their tribal character. On the other hand, most of the Gonds of the western regions are in lesser numbers in comparison to the Gonds of central Madhya Pradesh. The Gonds and Baigas show only minor differences in physical anatomy. Probably both these tribes belong to the Proto-Australoid race [1], which had been inhabited since pre-historic times in India. This group is considered as the second oldest racial group in India characterized by dolichocephalic head, broad and flat nose (platyrrhine nose) which is depressed at the root. They are further short in height, dark brown to nearly black in skin colour. The hair is wavy or curly. Supraorbital ridges are prominent. These features are found among almost all the tribes of the Central and Southern India. Their physical similarity was enhanced by the fact that until about fifty years ago, contradiction between the two tribes was frequent. The colour of the

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37

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इतिहास अध्ययनशाला
प.र.वि.शं.सु.वि.वि.रायपुर

बस्तर छत्तीसगढ़ प्रान्त (मध्यप्रांत) की एक प्रमुख रियासत थी। यह रियासत छत्तीसगढ़ के सभी 14 रियासतों में सबसे बड़ी थी जिसकी राजधानी जगदलपुर थी। इसका क्षेत्रफल 13062 वर्गमील था।⁽¹⁾रियासत की उत्तर से दक्षिण की लंबाई 180 मील तथा पूर्व से पश्चिम तक 125 मील चौड़ाई थी।⁽²⁾बस्तर एक आदिवासी बाहुल्य अंचल है जिसे संभाग का दर्जा प्राप्त है जो कि वर्तमान में 07 जिले बस्तर, कांकेर, दंतोवाड़ा,बीजापुर, कोंडागांव, नारायणपुर, एवं सुकमा में विभाजित है। किसी भी क्षेत्र का इतिहास वहाँ के निवासियों की राजनैतिक, सामाजिक, धार्मिक, आर्थिक एवं सांस्कृतिक जीवन की झांकी है तो बस्तर के इतिहास में भी ऐसी ही झांकी प्राप्त होती है।

प्रारंभ में बस्तर में राजतंत्रात्मक प्रणाली सत्ता थी तथा मध्यकाल में काकतीय वंश की स्थापना अन्नम देव द्वारा की गई। इस वंश के शासनकाल में बस्तर में राजनीतिक एवं सांस्कृतिक विकास की आधारशिला रखी गई। इस वंश को 1324 ई से 1947 ई तक बस्तर पर स्वाधीन शासक, मराठों मे नागपुर के भोसलों के पराधीनता एवं अंग्रेज के अधीन सामंती राजा के रूप में दीर्घ समय तक राज सत्ता के उपभोग का अवसर मिला। 1854 ई मे लार्ड डलहौजी के समय नागपुर राज्य, गोद, निषेध प्रथा द्वारा हड़प किये जाने के बाद बस्तर भी अंग्रेजी शासन के अधीन हो गया।⁽³⁾ इस नये शासन से न तो बस्तर के राजा नैरमदेव प्रसन्न थे, न उनके दिवान दलगंजनसिंह और न ही यहाँ की आदिवासी जनता। उन्हें यह चिंता सताने लगी की अब बस्तर की सम्यता व संस्कृति भी खतरे में है।

सन् 1856-57 में जब संपूर्ण भारत ईस्ट इंडिया कंपनी से मुक्ति पाने के लिये छटपटा रहा था, ठीक उसी समय दक्षिण बस्तर भी विद्रोह की आग में झूलस उठा। मार्च 1856 ई के अंत में दक्षिण बस्तर में आंदोलन तीव्र गति पर था। 50 वर्गमील क्षेत्र में फैले हुए लिंगागिरी तालुके की इस निर्णायक फैलाव में महत्वपूर्ण भूमिका थी। इस तालुक के तालुकदार को चार्ल्स इलियट ने धर्मारव कहा है जबकि ग्लासफर्ड के अनुसार वह धुर्वाराव के नाम से जाना जाता था। धुर्वाराव माड़िया जनजाति का था।⁽⁴⁾ धुर्वाराव कंपनी शासित बस्तर में अंग्रेजों की बढ़ती हुई दखलंदाजी से आहत थे। राजा के अधिकार सीमित हो चुके थे तथा आम जनता से उनकी दुरी बढ़ती ही जा रही थी। ईस्ट इंडिया कंपनी की सरकार चाहती थी कि बस्तर राज्य के मुकदमें उनकी अदालतों से सुलझाये जायें जबकि घनघोर जंगल मे स्थित बस्तर राज्य के लिए कानून किस चिड़िया का नाम है, यह जानना अभी बाकि था। बस्तर के राजा को परम्परागत रूप से प्राप्त सिविल तथा किमिनल दोनों ही स्थिति में न्याय करने का अधिकार अब छीन लिया गया। इसके साथ ही लगान की प्रक्रिया में भी बदलाव लाने की कोशिश की जाने लगी। यह खबरें भी आम थी कि आस-पास के गावों से युवक गायब हो रहें है, उन्हें जंगल काटने और बेकारी कराने के लिये उठाये जा रहें है। इन घटनाओं के पीछे अंग्रेजी कंपनी ही संदिग्ध पाये गये। कम्पनी के शासनकाल में बस्तर के जंगल की कटाई तेज होने लगी। जंगलों का सफाया यानी आदिवासियों के जीवन के खतरों की घंटी जैसी थी, अतः असंतोष होना स्वामाविक था।⁽⁵⁾

बस्तर का भोपालपट्टनम जमींदारी, बस्तर राज्य की सीमा निर्धारित करती थी, इसलिए नागपुर के हलचलों और अंग्रेजों के सुदूर दक्षिण तक बढ़ते हुए प्रभाव की जानकारी धुर्वाराव को मिलती थी, उन्हें यह भी ज्ञात हो गया कि भारत में जगह-जगह ईस्ट इंडिया कंपनी के खिलाफ इन दिनों बगावत की आग सुलग रही है। उन्हें भी यह सही अवसर लगा कि स्थान-स्थान पर युद्ध में उलझे हुए अंग्रेज एक नया मोर्चा हर्मिज नहीं खोलना चाहेंगे। सामान्य कदकाठी के इस माड़िया युवा धुर्वाराव की सोच और दुरदर्शिता बेमिसाल थी। जिस राज्य को बिना लड़े केवल छल से और नीतियों की दुहाई देकर हड़प लिया गया है, और उसके राजा के पास जुवान का अभाव हो गया हो, उसी के छोटे से तालुके लिंगागिरी का तालुकेदार बस्तर राज्य को अंग्रेजों से मुक्त कर देना चाहता था। उसने बस्तर के राजा भैरवदेव से भी निवेदन किया कि वह भी गैर कानूनी सरकार के खिलाफ विद्रोह कर दें, लेकिन भैरवदेव ने रहस्यमय चुप्पी ओढ़ ली।⁽⁶⁾

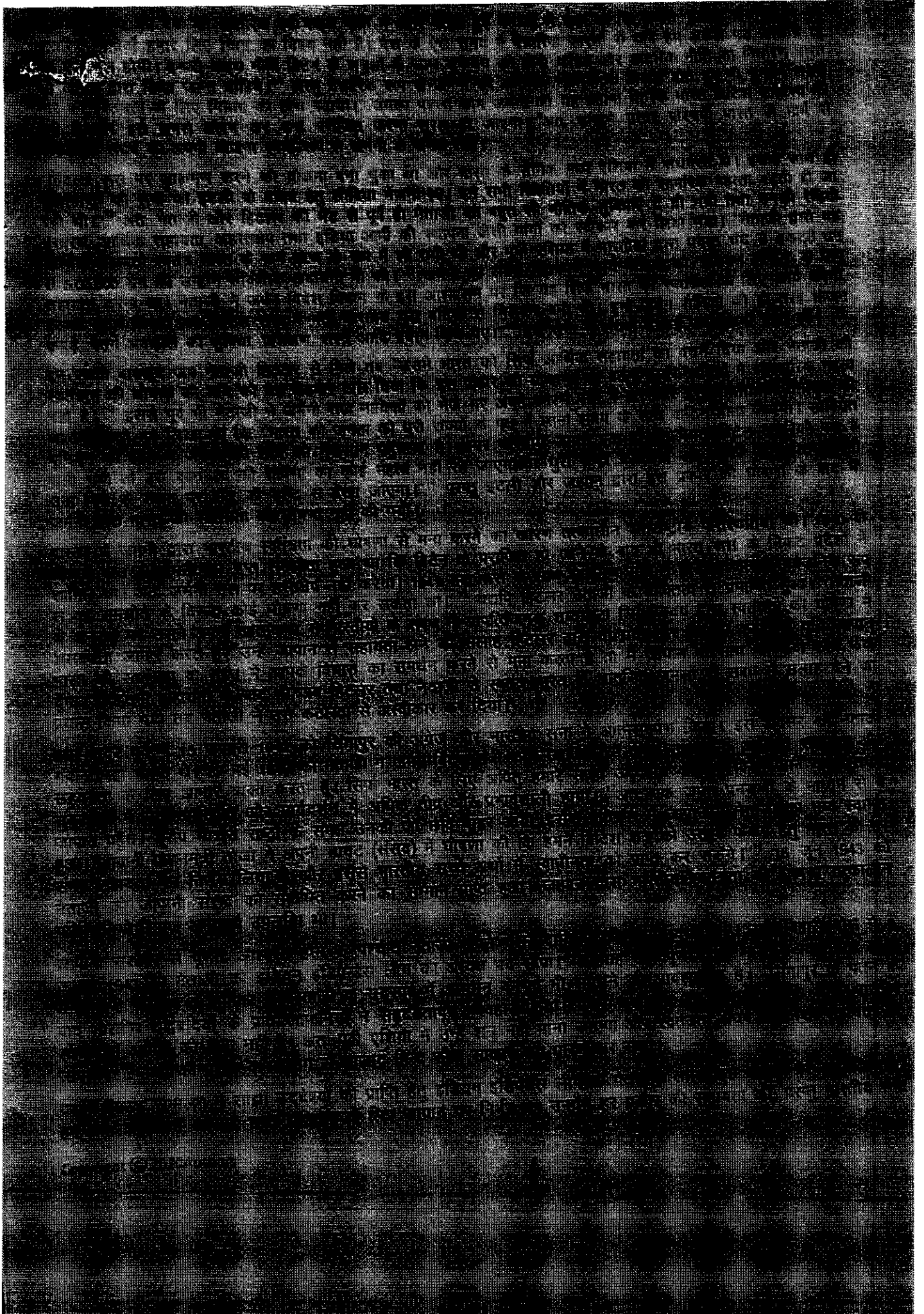
धुर्वाराव ने अपने माड़िया व दोरला साथियों को संगठित कर दक्षिण बस्तर में अंग्रेजों को न घुसने देने की दिशा में कार्य करना आरंभ कर दिया। इसी दौरान उसके भोपालपट्टनम के जमींदार का पुत्र यादोराव, मोमनपल्ली के तालुकादार बाबुराव एवं अरपल्ली तथा घोट के जमींदार व्यंकटराव से मित्रता हो चुकी थी तथा वे भी अंग्रेजों के खिलाफ विद्रोह में धुर्वाराव का साथ देने को तैयार हो चुके थे। विद्रोहियों द्वारा अंग्रेजी सेना पर प्रहार करने की योजना को अंतिम रूप घोटुलों में दिया गया। चिंतलनार की पहाड़ियों पर इस तरह से घेराबंदी की गई की अंग्रेजी सेना किसी भी तादाद में हो उसे कड़ा संघर्ष करने पर बाध्य होना पड़ता।

2 मार्च 1856 को एक अंग्रेजी बटालियन चिंतलनार की पहाड़ियों से गुजर रही थी। जहाँ पर धुर्वाराव अपने तीन हजार साथियों के साथ घात लगाकर बैठे थे, वे सभी अंग्रेजी सेनाओं के उपर दूट पड़े। बटालियन का नेतृत्व कर रहा कमांडर के घोड़े को तीर लगने से सनसनी फैल गई। इससे पहले कि कोई समझ पाता, कभी किसी पेड़ की आड़ से, तो कभी किसी झुरमुट से तीरों की बारिश होने लगी। ब्रिटीश सैनिकों में भगदड़ मच गयी, अब बंदूकें भी चलने लगी। घात-प्रतिघात की स्थिति शाम साढ़े तीन बजे तक चलती रही। स्थिति को प्रतिकूल देखकर प्लाटून कमांडर किसी तरह भोपालपट्टनम की ओर भागने में सफल हो गया।⁽⁷⁾

अब ब्रिटीश प्लाटून कमांडर ने अपनी "फूट डालो और शासन करो" की नीति का सहारा लिया। उसने भोपालपट्टनम के जमींदार से विद्रोह को कुचलने के लिए सहायता माँगी तथा वह जमींदार लिंगागिरी तालुका को दिये जाने के एवज में तैयार भी हो गया। जमींदार के सहयोग से एक कायराना योजना को अंजाम दिया गया। आसपास के गांवों में 460 बुढ़े, औरतें व बच्चे को खीच-खीच कर बाहर निकाले गए तथा बंधक बना लिए। इनमें धुर्वाराव की पत्नि और बच्चे भी थे।⁽⁸⁾

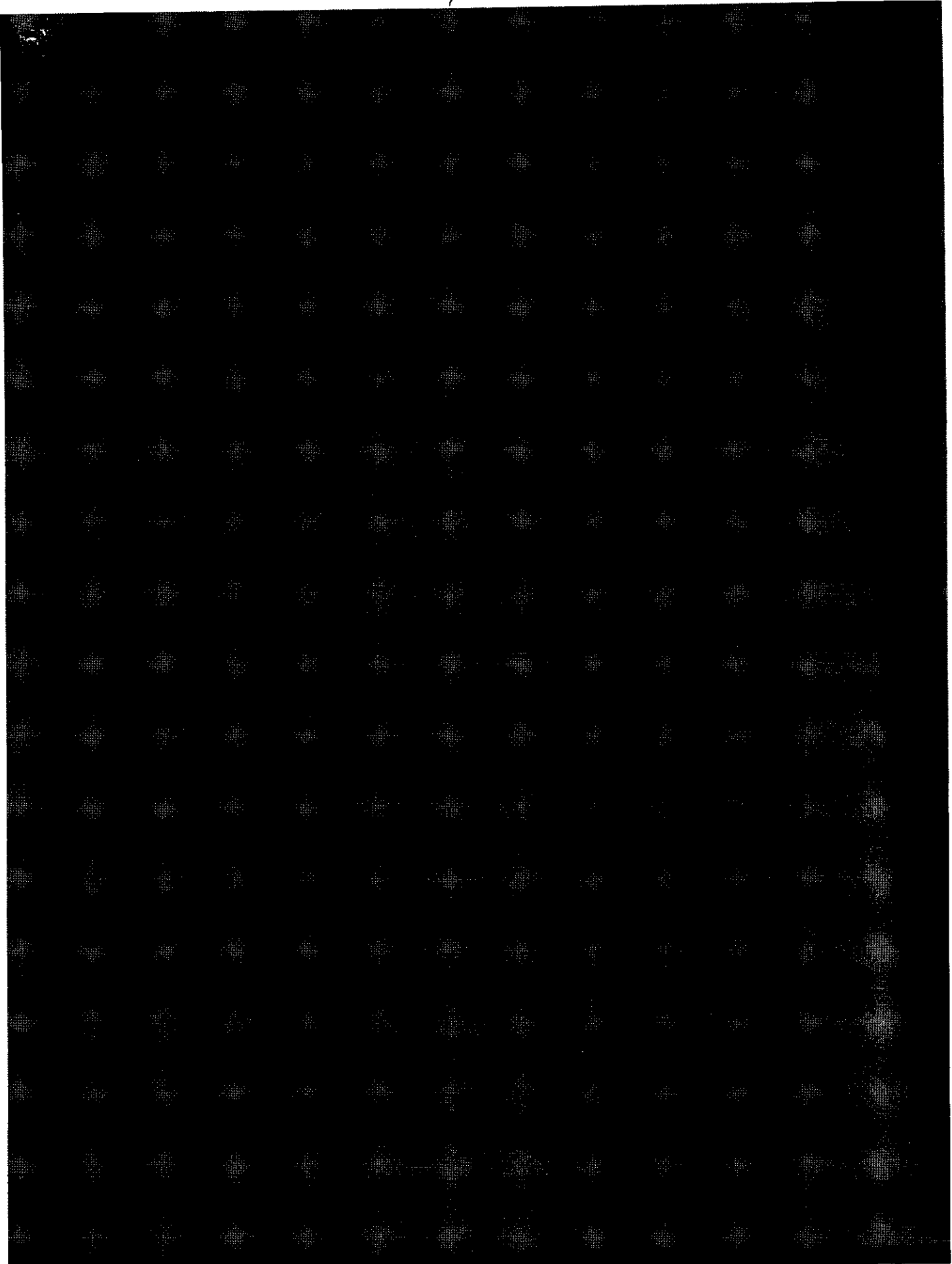
अंग्रेज प्लाटून कमांडर व भोपालपट्टनम का जमींदार युद्ध भूमि की ओर बढ़ रहे थे तभी एक तीर, पेड़ पर मोर्चा बांधे किसी माड़िया वीर के हाथों से छुटा और जमींदार के कंधे में जा धंसा जिससे वह घायल हो गए, साथ ही भोपालपट्टनम का एक सरकारी कर्मचारी मारा गया।⁽⁹⁾ जख्मों पर जंगली पत्तों का रस लगाने के बाद कुछ ठीक लगने पर भोपालपट्टनम के जमींदारों ने भी अपना संयम खो दिया था। एक संदेश वाहक को इस सूचना के साथ धुर्वाराव की ओर रवाना किया कि यदि अपने गांवों के बुढ़ो, बच्चों और औरतों को बचाना चाहते हो तो लड़ाई को तुरंत रोक दो तथा समर्पण करों अन्यथा बंधकों के साथ तुम्हारे पत्नि और बच्चे भी है, वह भी मारे जायेंगे।⁽¹⁰⁾

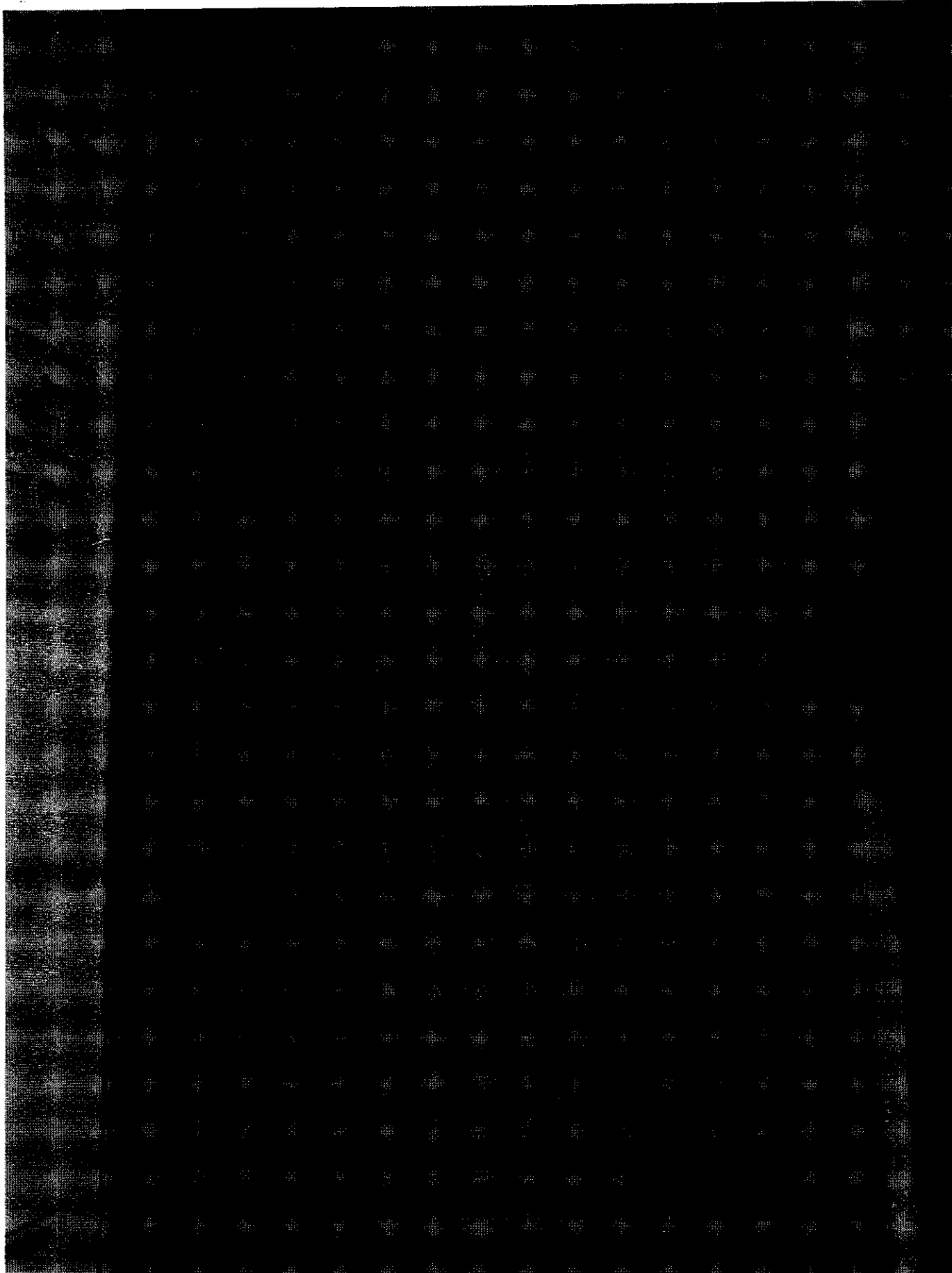
वीर धुर्वाराव इस कीमत पर जीत नहीं चाहता था। अपने बुजुर्गों, औरतों व बच्चों की लाशों पर हासिल जीत के कोई मायने नहीं थे। उसने आत्मसमर्पण का फैसला कर लिया। धुर्वाराव को



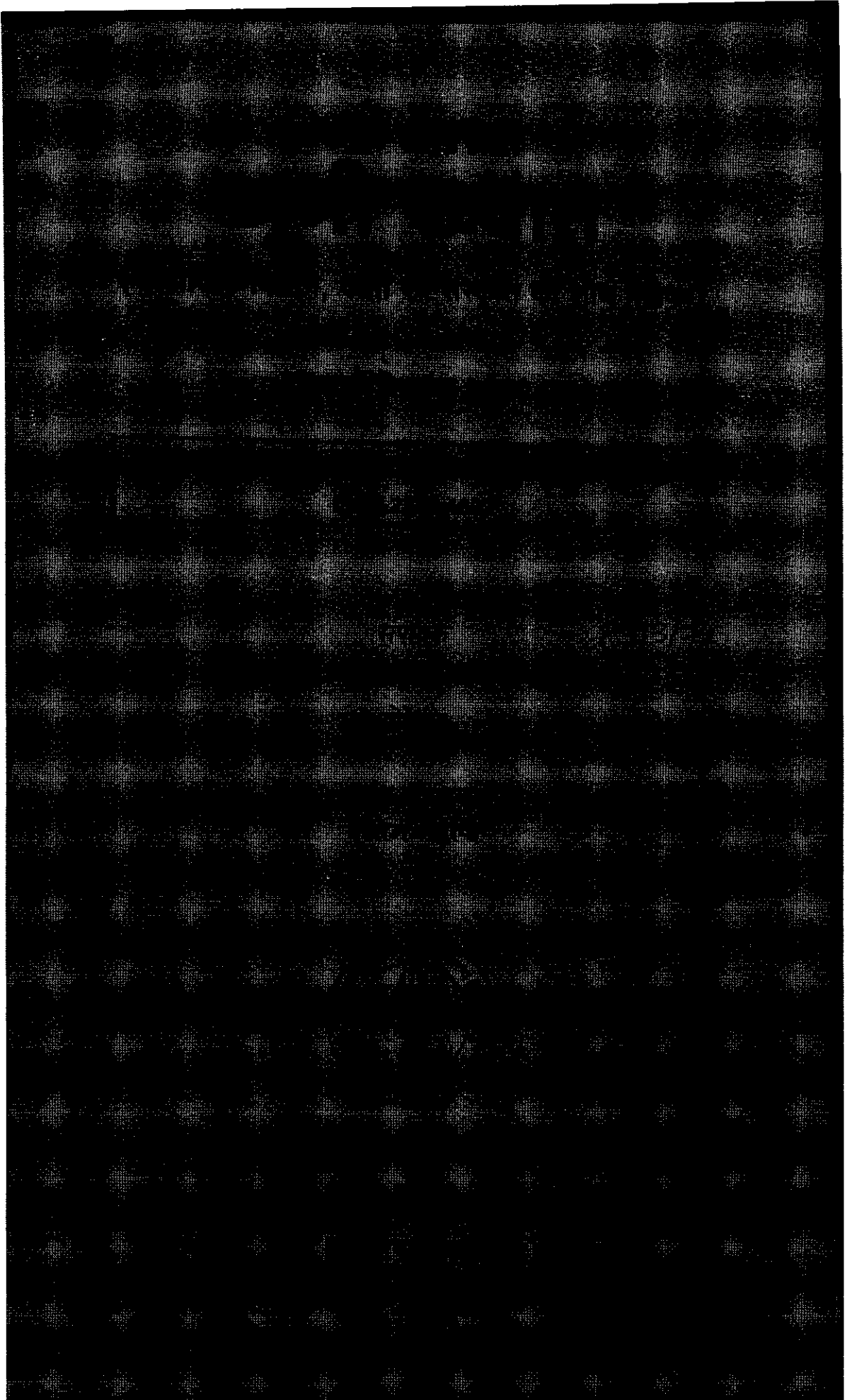
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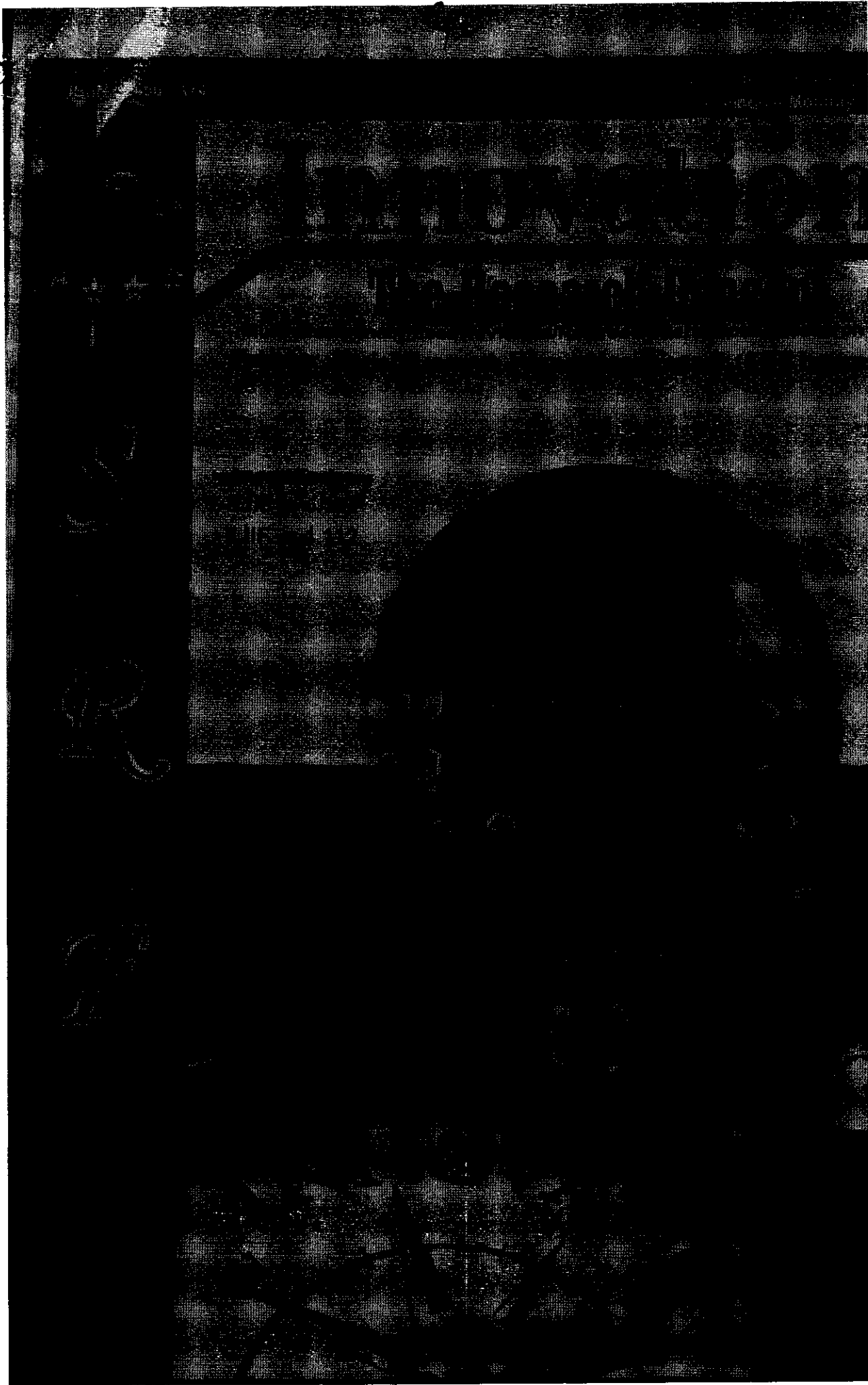
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बाल जनजातीय महिलाओं की स्थिति का ऐतिहासिक विश्लेषण (बालक जिला के विशेष संदर्भ में)

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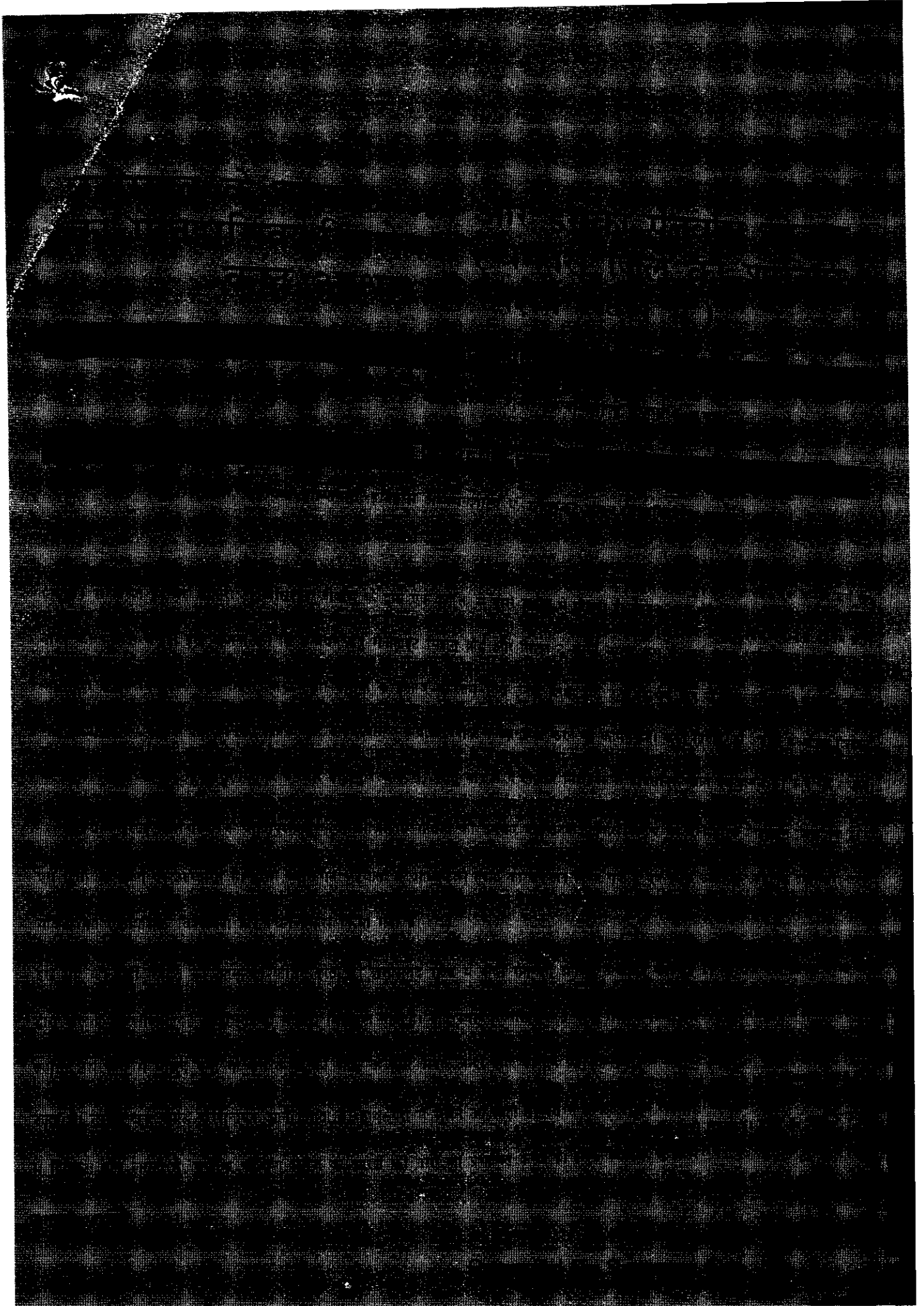
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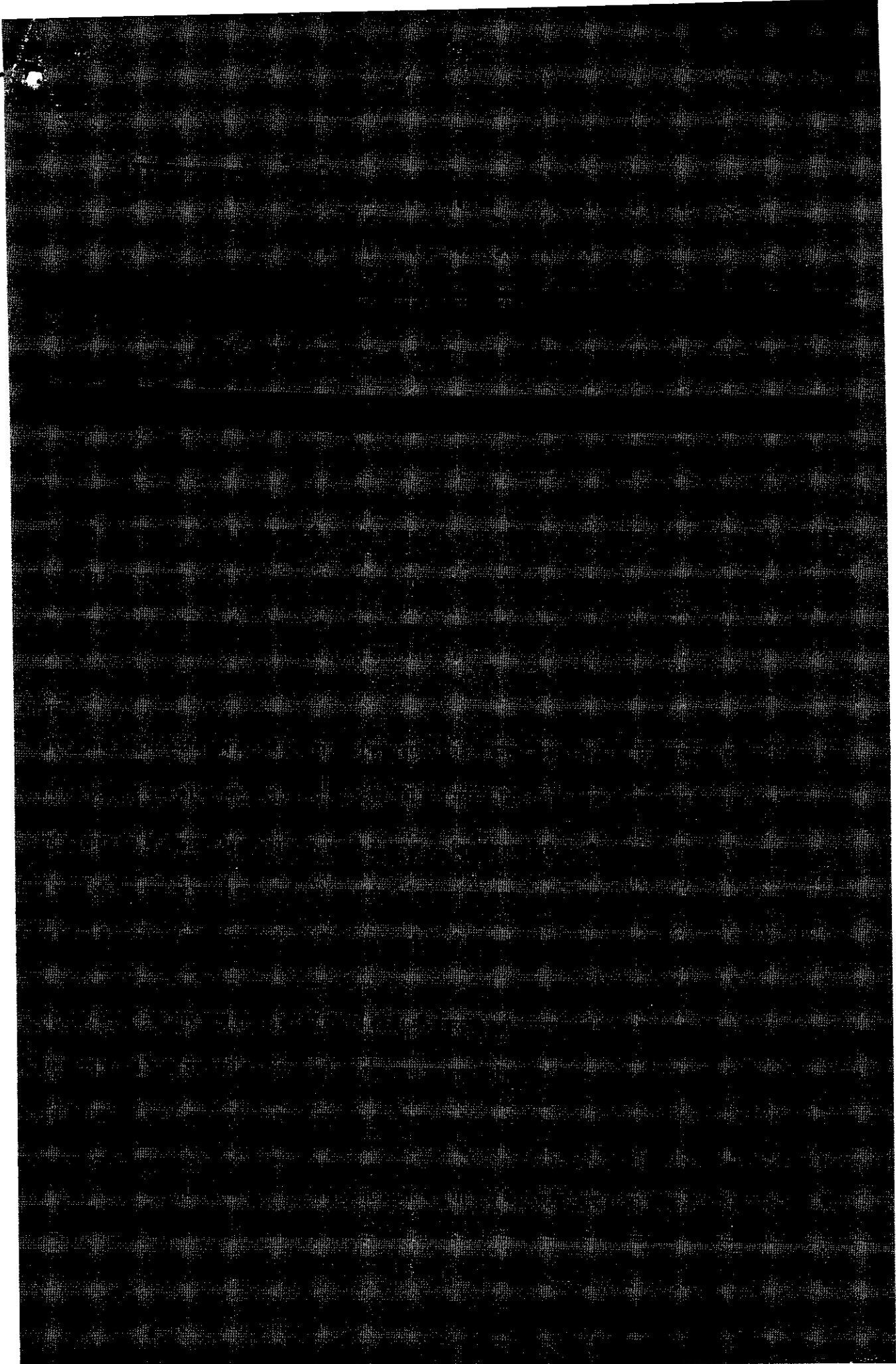
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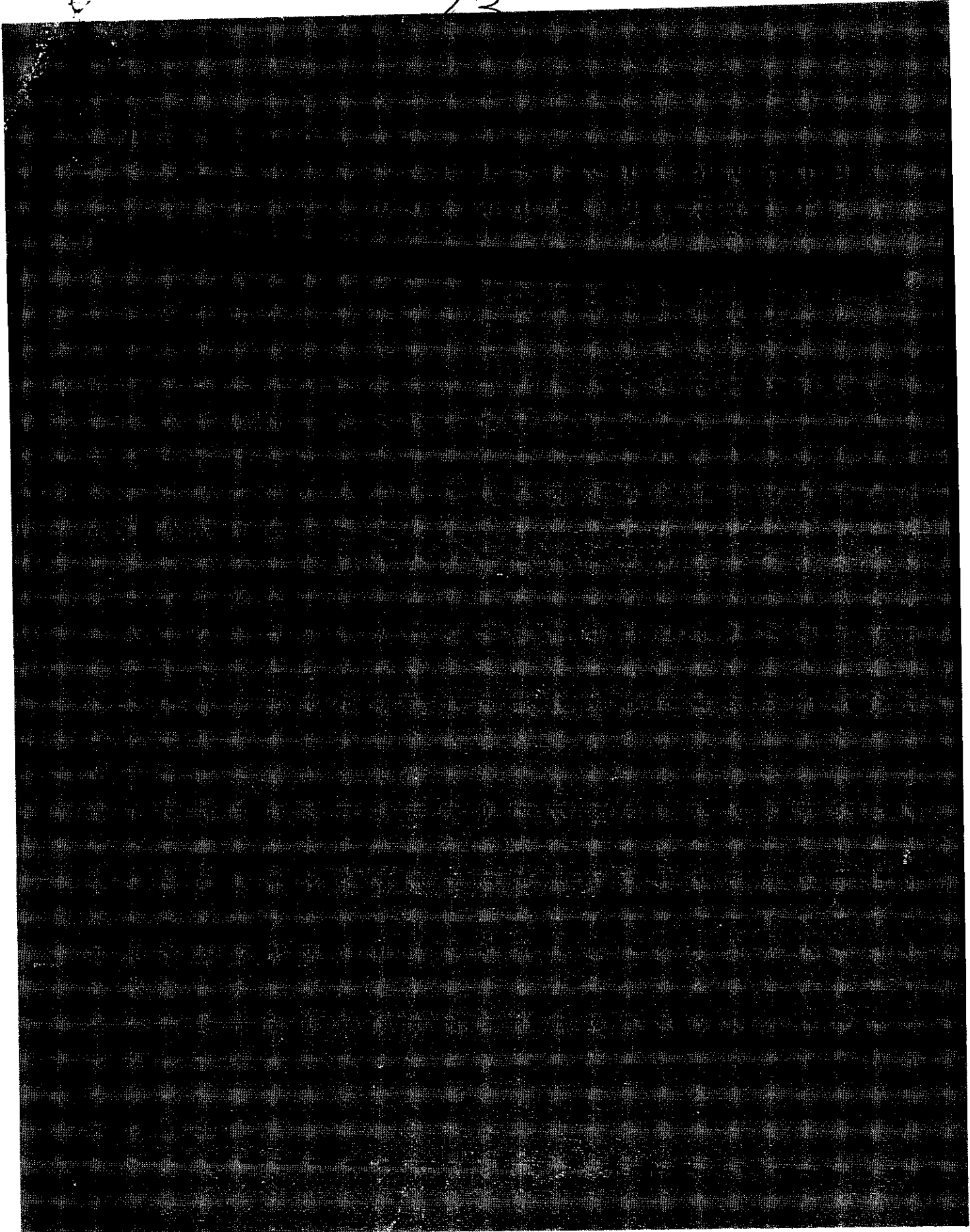
संस्कृत

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D. S. Mahipal

Doctoral Fellow, Department of Library and Information Science, Pandit Ravishankar Shukla University, Amanaka G.E. Road, Raipur - 492010, Chhattisgarh
(E): dsmahipal82@gmail.com

M. Verma

Professor, Department of Library and Information Science, Pandit Ravishankar Shukla University, Amanaka G.E. Road, Raipur - 492010, Chhattisgarh
(E): verma-maya64@rediffmail.com

Abstract

Library resources and services are pivotal role players in teaching, learning, and innovation. Owing to the adoption of information communication technology (ICT) in library and day-to-day changing information needs of the users, it is need of present era to redesign the library resources and services. The study which forms the subject matter of the present article highlights the usage of resources and services by agriculture postgraduate colleges of Chhattisgarh and examines the library resources and services which are really useful to agriculture scientist. Further the study is focused on significance satisfaction level differences amongst agriculture scientists. For carrying out this study, the research approach was used as a survey method. Questionnaire was used as a tool for getting information from respondents. The findings of the study have confirmed that most of the agriculture scientists were occasional visitors to the library due to less information resources in the library. It was found that majority of the agriculture scientists were partially satisfied with the library resources and services.

Keywords: Resources, Services, Agriculture scientist, Library

27 (24)

Lotka's Law and Productivity Patterns in the field of Genetics and Plant Breeding

Manika T. Sharma^{1*} & Dr. Santu Ram Kashyap²

¹Asst. Librarian, Indira Gandhi Agricultural University, Raipur (C.G.)

²Sr. Assistant Professor, SOS in Library and Information Science, Pt Ravishankar Shukla University, Raipur

*Email: manikathasharma@gmail.com or kashyap1976@rediffmail.com

Abstract: In this paper we have selected Indian journal of Genetics and Plant Breeding for bibliometric study. In this study data was taken from only 10 volumes vol. 68 (2008) to vol. 77 (2017). The purpose of this study is to examine the applicability of Lotka's Law on the above sample. To confirm the applicability of Lotka's Law a KS test was performed to examine the deviation between Observed cumulative frequency and Expected Cumulative Frequency. After application of KS test it is found that Lotka's Law does not fit on the given sample.

Key Words: Lotka's Law, KS-Test, Bibliometrics, Bibliometric Study, Indian Journal of Genetics and Plant Breeding.

Introduction:-

Indian Journal of genetics and plant breeding is published by Indian Society of Genetics and plant Breeding, New Delhi. Its SJR is 0.24 and H Index is 10.0. NAAS rating of this journal in 2017 is 6.28. It is a peer reviewed journal. This journal is interdisciplinary in nature. (jgaoplas.com). Its impact factor is 0.409. (scopus.com/submit-forms.php) Its publication frequency is quarterly. It publishes in the month of Feb, May, Aug and Nov.

"The Indian Journal of Genetics and Plant Breeding is a periodical for the publication of records of original research in all the branches of genetics, plant breeding and cytology, including nuclear genetics, molecular Biology and biotechnology, and other cognate sciences of sufficient importance and of such a character as to be of primary interest to the geneticist and plant breeder." (<http://www.jgaoplas.com/index.php>)

In this paper we will study the authorship productivity pattern of the journal of Genetics and Plant Breeding for 10 years 2008-2017 as well as we will study that this journal follows Lotka's law or not.

Review of Literature:-

Literature Review is the basic homework for any research process or it can be regarded the best strategy of any research. So to find out the objective of any Research comprehensive review of literature available on the topic is very much important. So many studies have been done in the field of bibliometrics. Many Researchers applied Lotka's Law in different disciplines and found different results.

Miranda Lee Pao in his paper Lotka's Law: A testing procedure has given step by step guidelines to find the author productivity through Lotka's Law. This paper becomes a land mark in study of Lotka's law and helps many of the researchers in their research work. This paper speak about how to calculate each and every value related to Lotka's law and what lotka's law can be applied. (Pao, 1985)

Marta Petek has done a study for testing Lotka's law through Personal name headings in CCNIB which is cooperative Bibliographic Database and contains 30,83,000 plus records. In this study author chose a random

Electronic Information-seeking behavior amongst Social Science faculty**Kirti Jadhav**Research Scholar, SoS of Library & Information Science
Pt. Ravishankar Shukla University Raipur, Chhattisgarh.E-mail: kirtijadhav@gmail.com

9303484700, 9131807877

Santa Rani KashyapSr. Assistant Professor, SoS of Library & Information Science
Pt. Ravishankar Shukla University Raipur, Chhattisgarh.E-mail: sr_kashyap1975@rediffmail.com

7610612593

ABSTRACT

The internet has become an important source to acquire information in this Covid-19 pandemic situation. Today, the internet is providing 24 hours service to us even though libraries have been closed in this critical pandemic situation. This study is to investigate the electronic information-seeking behavior of social science faculty, who work in colleges affiliated to Atal Bihari Vajpayee University, Bilaspur, Chhattisgarh. A survey method has been adopted for this study and used the questionnaire as a tool for data collection. The analysis showed the test of Chi-square, cleared that influence of gender counterpart on the use of the internet is not found statistically significant but the relationship between age and form of document (Print and Electronic) for reading and writing and the relationship between the use of e-books and e-journals with other electronic resources are found highly significant. They largely depend on e-books and e-journals among other e-resources. Regarding skills for using e-resources the internet majority of faculty found it by themselves and search through the search engine. To use of internet majority of the social faculty answered that the internet has been affected their information-seeking behavior positively with the help of it they get new and updated information frequently.

Keywords: Internet, Electronic resources, Effects, Linking Facilities.

1. INTRODUCTION

Social sciences are the study of society and social relationships that deal with human behavior in its social and cultural aspects. The cluster of disciplines like political science, sociology, economics, social and cultural anthropology, as well as economic geography are coming under this group but the Indian Council of Social Science Research (ICSSR) recognizes some others subject as social sciences, they are psychology, management, international relation, social work, criminology, education, computer. In the present scenario, information is the basic need of humankind after air, water, food, and shelter. It is the key element in all research activities. Information reduces uncertainty, helps policy formation, and decision making. It is most important for teaching, research, and development in academics. Information seeking behavior is one of the most famous areas in library and information science. It is the way, where people search, evaluate, obtain, and use the information to satisfy their information required. In

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RESEARCH ARTICLE

Research Productivity and Degree of Collaboration in Indian Journal of Information Sources and Services during 2013-2017

Dr. Harish Kumar Sahu

Sr. Assistant Professor, S.O.S. in Library and Information Science, Pt. Ravishankar Shukla University, Raipur
(C.G.) - 492010, India

*Corresponding Author Email: har1197479@yahoo.in

ABSTRACT:

This study research productivity and degree of collaboration in Indian journal of Information Sources and Services during 2013-2017. For the study data were downloaded and collected from www.trp.org.in/ijiss. In this study distribution of articles, references distribution, country-wise articles contributions, page length of articles contributions, institution wise research contributions, authorship patterns, single and multi authors contributions, degree of collaboration and most productive authors. The study has found that the contributions of research articles to Indian journal of Information Sources and Services were not only from in India but also from foreign countries. For the analysis of the study 03-07 volumes containing 10 issues and 90 research articles have been taken up. The maximum number of research articles 25 (27.77%) articles was published in 2014. The average degree of collaboration is 0.788.

KEYWORDS: Bibliometrics, Indian journal of Information Sources and Services, distribution of articles, references distribution, country-wise articles contributions, page length of articles contributions, institution wise research contributions, authorship patterns and degree of collaboration.

1. INTRODUCTION:

'Indian journal of Information Sources and Services' is an Indian, peer-reviewed journal, devoted to multidisciplinary library and information science journal, published by the research publication, Tamil Nadu, India. It is a half-yearly journal published since 2011 as a published every year in January-June and July-December. This study highlights the various article of this journal during 2013-2017.

2. SCOPE OF THE STUDY:

The Scope of the present study is Indian journal of Information Sources and Services. It published Original articles in the field of multidisciplinary library and information science journal. The study covers 10 issues from 3-7 Vol. during the years 2013-2017. It is found that 90 research papers were published during the study period.

3. REVIEW OF RELATED LITERATURE:

Previously several studies by different authors have been analyzing the contribution of Library and Information Science journals.

"Suriya (2010) analyzed the study mostly the publication performance of the 53 countries both from the developing and developed world is attempted to observe the share of various continents, countries and institutions in the production of publications in the subject sociology." [1].

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• Perception of Thangka Paintings by Tourists: Outlining the Ethnographic Evidences from Thangka Painters <i>Laxmi Dama Bhunia, Dr. R. A. Sharma</i>	905
• The Meaning of Life in the Second Half of Years <i>Sangita Gantam</i>	911
• Skill Efficiency Comparison: Government Vs Private Sector <i>Chandramani P Singh, Dr. Vival M Shibu</i>	915
• Construction and Standardisation of Self-Regulated Learning Scale (SRLS) <i>Dr. Ram Mohan, Dr. Anweri Kaur</i>	924
• To Study The effect of a sample HQ training on the BQ of employees of different Organisation in Ahmedabad <i>Sandil Chhabwal, Prof. (Dr.) Vival Kumar Shibu</i>	929
• An innovative swift approach for grocery purchases by metropolitans in the 21 st -century Kiranas: An analytical synthesis <i>Dr. Garvishal Sinha</i>	932
• How Can We Reconciliate Jesus Christ of The Bible and Prophet Jesus of The Quran? <i>Mayasar M Peerzada, Dr. P. S. Syed Masood Jamali</i>	935
• Exclusion of under Privileged Children in school Education: A Study in a bordering town in Assam <i>Dr. Jayeeta Sen</i>	944
• Regional Disparities of Health Care Infrastructure in Koch Bihar District, West Bengal <i>Bhupen Barman, Dr. Ranjan Roy</i>	949
• Research Productivity and Degree of Collaboration in Indian Journal of Information Sources and Services during 2013-2017 <i>Dr. Harish Kumar Sahu</i>	960
• Mathematics Anxiety of Secondary School Students in Relation to Self-Motivation, Self-Regulation and Responsibility of Emotions, Self- Esteem besides Confidence with Metacognition <i>Dr. Radha Arora, Kirandeep Kaur</i>	965
• Cultural Communication Pattern of Santal Community in Bishnupur <i>Ronit Chakraborty, Dr. Pooja Bassnet</i>	975
• Selling of Tokay Gecko (<i>Gecko gecko</i>): A Money Making Business in Forest-Fringe area of Jalpaiguri District, West Bengal, India <i>Chandan Datta</i>	979
• How Bureaucratic Dysfunctions Incapable State Universities to Attain Administrative Goal? <i>Dr. K.N. Dinesh</i>	984
• Environmental Damages: An Economic Assessment - A Case Study of Environmental Damages caused by Rice Mills <i>Dr. Sameer Agrawal, Dr. Ritesh Kumar Agrawal</i>	989
• A Study on Financial Management of Unaided Private Schools in Gujarat State <i>Sandeep Kumar R Pandya, Dr. N. D. Shah</i>	995
• Economic and Occupational Profile of the Rural Disabled Women: A Study of Raichur District of Karnataka <i>Lloyd Vicky D'Souza, Dr. Mohan S. Singhe</i>	1001
• Instruction to author.....	1006

Factors Affecting on Job Satisfaction level and Social Status among Library Professionals in Chhattisgarh

Aditi Joshi^{1*}, Harish Kumar Sahu²

^{1,2} School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur, C. G. (India)

*Corresponding Author: aditijoshi2479@gmail.com

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ABSTRACT :

This paper examined job satisfaction levels among library professionals in Chhattisgarh region based on different affecting factors. This survey study is made up of 69 library Professionals in different 7 districts. The majority of the respondents are female library professionals (53.62%) while the rest are male professionals (46.38%). Among the sample of library professionals, 81.16 % are married and 18.84% are unmarried. A questionnaire was distributed by hand and through the mail for data collection and analyzed using excel. Job satisfaction is a very essential aspect that is often evaluated by organizations. The way of measurement is the use of an evaluation scale where librarians report their opinion to their jobs. Questions are connected with Nature of work Professional status, social status, motivation, Management support, and professional development. As a result of a study by calculation of mean; most of the library professionals are dissatisfied with their nature of work but moderately satisfy with Professional status, motivation and human resources. High social status affects their satisfaction level.

Keywords: Job satisfaction, Library professionals, Social Status, Professional Status, Motivation and Human resources.

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Dr. Harish Kumar Sahu

Sr. Assistant Professor,

School of Studies in Library & Information Science,
Pt. Ravishankar Shukla University, Raipur (Chhattisgarh) India

Aditi Joshi

Librarian, Gurukul Mahila Mahavidyalaya
Kalibadi Road, Raipur (Chhattisgarh) India.

TITLE OF RESEARCH PAPER

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RESEARCH PRODUCTIVITY OF PEARL – A JOURNAL OF LIBRARY AND INFORMATION SCIENCE DURING 2007- 2019

Dr. Harish Kumar Babu*
Aditi Joshi**

ABSTRACT

A Bibliometric Analysis of the journal "PEARL – A Journal of Library and Information Science" for the period 2007-2019 has been carried out. The trend publication such as the year and volume-wise distribution of articles, page length of the contributions, year wise references, country-wise distribution of articles, authorship patterns of research contributions, single author and multi authors of contributions and degree of collaboration have been studied. For the analysis of the study 13 volumes containing 52 issues have been taken up. It is found that 541 papers were published during the period of study. The maximum number of articles (55) was published in 2017.

Keywords: Bibliometrics, PEARL: A journal of library and information science, authorship pattern, Research productivity, Ranking.

1. INTRODUCTION

The journal PEARL: A journal of Library and Information Science published by University Library Teachers Association of Andhra Pradesh, Hyderabad. It is a quarterly journal published since 2007. The journal publishing research papers in the fields of library and information science. The study highlights the various article of scholarly content published by this journal during 2007-2019.

2. REVIEW OF RELATED LITERATURE

Previously several studies by "K. Thavamani (2013) Study is also intended to identify the growth and authorship pattern of productivity of articles of source journal 'DESIDOC Journal of Library & Information Technology'. It was observed from the study that the year 2008 was most participating year during the study period 2007 - 2011. The

Relative Growth Rate (RGR) was high in terms of literature productivity and Degree Collaboration (DC) was also high in terms authorship pattern i.e., 108 out of 194 (0.556). and many more features were identified." [1].

"S. Paramasivam, A. Rajinikanth and M. Pandfyan (2013) Discusses the Bibliometric analysis of the journal titled 'Indian Journal of Radio and Space Physics 2007-2011'. This article cover mainly the number of articles in each volumes, authorship pattern, Institution wise contributions, Length of articles, Geographical distribution of contributions, Forms of documents cited, Ranked list of cited journals etc., This paper show that the total 246 contributions and maximum number of papers has been contributed by 40.24% of four and above authors. This study reveals that maximum contributions from foreign countries 149 (19.51%)." [2].

*Sr. Assistant Professor, School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh) India.

**Librarian, Gurukul Mahila Mahavidyalaya, K. Libadi Road, Raipur (Chhattisgarh) India.

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Aditi Joshi

Research Scholar,

School of Studies in Library & Information Science
Pt. Ravishankar Shukla University
Raipur (Chhattisgarh) India

Dr. Harish Kumar Sahu

Sr. Assistant Professor,

School of Studies in Library & Information Science
Pt. Ravishankar Shukla University
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JOB SATISFACTION OF LIS PROFESSIONALS OF SELECTED DISCIPLINE AND ITS IMPACT ON INFORMATION TECHNOLOGY

Dr. Aditi Joshi*
 Dr. Harsh Kumar Sahu**

ABSTRACT

In the present day, modern libraries are emerged in digitalization and be responsible for a variety of tools for access e-reading material from the library. The paper presents job satisfaction among library professionals and it's the impact on Information Technology (IT) of art, commerce science, engineering, medical, agriculture, law, education, management and other institutes. A total of 105 library professionals were selected as samples for the satisfaction of the Impact of Information technology. As a result of the study, the majority of the respondents were working with Information technology. Most engineering, medical and, agriculture LIS Professionals are satisfied with the impact of IT. The study examines that there is no significant relationship between job satisfactions of LIS professionals from various disciplines.

Keywords: Job satisfaction, digitization, information technology, library, LIS professionals, library automation.

1. INTRODUCTION

At the present time Modern ICT have extremely changed the traditional library system and its processes. Library professionals are changing them to fulfill the users' needs. LIS Professionals need to fill the gap between education and professional training. In this turn, increases the essential need for continuous bring up-to-date in the profession, with training and development. The library Professionals can be satisfied when the library can fulfill its responsibilities towards its library work as well as a satisfaction to the users. The Challenges that they face by the changes of emerging technology are to grow up

planning and arrangement to easier access to library resources and find the routes of various vendor and publishers' platforms. Second challenges are to fulfill the user's need with a low budget and high demand for library resources. The fast digitization of library operations inside a very short period, so it makes a gap it needs to improve the skills to operate a new modern library.

2. REVIEW OF LITERATURE

Bellary Ravi N, Sadlapur Shivanand Sadlapur and Ramesh R. Naik (2015) highlights on understanding the impact of ICT on job satisfaction and improvement of the

*Research Scholar, School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur

**Sr. Assistant Professor, School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh) India

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प्रोफेसर कौला ग्रन्थालय तथा
सूचना विज्ञान संदान

Use Pattern and Information Seeking Behaviour of participants of HRDC, Pt. Ravishankar Shukla University, Raipur (C.G.)

Dr. Harish Kumar Sahu

Sr. Assistant Professor, School of Studies in Library & Information Science,
Pt. Ravishankar Shukla University, Raipur (C.G.) India.

Email Id: har197479@yahoo.in (Mobile No: 9977889006)

Abstract- The search for information is similar to an activity in which the most knowledge from any subject can be tested. Attempts have been made by the participants to obtain the necessary information from various information channels to fulfill their objectives. To find out what kind of information is used by the participants of the refresher course at the Human Resource Development Center of Pandit Ravi Shankar Shukla University, Raipur. The participants use which means to get information. In this, 100% of the participants prefer to attend conferences, workshops and seminars to get new information. The participants also use the highest 84.61% e-journals, 79.48% Shodh Ganga, 74.35% Books, 71.79% N-List, 66.66% e-ShodhSindhu, 58.97% Journals, 46.15% Shodh Gangotri, 41.02% E-Books and Magazine / Newspapers, and 35.89% Vidwan Database and the least 28.20% Vidya-Mitra sources to get information.

Keywords - Information, Information sources, Information Seeking Behaviour, Library, Human Resource Development Center.

1. Introduction:-

New information, whether it is related to any area of the world of knowledge, we get information only from a discovery. In the field of education, we define a search by research, based on this, it can be said that research is done to obtain knowledge-based information. The search for information is similar to an activity in which knowing the most knowledge from any subject can be tested in the form of various types of information, documents, and journals are considered. Information sources refer to documents that act as a carrier of knowledge by presenting data and information in a sophisticated form; it is obtained through the collection and retrieval of information from thousands of documents published in nearly 40 languages of the world. This study aims to integrate the search trend into information collection.

2. Information Seeking Behaviour:-

After the Industrial Revolution, today the world is moving towards the information revolution. The dependence on information is increasing day by day in the intellectual activities of various fields. Technology advancement has made information a new basic source of energy and power. Information is a power that Discharges an essential role in the development and progress of a country. Therefore, it is necessary that all types of information are acquired and organized, and passed on to the right users so that they can be utilized to the maximum.

Information is an important resource of a nation. It has been considered an indispensable material for taking important decisions at the individual managerial or government level. It is indeed an essential element for the socio-economic and cultural development of any developing country like India. It is that

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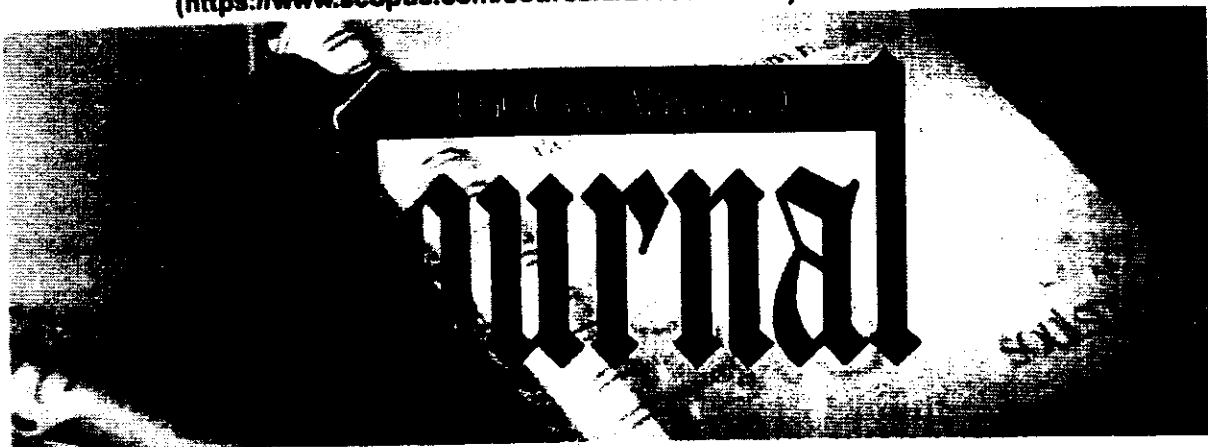
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57

Role of libraries in Pharmacy Education

Dr. Harish Kumar Sahu

Sr. Assistant Professor, School of Studies in Library & Information Science,

Pt. Ravishankar Shukla University, Raipur (Chhattisgarh) India.

Email Id: hari197479@yahoo.in (Mobile No: 9977889006)

ABSTRACT

This paper is to discuss the findings on Research Productivity of role of libraries in Pharmacy education among Pharmacy students in Chhattisgarh. For the purpose of data collection, 46 questionnaires were distributed. The findings reveal that majority of users 28 (60.86%) are of female respondents, 32 (69.56%) greater part of respondents use digital resources daily. It is also clear that highest numbers of 39 (84.78%) respondents are using digital resources to prepare course materials for study in the field.

KEYWORDS: Pharmacy Education, digital literacy, digital resources.

1. INTRODUCTION

Pharmacy education is essential for the development of basic medical and pharmaceutical sciences to serve the society. Libraries are provided in supporting and achieving the mission of higher education in today's information world. Faculty, students and research scholars always depend on libraries and librarians. Librarians generously share their knowledge with them. It is important to work with your librarians to embed information literacy training into delivery of support for the course. Computer is very important because they are applied in almost all the fields in the Modern Era.

2. OBJECTIVES OF THE STUDY

The following objectives of the study are:

1. To find research productivity of role of libraries in Pharmacy education and digital literacy among Pharmacy students in Chhattisgarh.
2. To find out the frequency of use of digital resources pharmacy students.
3. To identify the purpose of using digital resources pharmacy students.

3. METHODOLOGY OF THE STUDY

The present study was conducted pharmacy students. For collecting of data from the respondents' questionnaire was administered. 46 questionnaires were distributed among the students.

4. PHARMACY EDUCATION IN CHHATTISGARH

There has been a substantial quantitative growth of pharmacy institution in the state towards the promotion and development pharmaceutical field.

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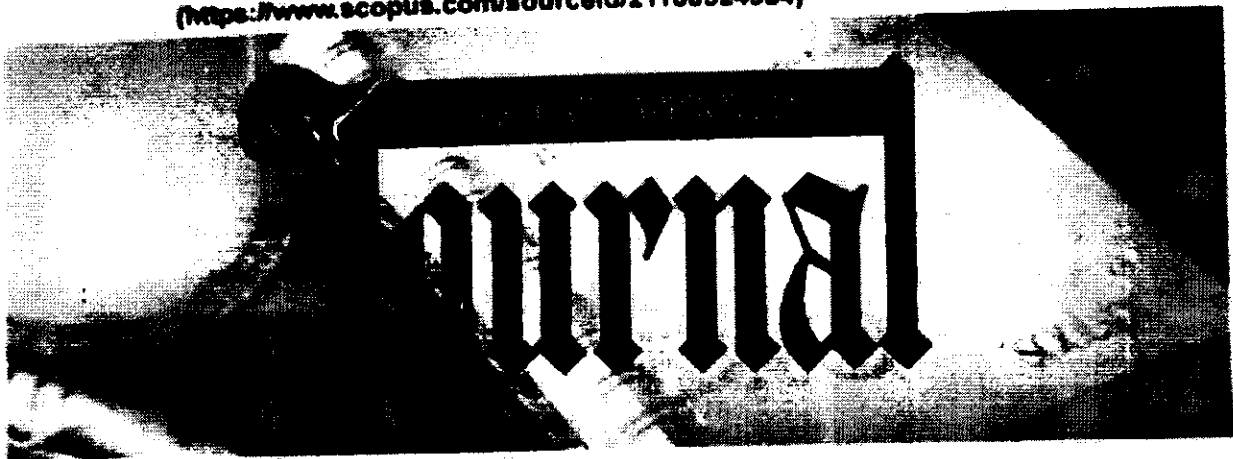
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Correlation between Job Satisfaction and Related Factors

Aditi Joshi¹ & Dr. Harish Kumar Sahu²

¹Research Scholar, School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh), India.

²Sr. Assistant Professor, School of Studies in Library & Information Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh), India

E-mail: aditijoshi2479@gmail.com Mob +91 9826697924

E-mail: hari197479@yahoo.in Mob +91 9977889006

ABSTRACT

This paper examined job satisfaction levels among library professionals in the Chhattisgarh region based on different related factors. This survey study is made up of 129 library Professionals. The study used a sample survey to collect the data, with an 86% response rate. The questionnaire is based on Likert's 5-point scale. The study focus on the satisfaction level among Library Professionals through the factors Nature of work, Job Security, Pay and Increment, Promotion Policy, supervision, Colleague Coordination, Impact of IT and measure the satisfaction level by mean, standard deviation calculation and correlation with Overall satisfaction. Most of 54.26 % of Professionals are male. Most of 55.03% of them having M. Lib & I. Sc, Majority of 31.01% of them had below 5 years' experience. Most of 57.36% of LIS Professionals are working as Librarian. Most of LIS Professionals are satisfied with the nature of work, Job security supervision, and Colleague coordination. Highest LIS professionals are satisfied with the Impact of IT while professionals are less satisfied with the Pay increment and Promotion policy. Calculation of correlation between overall satisfaction and job satisfaction factors: nature of work, promotion policy, colleague coordination, and supervision has a significant positive relationship 0.05 Significance. There is no significant relationship between job security, payment, and increment and the Impact of IT.

Keywords: Job satisfaction, Library professionals, nature of work, Job Security, Pay and Increment, Promotion Policy, supervision, Colleague Coordination, Impact of IT

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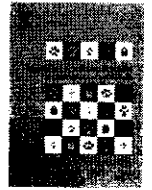
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Behavior and foraging ecology of cattle: A review

Bhupendra Kumar Sahu^a, Arti Parganiha^{a,b,*}, Atanu Kumar Pati^{a,b,c}

^a School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India

^b Center for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

^c Gangadhar Meher University, Sambalpur, India

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ABSTRACT

Cattle are diurnal and distributed all over the world. They are true ruminants and exhibit several behaviors, namely, foraging, reproductive, social, maternal care, dominance, cognitive behavior, and so on. Foraging behavior is essential for their survival, growth, and reproductive fitness. A review of the literature reveals that in most of the research papers and projects, the study of cattle behavior has not been one of the primary objectives of the research—most of the documents focused on foraging and reproductive behavior from the angle of economic prospective only. The Scopus and other searches revealed only 2 publications on street/stray cattle. Street/stray cattle are the perfect model to study their changing behavior during urbanization. Therefore, information on the behavioral ecology of street/stray cattle will be relevant and valuable for the ethologists studying urban ecology and landscape.

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Introduction

The response of an organism to a stimulus is known as behavior. Alternatively, the way an organism reacts to a particular situation, circumstance, or stimulus is behavior. A stimulus could be either endogenous or exogenous. The response of an organism toward a stimulus may vary depending on the spatiotemporal situation. Besides, the behavior itself may be different depending on the involvement of the system or the function of the organism. For example, characteristic behavioral dispositions linked to migration in birds are called migratory behavior, whereas actions that facilitate thermoregulation in mammals are called thermoregulatory behavior. Some of the behavioral responses are obligatory, for example, foraging, locomotion, and reproductive behavior, whereas some are facultative, such as mimicry and escape behavior from predators.

The sciences that deal with animal behavior are classified under “ethology.” Ethology is one of the most exciting branches of

zoology/animal science. It deals with the scientific and systematic study of the behavior of an animal. The credit of initiation of the scientific study of behavior goes to J.B. Lamarck (1744–1829) and C. Darwin (1809–1882), but the term “ethology” was introduced by Nikolaas Tinbergen in 1950. This branch became conspicuous when Karl Von Frisch, Konrad Lorenz, and Nikolaas Tinbergen were awarded jointly with the Nobel Prize in 1973 for their discoveries concerning organization and elicitation of individual and social behavior patterns. Modern ethology emerged as an essential discipline after that. Konrad Lorenz is equivocally considered as the father of ethology.

Ethology is a multidisciplinary branch of science and includes ecoethology, ethophysiology, ethogenetics, phylogeny of behavior, the behavior of ontogeny, human ethology, sociobiology, bioacoustics, and biological clock, to name a few. Besides, the study of ethology also falls in the domain of evolution. One of the famous geneticists, T. Dobzhansky, said that “*Nothing in biology makes sense except in the light of evolution.*” Ethology is as vital as molecular biology, as the gene action is ultimately expressed in the form of behavior.

Foraging is one of the branches of behavioral ecology. Searching for food by an animal is known as foraging/grazing/feeding behavior. It is crucial for an animal for its survival and reproductive fitness. All the animals, from amoeba to mammal, need food for

* Address for reprint requests and correspondence: Arti Parganiha, School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, 492010 Chhattisgarh, India. Tel: 91 (771) 2262631x115; fax: 91 (771) 2262583.

E-mail address: arti.parganiha@gmail.com (A. Parganiha).

BIOACCUMULATORY, HEPATOTOXIC AND GENOTOXIC POTENTIAL OF CHRONIC FLUORIDE EXPOSURE ON CAT FISH, *CLARIAS BATRACHUS*

Purva Mishra* and Aditi (Niyogi) Poddar

SOS in Life Science, Pt. Ravishankar Shukla University, Raipur-492 010, India.

*e-mail : purvamishra49@gmail.com

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ABSTRACT : Fluorine is the most reactive and highly electronegative element in the periodic table and is not available in its free form due to its high reactive property. Being a soluble and easily transportable inorganic pollutant, it gets accumulated in various organs of aquatic organisms and adversely affects many physiological functions. *Clarias batrachus* were exposed to different sub lethal concentrations of NaF (Sodium fluoride) for 60 days (chronic exposure). Bioaccumulation status of fluoride was estimated in blood and tissues (Liver, Kidney & Muscle). Highest concentration was found in liver tissues ranging from 0.018 to 0.069 mg Kg⁻¹. Liver enzymes GOT (Glutamic oxaloacetic Transaminases) & GPT (Glutamic pyruvic Transaminases) were analyzed for their activities, which ascertained hepatotoxic effects of fluoride accumulation. DNA damage was also estimated using COMET assay technique, in which percent DNA was calculated using visual scoring method. Percent DNA damage was found to be high in fluoride exposed fishes. All the results were found to be highly significant, performed by statistical analysis, two way ANOVA (P<0.05).

Key words : Fluoride, bioaccumulation, liver damage, genotoxicity.

INTRODUCTION

Fluorine is the most reactive and highly electronegative element in the periodic table and is not available in its free form due to its high reactive property. It exhibits an oxidation state of -1 and is combined chemically in the form of inorganic (F⁻) and organic fluorides (Freons). Fluoride occurs in variety of minerals like fluorspar (CaF₂), cryolite (Na₃AlF₆), apatite [Ca₁₀(F₂(PO₄)₆)] and hornblende with percent occurrence of 0.06-0.09 in the earth's crust (WHO, 1994). It is generally used in steel, glass and fiber industries and is also released during the production of bricks, ceramics, tiles and phosphate fertilizers. Although, an essential element, long term exposure to fluoride in concentrations above the reference level (1.5 mgL⁻¹ according to WHO) in drinking water can lead to deformities in bones (skeletal fluorosis) and adverse effects on tooth enamel (dental fluorosis). Fluoride intoxication is very common in aquatic ecosystems. Being a soluble and easily transportable inorganic pollutant, it gets accumulated in various organs of aquatic organisms and adversely affects many physiological functions (Singh *et al*, 2015). Besides, it also accumulates in both soft tissues and bones in fishes. Concentration of fluoride accumulation in muscles differs from species to species (Sigler *et al*, 1972).

Fishes are aquatic and poikilothermic animals. Hence, their existence and performance is dominated by the quality of their environment. All species of fish perform best under certain optimal conditions, but the amplitude of such conditions is quite narrow (Wedemeyer, 1970; Wedemeyer and Wood, 1974). Various stress conditions, like low dissolved gases, change in temperature, pH, density, pressure, light, etc. lower the resistance power of fishes. As a result, the organism undergoes a series of morphological, biochemical & physiological changes that constitute the General Adaptation Syndrome (GAS). These changes allow the organism to maintain its state of homeostasis in an unfavorable condition (Wedemeyer *et al*, 1999).

MATERIALS AND METHODS

Exposure of NaF : Experimental fishes, *Clarias batrachus* were purchased from local market and acclimatized with continuous water and oxygen supply for 15 days. After acclimatization fishes were divided into three groups including, one control and two experimental groups (E1 & E2). Fishes of control group were exposed to normal tap water, while those of the experimental groups E1 and E2 to 10 mgL⁻¹ & 20 mgL⁻¹ NaF solution, respectively for 60 days (chronic exposure).

Collection of blood and tissues : Fishes were



Circadian rhythm in the pattern of online usage of Facebook messenger during the COVID-19-triggered lockdown: a sequel to the pre-pandemic study

Rakesh Kumar Swain^a, Sarojini Minz^a, Arti Parganiha^{b,c}, Ananya Diwan^d
and Atanu Kumar Pati^{a,b,c}

^aSchool of Zoology, Gangadhar Meher University, Sambalpur, India; ^bSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^cCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India; ^dCenter for Basic Sciences, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

The Government of India imposed the strictest lockdown from 25 March 2020 till 31 May 2020 to control the spread of coronavirus outbreak. Consequently, about 1.38 billion people were under home confinement. Before the COVID-19 pandemic, we studied circadian rhythm (CR) in the usages of Facebook Messenger (FBM), as a group phenomenon, and published the findings in this journal. We thought it would be worthwhile to carry out a sequel study to assess if there are any changes in the CR in the patterns of digital activity of the FBM users during the COVID-19-triggered lockdown. All the authors of this paper harvested real-time data from their FBM account for over 16 consecutive days between 26 March and 17 April 2020. A statistically significant CR in the digital activity pattern of FBM friends of all the authors was validated. Results of one-way repeated measures ANOVA revealed a statistically significant higher Mesor and amplitude of the rhythm in FBM activity patterns during the lockdown; however, acrophase remained unchanged. We concluded that the COVID-19-triggered lockdown did not affect the location of the peaks and the persistence of CR in the online activity patterns of FBM users.

ARTICLE HISTORY

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KEYWORDS

COVID-19 pandemic; lockdown; circadian rhythm; patterns in FBM usage; pre-lockdown

1. Introduction

The COVID-19 pandemic provides a unique opportunity to study the impact of lockdown on physiological, psychological, and behavioral responses in the human population. It is very much likely that the physiological and psychosocial behavior of a person under prolonged home confinement would be affected (Majumdar et al. 2020; Sinha et al. 2020). The governments of several countries restricted the people from stepping out of their homes soon after the declaration of COVID-19 as a pandemic. As a consequence, people got little exposure to direct sunlight during



Optimization of kraft lignin decolorization and degradation by bacterial strain *Bacillus velezensis* using response surface methodology

Monika Verma^a, Amia Ekka^a, Titikshya Mohapatra^b, Prabir Ghosh^a

^a School of Studies in Life Science, Ravishankar Shukla University, Raipur, Chhattisgarh, India

^b Department of Chemical Engineering, NIT Raipur, Raipur, Chhattisgarh, India

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ABSTRACT

In the present study, optimization of Kraft lignin (KL) decolorization and degradation were carried out using an isolated ligninolytic bacterial strain *Bacillus velezensis*. The process was optimized using Central Composite Design (CCD) through Response Surface Methodology (RSM) for four variables i.e. carbon, nitrogen as nutritional parameters and temperature, pH as physical parameters while monitoring two response (% color removal and degradation). Under optimal conditions, the maximum KL decolorization and degradation capacity of strain was 56.16 % and 40.39 %, respectively. The pulp paper mill effluent toxicity was assessed in terms of phytotoxicity measurement on *Phaseolus aureus*. The germination percentage of *Phaseolus aureus* in wastewater treated with bacterial strain was 70 %, while untreated sample showed 50 % only.

1. Introduction

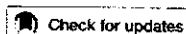
In our country, the pulp and paper mill are the major industrial sectors. There were 17 paper mills in India with the total paper production of 0.13 million tons per year in 1951. The number was increased up to 406 in 2002 with the production of 1.9 million tons [1]. These industries utilize huge amount of chemicals, lignocellulosic components of plants and water during manufacturing. The amount of water required for per tons of paper production is about 60,000–1,00,000 gallon and discharges more than 47,000–80,000 gallon of water which contains lignin and chlorophenols [2]. The wastewater released from pulp and paper is dark brown in color which is due to the presence of lignin and its derivatives [3–5]. The dark brown color adversely affects the aquatic ecosystem due to the absorbance of light as it inhibits the natural process of photosynthesis in the streams. Untreated and partially treated effluents result in the persistence of color in the receiving water body over a long time discharge. Depending on the used raw material and stage of production process, these industries generate different kinds of wastewater with different characteristics. Most significant source of pollutant in such mill is wood preparation, pulping, bleaching and coating process [6]. During pulping process, a polymer by product, kraft Lignin is formed. In order to produce the rayon grade pulp, only premium-quality fiber containing wood chips were chosen with a superfluous chemical process that involves extensive pre-hydrolysis of wood chips at elevated

pressure and temperature followed by alkaline digestion. The semisolid pulp is collected, washed and a colloidal aqueous solution of lignin, black liquor is generated. The dark brown color is due to lignin solubility. The waste water released from this stage principally contains hemicelluloses, lignin fragments, phenolics, resins, sodium sulfate, sodium carbonate, fatty acids and extra inorganic salts. When these constituents get mixed together becomes soluble in the strongly basic medium [7]. Unnecessary load of inorganic nutrients and organic matter causes eutrophication contained by the receiving water bodies. The lignosulfonate constituent of pulp paper wastewater may hinder the growth of algae, phototrophic planktons and plants by dropping the transmission of sunlight in water. Farmers in many developing countries like India, due to non-availability of alternative sources, irrigate their crop plants with industrial effluents containing high level of toxic compounds including heavy metals, leading to adverse effect on human health through food chain [8].

Although several physical and chemical methods are available for the treatment of effluent, however they are considered to be less desirable. Therefore, the researchers are now focusing on environmental friendly technologies for the treatment of wastewater, which include biological methods for the removal of contaminants from the effluent [9]. Among the biological methods, majority of the literatures have been paying attention only on some genera of white rot fungi because of their wide range and non-specific extracellular ligninolytic enzymatic system (Manganese peroxidase, Lignin peroxidase and Laccase). For the

* Corresponding author.

E-mail address: prabir.ghosh@rsu.ac.in (P. Ghosh).



Predictive role of socio-demographic and chronotype on health-related quality of life of cancer patients from southeastern India

Armiya Sultan^a, Saba Taj^a, Vivek Choudhary^b and Arti Parganiha^{a,c}

^aChronobiology and Animal Behavior Laboratory, School of Studies in Life Sciences, Pandit Ravishankar Shukla University, Raipur, India; ^bRegional Cancer Center, Dr. B.R. Ambedkar Memorial Hospital, Raipur, India; ^cCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

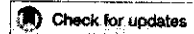
It is well known that cancer and its treatment produce marked impact on the health-related quality of life (HRQoL) of cancer patients. Research concerning impact of chronotype on HRQoL in cancer patients is almost not studied yet, but the interests are growing in several diseases. Present study was carried out to explore the impact of socio-demographics, chronotype and consumption of tobacco, alcohol and sleeping medicine on HRQoL of Indian oncology patients. Self-reported Quality-of-Life questionnaire (EORTC QLQ-C30), Hospital Anxiety and Depression Scale (HADS), and Morningness-Eveningness Questionnaire (MEQ) were administered to the cancer patients (N = 1000) in the native Hindi language. Results revealed that among the socio-demographic factors, only age exhibited significant negative association with physical, role and cognitive functioning and positive association with symptoms, namely fatigue and pain. Interestingly, chronotype was found to be positively associated with emotional functioning and negatively with nausea-vomiting, dyspnoea, diarrhoea and depression. Patients who consumed tobacco, alcohol or sleeping medicine exhibited lower functioning and higher symptoms. Further, treatment of cancer also produced effect on a few measures of HRQoL of patients. In conclusion, age, chronotype and consumption of tobacco, alcohol or sleeping medicine were found to be important determinants of HRQoL of the patients.

KEYWORDS

Cancer patients; health-related quality of life; socio-demographic; chronotype; addictive habits

1. Introduction

In oncological trials and practices, health-related quality of life (HRQoL) is considered as an important end point along with the tumour response rate, and disease-free and overall survival of the cancer patients. HRQoL includes patient's physical, psychological, and social wellbeing (Parganiha et al. 2014; Sultan et al. 2017a, 2018a). It is well known that cancer and its treatment produce marked impact on the anxiety, depression and HRQoL of cancer patients (Mystakidou et al. 2005; Sultan et al. 2017b). However, the impact may depend on the gender, age, type, stage and grade of cancer; type of treatment and its



Time-of-day and seasonal variations in foraging behavior of street cattle of urban Raipur, India

Bhupendra Kumar Sahu^a, Arti Parganiha^{a,b} and Atanu Kumar Pati^{a,b,c}

^aSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^bCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India; ^cSchool of Zoology, Gangadhar Meher University, Sambalpur, India

ABSTRACT

We studied time-of-day and seasonal variations in the foraging behavior of street cattle in Raipur city, India. We recorded the foraging behavior of street cattle at 48-time points each day for over three consecutive days at 10 different locations of Raipur city across three distinct seasons of the year. We log-transformed the time series data and employed Single Cosinor to compute the characteristics of time-of-day variation in foraging activity. We also determined the effects of the factors "time-of-day" and "season" on foraging behavior and the number of cattle. We found statistically significant time-of-day variation in foraging pattern with the peaks located mostly at midday hours, irrespective of seasons. The amplitude of foraging was the least in the summer as compared with the rainy and the winter seasons. The factors "time-of-day" and "season" modulated both foraging activity and frequency of cattle on the streets statistically significantly. The observed spatiotemporal patterns in the foraging behavior of cattle on the streets might provide useful information to the stakeholders engaged in mitigating the urban cattle menace in Raipur city and elsewhere in the world.

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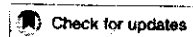
KEYWORDS

Time-of-day variation; seasonal variation; foraging behavior; street cattle; cattle menace

1. Introduction

Bovine species are familiar to humans. They were domesticated from time immemorial for the purpose of meat and milk. Cattle population has worldwide distribution. A sizable number of cattle, nearly 305 million head (30.44% of the global population), are present in India. This makes India a leading country in the world for cattle population (Cook 2019). Recently released 20th Livestock Census report of India (2019) indicated that out of 302.79 million bovine population (Cattle, Buffalo, Mithun, and Yak), 192.49 million consists of cattle (cow and ox) only. The report also revealed a 0.8% increase in the cattle population in India over the data recorded in the last livestock census (19th Livestock Census 2012). A large number of stray street cattle wander freely on the street in urban cities of India. Continuous overexploitation and shrinkage of grassland might be the cause of the above phenomenon (19th Livestock Census 2012; Gowen 2018; Arya et al. 2019; Sahu et al. 2019).

CONTACT Arti Parganiha arti.parganiha@gmail.com School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur 492010, India



Use of social networking sites (SNSs) and its repercussions on sleep quality, psychosocial behavior, academic performance and circadian rhythm of humans – a brief review

Rakesh Kumar Swain^a and Atanu Kumar Pati^{a,b,c}

^aSchool of Zoology, Gangadhar Meher University, Amruta Vihar, Sambalpur, India; ^bSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^cCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

Social networking sites (SNSs) confer countless benefits to mankind through increased communication and connection between and among millions of people on the globe. Do the detrimental effects of SNSs outweigh its benefits? We have tried to answer this question through reviewing the relevant literature on the repercussions of use of SNSs on sleep quality, psychosocial behavior, academic performance and circadian rhythm in humans. Literature on the subject underscores the adverse effects of SNSs usage on sleep resulting in poor sleep quality, delayed sleep onset, shortening of sleep length, excessive daytime sleepiness (EDS), insomnia, apnea and nightmare. The students addicted to social media suffer from psychiatric distress, anxiety, depression, low self-esteem, suicidal ideation, procrastination and poor academic attainment. There is, however, a paucity of literature on the effects of overuse of SNSs on the functioning of circadian clocks in humans. It emerged that the adolescents and young adults are the most vulnerable to the ill effects of excessive use of the SNSs. We recommend that more researches on the effects of SNSs on human health should be carried out and effective awareness campaigns should be launched to educate the people about the darker side of the excessive use of SNSs.

ARTICLE HISTORY

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KEYWORDS

Social networking sites; sleep quality; academic performance; circadian rhythm; chronotype

1. Introduction

The *Homo sapiens* are innovators. They developed various tools and techniques for themselves and also for the welfare of society. All tools and techniques are collectively called as technology. The lifestyle of today's man is technology dependent. The technologies play an important role in several sectors, such as industry, health care, education, business, trade and day-to-day life of an individual. One of the technologies, the "Internet" was developed just a few years back. It started playing a crucial role in human life and at this moment it solves many of their problems. The smartphone is one of the



RESEARCH ARTICLE

A population estimation study reveals a staggeringly high number of cattle on the streets of urban Raipur in India

Bhupendra Kumar Sahu¹, Arti Parganiha^{1,2*}, Atanu Kumar Pati^{1,2,3}

1 School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, Chhattisgarh, India, **2** Center for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, Chhattisgarh, India, **3** Gangadhar Meher University, Sambalpur, Odisha, India

* arti.parganiha@gmail.com



Abstract

Cattle are cosmopolitan in distribution. They are economically and ecologically significant. The cattle menace on the urban streets of developing and underdeveloped countries is challenging. The number of road accidents is increasing rapidly over time, in the urban areas of most of the developing countries, like India. In the present study, we estimated the population of cattle wandering on the streets/roads/highways of Raipur city of India using the direct headcount method and advanced Photographic Capture-Recapture Method (PCRCM). We compared these two methods of population estimation to check their suitability and adequacy. We superimposed 163 grids (1.0 x 1.0 km each) on the map of Raipur city using Quantum Geographic Information System (QGIS) software. We randomly selected 20 grids for the estimation of the street cattle population. We used both line transect and block count sampling techniques under the direct headcount method. The estimates of visibly roaming cattle on the Raipur city streets were 11808.45 and 11198.30 using the former and the latter sampling techniques, respectively. Further, advanced PCRCM indicated an estimated 35149.61 and 34623.20 cattle using the line transect and block counting sampling techniques, respectively. We observed a female-biased sex ratio in both mature and immature cattle. The frequency of mature cattle was significantly higher than that of naive cattle, followed by the calf. Further, we noticed the frequency of cattle in a grid in the following order: cow > bull > heifer > immature male > female calf > male calf. We concluded that the estimated population of street cattle in Raipur city is about 35 thousand. The results of both the techniques, i.e., direct headcount method and PCRCM, are consistent for population estimation. The direct headcount method yields the number of cattle visibly roaming on the street at a particular time. In contrast, advanced PCRCM gives the total population of street cattle in the city. Active surveillance of the urban cattle population might be of critical importance for municipal and city planners. A better understanding of the urban cattle population might help mitigate the cattle menace on the street, eventually preventing cattle-human conflict and minimizing road accidents. The techniques adopted in this study will also help estimate the population of free-ranging dogs and other wildlife animals in any target location.

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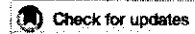
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Attitudes Toward Animal Welfare Among Adolescents from Colombia, France, Germany, and India

Christoph Randler ^{a,b}, Jean-Marie Ballouard^c, Xavier Bonnet^d, Priti Chandrakar^e, Atanu Kumar Pati^{e,f,g}, William Medina-Jerez^h, Babita Pande^e, and Subhashis Sahuⁱ

^aDepartment of Biology, University of Tuebingen, Tuebingen, Germany; ^bLEAD Graduate School and Research Network, Tuebingen, Germany; ^cCRCC Centre for Research and Conservation of Chelonians, Carnoules, France; ^dCEBC, UMR-7372, CNRS-Université de La Rochelle, La Rochelle, France; ^eSoS in Life Science, Pt. Ravishankar Shukla University, Raipur, India; ^fCenter for Translational Chronobiology, Pt. Ravishankar Shukla University, Raipur, India; ^gGangadhar Meher University, Sambalpur, India; ^hCollege of Education, University of Texas at El Paso, El Paso, TX, USA; ⁱErgonomics & Occupational Physiology Laboratory, Department of Physiology, University of Kalyani, Kalyani, India



ABSTRACT

Concerns about animal welfare are becoming increasingly important. Recent research suggests that age and gender are associated with attitudes toward animal welfare in adolescents. In this study, we analyzed attitudes toward animal welfare in adolescents from five geographic regions: Colombia, France, Germany, and two regions in India (Raipur and Kalyani). Individuals responded to the Composite Respect for Animals Scale (CRAS-S). The CRAS-S score integrates 10 facets of attitudes toward animal welfare: the use of animals in research, for food, as pets, for recreation, for clothing, farm animal husbandry, and the conservation of animals, as well as emotional aspects such as feeling superior to animals or emotional affection. A total of 627 males and 506 females ($n=1,133$) participated in this study (France, 134; Colombia, 193; Germany, 377; Raipur, 210; Kalyani, 219). Females scored significantly higher than males (2.9% of variance explained). There was no consistent relationship with age. No relationship was found in Colombia, France, and Raipur, and a negative relationship in attitudes toward animal welfare was found in Germany and Kalyani.

KEYWORDS

Adolescents; age effects; animal welfare; attitudes; Composite Respect for Animals Scale (CRAS-S); human-animal interaction

Issues regarding animal welfare – such as using animals for food, recreational activities, or scientific research – are becoming increasingly important, at least in Western societies (see, e.g., https://ec.europa.eu/food/animals/welfare_en). Accordingly, there are big debates in the general public about how and why science, industry, and society use animals; studying attitudes toward animal welfare is a rapidly growing domain (Deemer & Lobao, 2011; Delon, 2018; Kendall et al., 2006; Ormandy & Schuppli, 2014). These issues have often been investigated regarding the attitudes of adults and the general public (Deemer & Lobao, 2011; Kendall et al., 2006; Ormandy & Schuppli, 2014).

CONTACT Christoph Randler  christoph.randler@uni-tuebingen.de  Department of Biology, University of Tuebingen, Morgenstelle 24, D-72076 Tuebingen, Germany

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Article

Animal Welfare Attitudes: Effects of Gender and Diet in University Samples from 22 Countries

Christoph Randler ^{1,2,3,*}, Ana Adan ^{4,5}, Maria-Mihaela Antofie ⁶, Arturo Arrona-Palacios ⁷, Manecas Candido ⁸, Jelle Boeve-de Pauw ⁹, Priti Chandrakar ¹⁰, Eda Demirhan ¹¹, Vassilis Detsis ¹², Lee Di Milia ¹³, Jana Fančovičová ¹⁴, Niklas Gericke ¹⁵, Prasun Halder ¹⁶, Zeinab Heidari ¹⁷, Konrad S. Jankowski ¹⁸, Juhani E. Lehto ¹⁹, Ryan Lundell-Creagh ²⁰, William Medina-Jerez ²¹, Adrian Meule ^{22,23}, Taciano L. Milfont ²⁴, Mireia Orgilés ²⁵, Alexandra Morales ²⁵, Vincenzo Natale ²⁶, Xóchitl Ortiz-Jiménez ²⁷, Babita Pande ¹⁰, Timo Partonen ²⁸, Atanu Kumar Pati ^{10,29,30}, Pavol Prokop ^{31,32}, Arash Rahafar ¹⁷, Martin Scheuch ^{33,34}, Subhashis Sahu ³⁵, Iztok Tomažič ³⁶, Lorenzo Tonetti ²⁶, Pablo Vallejo Medina ³⁷, Peter van Petegem ⁹, Alejandro Vargas ³⁷ and Christian Vollmer ³⁸

- 1 Department of Biology, University of Tuebingen, Morgenstelle 24, D-72076 Tuebingen, Germany
- 2 LEAD Graduate School and Research Network, University of Tübingen, D-72072 Tübingen, Germany
- 3 Department of Biology, Faculty of Natural Sciences and Technology, University of Education Heidelberg, D-69120 Heidelberg, Germany
- 4 Department of Clinical Psychology and Psychobiology, School of Psychology, University of Barcelona, 08035 Barcelona, Spain; aadan@ub.edu
- 5 Institute of Neurosciences, University of Barcelona, 08035 Barcelona, Spain
- 6 Faculty of Agricultural Sciences, Food Industry and Environmental Protection, “Lucian Blaga” University of Sibiu, 550012 Sibiu, Romania; mihaela.antofie@ulbsibiu.ro
- 7 Writing Lab, Institute for the Future of Education, Tecnológico de Monterrey, 64849 Monterrey, Mexico; a.arrona@hotmail.com
- 8 Department of Natural Sciences, Universidade Pedagógica Mozambique, University Rovuma, 3100 Nampula, Mozambique; manecasandido@yahoo.com
- 9 Department of Training and Education Sciences, University of Antwerp, Prinsstraat 13, 2000 Antwerp, Belgium; jelle.boevedepauw@uantwerpen.be (J.B.-d.P.); peter.vanpetegem@uantwerpen.be (P.v.P.)
- 10 SoS in Life Science, Pt. Ravishankar Shukla University, Raipur 492010, India; pritchandrakar229@gmail.com (P.C.); babitatime14@gmail.com (B.P.); akpati19@gmail.com (A.K.P.)
- 11 Department of Special Education, Sakarya University, Sakarya 54300, Turkey; edemirhan@sakarya.edu.tr
- 12 Department of Economics and Sustainable Development, Harokopio University, Venizelou 70, 17676 Athens, Greece; detsis@hua.gr
- 13 School of Business & Law, CQ University Australia, Rockhampton, QLD 4701, Australia; v.dimilia@cqu.edu.au
- 14 Department of Biology, Faculty of Education, Trnava University, Priemyselná 4, 918 43 Trnava, Slovakia; jana.fancovicova@trun.sk
- 15 Department of Environmental and Life Sciences, Karlstad University, 65188 Karlstad, Sweden; niklas.gericke@kau.se
- 16 Department of Biological Sciences, Midnapore City College, Paschim Medinipur 721129, West Bengal, India; ssprasun0@gmail.com
- 17 Independent Researcher, 1653676331 Tehran, Iran; veganlife2012@gmail.com (Z.H.); ar.ra.rhythm@gmail.com (A.R.)
- 18 Faculty of Psychology, University of Warsaw, 00-183 Warszawa, Poland; kjankows@psych.uw.edu.pl
- 19 Educational Sciences, Open University, P.O. Box 9 (Siltavuorenpenger 3 A), University of Helsinki, 00014 Helsinki, Finland; juhani.e.lehto@helsinki.fi
- 20 Department of Psychology, Bishops University, Sherbrooke, QC J1M 1Z7, Canada; RLUNDELL12@ubishops.ca
- 21 College of Education, University of Texas at El Paso, El Paso, TX 79968, USA; wjmedinajerez@utep.edu
- 22 Department of Psychiatry and Psychotherapy, University Hospital of the LMU Munich, Nußbaumstraße 7, 80336 Munich, Germany; ameule@med.lmu.de
- 23 Schoen Clinic Roseneck, Am Roseneck 6, 83209 Prien am Chiemsee, Germany
- 24 School of Psychology, University of Waikato, 3240 Hamilton, New Zealand; taciano.milfont@waikato.ac.nz
- 25 Department of Health Psychology, Miguel Hernández University, 03202 Elche (Alicante), Spain; morgiles@umh.es (M.O.); alexandra.morales@umh.es (A.M.)
- 26 Department of Psychology “Kenzo Canestrari”, University of Bologna, Viale Berti Pichat 5, 40127 Bologna, Italy; vincenzo.natale@unibo.it (V.N.); lorenzo.tonetti@unibo.it (L.T.)

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Circadian clock modulating small molecules repurposing as inhibitors of SARS-CoV-2 M^{Pro} for pharmacological interventions in COVID-19 pandemic

Armiya Sultan^{a,b,c}, Rafat Ali^b, Tahira Sultan^d, Sher Ali^e, Nida Jamil Khan^b, and Arti Parganiha^c

^aFunctional Genomics Laboratory, Center for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia (A Central University), New Delhi, India; ^bDepartment of Biosciences, Jamia Millia Islamia (A Central University), New Delhi, India; ^cChronobiology and Animal Behaviour Laboratory, School of Studies in Life Sciences, Pt. Ravishankar Shukla University, Raipur, India; ^dDepartment of Biochemistry, University of Kashmir, Srinagar, India; ^eDepartment of Life Sciences, Sharda University, Greater Noida, India

ABSTRACT

The COVID-19 pandemic caused by SARS-CoV-2 is a global health emergency warranting the development of targeted treatment. The main protease M^{Pro} is considered as a key drug target in coronavirus infections because of its vital role in the proteolytic processing of two essential polyproteins required for the replication and transcription of viral RNA. Targeting and inhibiting the M^{Pro} activity represents a valid approach to prevent the SARS-CoV-2 replication and spread. Based on the structure-assisted drug designing, here we report a circadian clock-modulating small molecule "SRT2183" as a potent inhibitor of M^{Pro} to block the replication of SARS-CoV-2. The findings are expected to pave the way for the development of therapeutics for COVID-19.

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Circadian clock-modulating molecules; COVID-19; inhibitors; main protease; pandemic; SARS-CoV-2 M^{Pro}; SRT2183; targeted therapy

Introduction

Outbreaks of deadly contagious diseases, particularly caused by viruses, have always been a big threat to the human race. During the last five decades, herpes, legionnaires, HIV/AIDS, Western African Ebola epidemic, Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS), and now new coronavirus disease 2019 (COVID-19) viruses have attacked human population worldwide. The members of the coronavirus family, alone, have caused two deadly outbreaks, namely MERS caused by MERS coronavirus (MERS-CoV) and SARS caused by SARS coronavirus (SARS-CoV) during the last two decades (Zhong et al. 2020). In December 2019, a new unprecedented viral infection emerged in Wuhan, China. Genomic studies have shown that about 82% genome of this novel virus match the RNA genome of SARS-CoV (Wu et al. 2020a, 2020b; Zhou et al. 2020). The novel virus was named as Severe Acute Respiratory Syndrome coronavirus-2 (SARS-CoV-2) and the contagious infectious disease caused by this new virus was named as coronavirus disease 2019 (COVID-19) (Gorbalenya et al. 2020).

Pathophysiological findings made it evident that SARS-CoV-2 infection is more contagious than both MERS and SARS (Zhang and Holmes 2020). Infection can spread even if an individual is asymptomatic or in presymptomatic conditions. Individuals infected with

SARS-CoV-2 develop mild-to-moderate illness; however, older people and those with chronic medical complications are more likely to develop serious illness (Chen et al. 2020; Li et al. 2020; World Health Organization, clinical management of COVID-19: Interim Guidance 2020).

In December 2019, the COVID-19 pandemic outbreak originated in Wuhan city, Hubei province of China. The first cluster of cases of "pneumonia of unknown cause" was reported in late December 2019 (Wu et al. 2020c). Thereafter, the contagious SARS-CoV-2 infection quickly spread globally. The first laboratory-confirmed novel coronavirus case recorded outside of China was reported on 13th January 2020 by the Ministry of Public Health in Thailand (Yan et al. 2020). The World Health Organization (WHO) declared the infection a pandemic on 11th March 2020 (Zhang et al. 2020). According to WHO reports, confirmed cases of COVID-19 are increasing exponentially worldwide. Globally, as of 04:02h CET, 4 March 2021, there have been 114,853,685 confirmed cases of COVID-19, including 2,554,694 deaths, reported to WHO (<https://covid19.who.int/>). However, these numbers are likely to be higher than reported because of the frequent exclusion of mild or asymptomatic cases.

Currently, no therapeutic options are available for COVID-19. However, an insight gained on the SARS-CoV-2 RNA genome and crystal structures of

CONTACT Armiya Sultan ✉ armia86bms@gmail.com Functional Genomics Laboratory, Center for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia (A Central University), New Delhi 110025, India.

Circadian rhythmicity of heart rate variability and its impact on cardiac autonomic modulation in asthma

Meenakshi Sinha^a, Ajoy K. Behera^b, Ramanjan Sinha^b, Arti Parganiha^c, Babita Pande^b, Richa Sharma^a, and Atanu K Pati^d

^aDepartment of Physiology, All India Institute of Medical Sciences, Raipur, India; ^bDepartment of Pulmonary Medicine, All India Institute of Medical Sciences, Raipur, India; ^cSchool of Studies in Life Sciences, Pt. Ravishankar Shukla University, Raipur, India; ^dDepartment of Zoology, Gangadhar Meher University, Odisha, India

ABSTRACT

The commonly observed nocturnal attack of asthma is accompanied by circadian variations in airway inflammation and other physiological variables. It is also documented to present with a significantly higher risk of adverse cardiovascular events that are associated with lower heart rate variability (HRV) and depressed sympathetic and enhanced parasympathetic modulations. However, available literature is scarce with regard to the impact of alteration in circadian rhythmicity of long-term HRV and its day-night variation in asthmatic patients. Thus, 72-h continuous recording of RR interval and oxygen saturation was done to study the circadian variability of HRV (in terms of time and frequency domain indices) and also to assess the pattern of alterations in sympathetic and parasympathetic tones at different times of the day in asthmatic patients ($n = 32$) and healthy control subjects ($n = 31$). Repeated-measure analysis of variance and independent-samples t-test revealed significantly increased parasympathetic tone [in terms of increased square root of the mean squared differences of successive NN intervals (RMSSD), percentage of number of pairs of adjacent RR interval differing by more than 50 ms (pNN50), standard deviation of NN intervals (SDNN), and high frequency (HF)] with reduced sympathetic activity [decreased low frequency (LF) and LF/HF ratio] at early morning hours (between 04:00 and 10:00 h) in the asthma patients in contrast to the healthy subjects who had opposite response. Also, significant phase delay ($p < 0.05$) of all the HRV indices and SpO_2 was evident by cosinor analysis. Therefore, disturbed circadian rhythm of HRV indices and early morning increased parasympathetic tone points toward the possible pathophysiological basis of exacerbated asthmatic symptoms at late night/early morning hours and susceptibility of future cardiovascular pathologies. This also necessitates the assessment of HRV rhythm while dealing with the therapeutic management of asthma patients.

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HRV; HRV circadian rhythm; circadian rhythm in asthma; oxygen saturation rhythm

Introduction

Asthma, a chronic lung disease due to inflammation and narrowing of the airways, frequently presents with worsening of symptoms overnight, particularly in the early hours of the morning. In fact, nocturnal symptoms in asthma are the most frequent reason and essential indicator of the escalation of treatment. Circadian variations in airflow limitation and airways hyper-responsiveness accompanied by the nocturnal symptoms of cough and dyspnea have been documented as the pathophysiological basis for the same (Sutherland 2005).

On the other hand, a significantly higher risk of cardiovascular events, including myocardial infarction, cardiac arrest, angina, and stroke, has been seen in persistent asthma (Tattersall et al. 2015). In this context, heart rate variability (HRV) has emerged as a noninvasive validated tool for the evaluation of cardiac autonomic function.

Poor asthma control has been found to be associated with lower HRV, depressed sympathetic, and enhanced parasympathetic modulations with longer asthma duration, whereas an opposite HRV response is found in controlled asthmatics (Lutfi 2015). Children with stable chronic asthma have been documented recently to present with enhanced parasympathetic modulation and cardiac autonomic imbalance (Franco et al. 2020). But the impact of altered circadian rhythm of HRV in the disease process is still largely unclear. The well-known circadian rhythmicity of various HRV indices in healthy individuals shows increased HRV during the night with predominance of vagal activity and a nighttime peak during the second half of the night (Sammito et al. 2016). A maximal shift toward sympathetic autonomic activation during sleep-to-wake transitions takes place, which has been linked to the observed increase in cardiovascular

Circannual production rhythms of seven commercially important fishes in the Chilika lagoon

Prasanti Mishra^{a,b}, Amita Kumari Mohanty^a, Rakesh Kumar Swain^b,
Arti Parganiha^{c,d} and Atanu Kumar Pati^{b,c,d}

^aAquaculture Production Division, Central Institute of Freshwater Aquaculture (Indian Council of Agricultural Research), Bhubaneswar, India; ^bSchool of Zoology, Gangadhar Meher University, Sambalpur, India; ^cSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^dCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

The main objective of this investigation was to delineate spatio-temporal patterns in annual production of seven species of fishes inhabiting the famous Chilika lagoon. The data were collected from 19 landing centers located across four different geographical sectors of the lagoon over a period of two consecutive years. Using Cosinor rhythmometry, statistically significant circannual rhythms of production in all seven species of fishes were validated at the group level either at one or multiple landing centers of the lagoon. The peaks of the circannual rhythms were subjected to Bray–Curtis cluster analysis and similarities among the landing centers apropos the peak timings of the circannual rhythms in production of fish species was determined. Three distinct clusters were witnessed apropos the peaks at different time of the year and at different sectors of the lagoon. This spatiotemporal relationship reflects how temporal abundance of fish species is distributed to avoid conflicts and competitions among themselves along the annual time scale. The findings reported here might help in making strategy to maximize annual fish yield. That will also help in the management of biodiversity of the lagoon.

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KEYWORDS

Spatiotemporal variability; circannual rhythms in fish; production; biodiversity management; chilika lagoon

1. Introduction

The species interaction in a community takes place at different levels, namely competition, mutualism and predation (Tulloch et al. 2018). The level and intensity of species interaction also vary depending on the types of the habitat/niche. There are numerous studies on the species interaction in brackish water lagoons. A majority of the studies, reported on species interaction in different lagoons, includes spatial distribution of species in the high marsh (Bortolus et al. 2002), fish species richness and salinity (Sosa-López et al. 2007), intra-annual relationship between zooplankton and abiotic factors (Feike and Heerkloss 2008), co-occurrence of one species with another (Boscutti et al. 2018), effects of global warming and salinisation on the mortality of ephemeral wetland predator (Cuthbert et al. 2019), impact of climate change on species in brackish water lagoon (Brucet et al. 2009),

CONTACT Prasanti Mishra  mishra.prasanti@gmail.com  School of Zoology, Gangadhar Meher University, Amruta Vihar, Sambalpur 768 004, Odisha, India

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Does exposure to radiofrequency radiation (RFR) affect the circadian rhythm of rest-activity patterns and behavioral sleep variables in humans?

Margaret Messiah Singh^a, Priyanka Chandel^a, Atanu Pati^{a,b,c} and Arti Parganiha^{a,b}

^aSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^bCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India; ^cDepartment of Zoology, Gangadhar Meher University, Sambalpur, India

ABSTRACT

We evaluated the effects of the exposure to radio-frequency radiation emanating from the base transceiver station (BTS) on the characteristics of circadian rest-activity rhythm and behavioral sleep variables in humans. We performed this exploratory field study in a sample of 89 healthy subjects randomly chosen out of 1434 individuals surveyed for the purpose. We divided 89 subjects into five groups, including the control, as a function of distance from the BTS. The E-field strength was higher in the groups of the inter-tower region and between 0 and 150 m away from the BTS. The E-field (distance) did not significantly affect the circadian rhythm parameters and behavioral sleep variables, except a marginal delay in the peak timings of the rest-activity rhythm of subjects in the inter-tower and 300–500 m groups. Notable secondary effects of the factor gender were noticed on circadian amplitude, sleep efficiency, dichotomy index, and wake after sleep onset. We concluded that exposure to radiation from the BTS did not modulate actigraphy-based behavioral sleep variables of people residing around BTS installations. We recommend more extensive field-based studies with rigorous longitudinal designs to validate the effects of radiation from the BTS in humans.

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KEYWORDS

BTS; RF-EMR; actigraphy; rest-activity rhythm; behavioral sleep variables; human

1. Introduction

In modern society, we have an intimate association with the telecommunication system comprising mobile phones (MPs) and their base transceiver stations (BTSs). Each BTS operates in the radiofrequency range. According to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the non-ionizing radio-frequency electromagnetic field (RF-EMF) ranges from 3 kilohertz (kHz) to 300 gigahertz (GHz). The number of BTS installations is rapidly rising over the last decade to meet the increasing use of smartphones for social media, online services, and internet access (Barrile et al. 2009; Kaushal et al. 2012; Haryono and Gunawan 2020). Deployment of BTS in residential areas makes humans exposed to radiofrequency radiation (RFR) persistently. People living in BTS

CONTACT Arti Parganiha  arti.parganiha@gmail.com  School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; Center for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India
 Supplemental data for this article can be accessed here.



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TUBERCULOSIS

Review article

Drug resistant tuberculosis: Current scenario and impending challenges

Shivendra Singh Dewhare*

School of Studies in Life Science, Pt. RavishankarShukla University, Raipur, 492010, Chhattisgarh, India

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ABSTRACT

Tuberculosis is still one of the ten leading causes for death worldwide. In spite of the latest medical and health advance gained over a period of time, tuberculosis effectively evades the successful targeting by drugs. The persistence abilities demonstrated by the mycobacteria had surprised the global community, since its discovery and pathogenesis in humans. Emergence and detection of drug resistant mycobacteria (MDR-TB, XDR-TB) had further complicated the treatment regime. Under the aegis of WHO, there is a concerted understanding and effort by the global community to eradicate TB. Towards this goal, novel drug molecules, new vaccine and treatment regime are being developed. Here, our current understanding pertaining to mode of action, molecular mechanisms of novel as well as traditional drug molecules and possible drug resistance mechanism in *M. Tuberculosis* is reviewed. Recent advances on new vaccination regime are also reviewed as it demonstrated huge potential in containing TB. This knowledge is essential for the development of more effective drug molecules, vaccines and may help in devising new strategy for containing and eradicating TB.

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1. Introduction

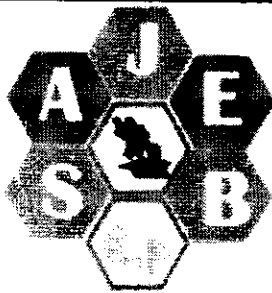
Tuberculosis has become an epidemic in the world amounting to approximately one fourth of the world's population being infected with the latent form of tuberculosis.¹ According to World Health Organization (WHO), a total of 1.4 million people died from TB in 2019 (including 2, 08,000 people with HIV). Epidemiologically, TB is still one of the top 10 causes of death from a single infectious agent (above HIV/AIDS). *Mycobacterium tuberculosis* (MTB), the causative agent, primarily affects human lungs (pulmonary tuberculosis, PTB), but can affect other tissues and organs such as brain, bone and liver.^{2,3} TB is

predominant in developing countries due to poor health regime and lack of awareness. Majority of the people who developed tuberculosis in 2019 were localized in South East Asian countries (44%), followed by Africa (25%), Western Pacific (18%), Eastern Mediterranean (8.2%), the Americas (2.9%) and Europe (2.5%). Eight countries, namely India (26%), Indonesia (8.5%), China (8.4%), the Philippines (6.0%), Pakistan (5.7%), Nigeria (4.4%), Bangladesh (3.6%) and South Africa (3.6%), accounted for almost two thirds of the total patients.⁴ Emergence of drug-resistant TB had further complicated the treatment regime and poses a grave threat to public health. Globally in 2019, close to half a million people developed rifampicin-resistant TB (RR-

* Corresponding author.

E-mail address: shivendraprsu@gmail.com.<https://doi.org/10.1016/j.ijtb.2021.04.008>

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REGULAR ARTICLE

Exposure to radio-frequency electromagnetic radiation shortens sleep duration and lengthens sleep latency and sleep inertia in humans living in proximity to the base transceiver stations

Priyanka Chandel¹, Margaret Messiah Singh¹, Atanu Kumar Pati^{1,2}, Arti Parganiha^{1,2*}

¹School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur-492010, India

²Center for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur-492010, India

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*Corresponding Author:

Email: arti.parganiha@gmail.com

Telephone: +91-771-2262631 (Ext. 108)

Keywords: Radiofrequency electromagnetic radiation; base transceiver station; electric-field strength; Narda Broadband Meter-550; behavioral sleep pattern

ABSTRACT

Radio-frequency electromagnetic radiations (RF-EMRs) are ubiquitous at present. Therefore, it is essential to assess the impact of RF-EMRs on human health. In this study, we examined the non-thermal effects of RF-EMR exposure on behavioral sleep patterns in humans. A total of 1072 randomly selected individuals living in the proximity of base transceiver stations (BTS) participated in the study. The sample consisted of 122 subjects from zone A (Inter-tower region), 310 from zone B (0-150 m), 316 from zone C (150-300 m), 197 from zone D (300-500 m), and 127 from the control zone (without BTS installations). We classified the zones as a function of distance from the BTS. We measured electric-field strength at each participant's house using Narda Broadband Field Meter-550 equipped with EF0-391 probe. We used Munich-Chronotype Questionnaire to determine each subject's behavioral sleep patterns. ANOVA results revealed the highest E-field strength in zone-A than the other zones and control. Results from ANCOVA, Kruskal-Wallis, and Mann-Whitney U tests showed that the participants from zone A had shorter sleep duration, and longer sleep latency and inertia than those living in other zones. Further, a significant effect of co-factors 'gender' and 'year of residence' was validated on mid-sleep (work and free days). Compared to women and > 5-year residents, men and 1-5-year residents had delayed mid-sleep. We concluded that RF-EMR might alter the behavioral sleep patterns of subjects living in the vicinity of BTS. However, further confirmatory and extensive studies are necessary, involving a large sample living near many more BTS installations.

1. Introduction

Exposure to electromagnetic fields (EMFs) is a common phenomenon these days. All organisms, including humans, receive electromagnetic radiations of varying frequencies. Base transceiver stations (BTS) and cell phones are the primary sources of human-made EMF (Buckus et al., 2017). However,

the radio-frequency electromagnetic radiations (RF-EMRs) fall in the non-ionizing category (The International Commission on Non-Ionizing Radiation Protection, 1998). RF-EMR lies in the frequency range between 3 kilohertz (kHz) to 300 gigahertz (GHz) as per the report of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). In the past few decades, the extensive usage of

Locomotor activity rhythm in catfish *Heteropneustes fossilis* as a function of shoal size under different light regimens

Pratibha Kujur^a, Atanu Kumar Pati^{a,b}, and Arti Parganiha^{a,b}

^aSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^bCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

The information on the circadian characteristics of catfish in shoals is scanty. We examined the circadian locomotor activity rhythm of catfish *Heteropneustes fossilis* either singly housed (SS1) or in shoals of four (SS4) and six (SS6) under different light regimens. We carried out the study sequentially under LD₁ (12:12), constant darkness (DD), LD₂, continuous light (LL), LD₃, and DL (12:12). Each condition was for at least 10–12 consecutive days. We analyzed the time-series data by employing Cosinor rhythmometry to detect circadian rhythm characteristics in locomotor activity at a fixed time window with a $\tau = 24$ h. Results indicated that singly housed or shoals exhibited statistically significant ($p < .001$) circadian rhythm in locomotor activity under LD conditions with a higher activity level during the dark phase. Further, we observed free-running rhythms in locomotor activity under DD and LL, irrespective of the shoal sizes. In phase inverse DL, both singly housed and shoals demonstrated higher activity in the dark phase. The two-way ANOVA results revealed a significant effect of the factor 'light regimen' on amplitude and acrophase; the factor 'shoal size' produced a statistically significant impact on the mesor only. Both shoals showed significantly higher mesor than singly housed fish. The circadian amplitude declined under constant conditions of DD and LL. The locomotor activity rhythm exhibited a free-running pattern with a T_{FR} greater than 24 h under both DD and LL conditions. We conclude that light is a more prominent factor for the entrainment of circadian activity in catfish *H. fossilis*. However, the extent of social aggregation (shoal size) has little or no effects on the characteristics of circadian locomotor activity rhythm in *H. fossilis*.

ARTICLE HISTORY

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KEYWORDS

Locomotor activity rhythm;
light regimen; shoal size;
free-running period;
Heteropneustes fossilis

Introduction

The social organization of fishes is unique and exciting. Fishes live either in solitude or in a group. The fishes often swim together for foraging, avoiding predators, and finding a suitable mate. The phenomenon is called shoaling behavior. During shoaling, fishes' social aggregation could be either loose or stable (Ryer and Olla 1998). Shoaling behavior is typical among many teleost fishes (Snekser et al. 2010). Fish in shoals demonstrates varied behavioral patterns, unlike those in solitude. It is a complex behavioral strategy that has broad adaptive functions (Pavlov and Kasumyan 2000). Shoaling confers several benefits to the individuals.

The foremost is the anti-predator benefits (Magurran 1990). In addition, shoaling provides benefits in selecting and having easy access to mates (Krause and Ruxton 2002). A shoal in many fish species may vary in size and composition (Pitcher 1998). The more massive shoal incurs confusion effects for predators; hence confers significant advantages to shoal members. However, big

shoals also have some negative consequences by increasing the competition among the shoal mates (Krause et al. 2000). The shoal modulates the behaviors, namely foraging and swimming in minnows (*Phoxinus phoxinus*) and goldfish (*Carassius auratus*) (Magurran and Pitcher 1983; Pitcher et al. 1982). These two species exhibit variability in foraging behaviors when shoaling size increases. It implies that shoaling behavior and shoal size are species-specific. The foraging advantages associated with more massive shoals decrease in some species when the shoal size increases beyond a critical number (Pitcher et al. 1982). The behavior difference can also be due to the difference in a species' shoaling tendency (Magurran and Pitcher 1983). It indicates that optimum shoal size plays a role in influencing the behavior of the fish.

The shoaling behavior of fish may vary dramatically as a function of the time of the day. Environmental cues that vary along a 24-h day might play a significant role (Paciorek and McRobert 2012). Different shoal sizes might also modulate circadian rhythm in locomotor



Morningness–eveningness preference, sleep quality and behavioral sleep patterns in humans – a mini review

Sarojini Minz^a and Atanu Kumar Pati^{a,b,c}

^aSchool of Zoology, Gangadhar Meher University, Sambalpur, India; ^bSchool of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^cCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

The sleep requirement of humans varies as a function of the country they live in, and their chronotype, gender, ethnicity, physiological state, and lifestyle. An interaction between the circadian clock (process C) and the sleep-wake homeostasis (process S) regulates sleep in humans. The Suprachiasmatic nuclei (SCN) – the master clock, measures the length of the solar day and through appropriate neuroendocrine mechanisms promotes sleep in the night. In this mini-review, we made an attempt to summarize findings of earlier studies dealing with the distribution pattern of chronotypes, sleep quality, and behavioral sleep patterns in human populations. The review is based on 203 relevant papers that we picked up from the databases, such as PubMed, Scopus, and Google Scholar. The review reveals the paucity of information on sleep behavior in humans in densely populated countries, like China and India. In addition, a clear message emerged from the review of the literature, i.e. the studies on the distribution of chronotypes and their problems associated with sleep quality, the behavioral sleep pattern, and diseases are critically limited and are far from complete. We recommend that this is the area that needs to be investigated extensively and intensively.

ARTICLE HISTORY

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KEYWORDS

Chronotype; morningness-eveningness; sleep quality; behavioral sleep pattern; humans

1. Introduction

The genus *Homo* evolved circa 2.5 million years BP and *Homo sapiens* evolved in the East Africa about 200,000 years BP. Since their evolution, they continued to sleep in the night and wake up in the morning. They were and still are diurnal. It is not known how many hours they slept everyday in the beginning. It is also not known how many were morning active or evening active then. However, it is well known that sleep length in humans is diminishing gradually. Now, it has become a matter of global concern.

Not only humans, almost all living organisms do sleep. The mammals and birds definitely sleep. The reptiles, amphibians and fish also sleep. In these cases, resting period is considered as sleep. Plants also sleep. Look at the daily movement in the leaves

PROTECTIVE ROLE OF L-DOPA AGAINST CYPERMETHRIN INDUCED REPRODUCTIVE TOXICITY IN JAPANESE QUAIL

Bindushree Baghel and S. K. Prasad*

School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur - 492 010, India
e-mail: drskprasad2006@gmail.com

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ABSTRACT : To test whether administration of L-Dopa can protect against cypermethrin (Cyp) induced reproductive toxicity in Japanese quail, *Coturnix coturnix japonica*. Twenty four adult male quails were divided into four groups. Group-1 received normal saline and served as control. Group-2 received Cyp 1mg/kg bw. Group-3 received L-Dopa 5mg/100mg bw and Group-4 received both Cyp and L-Dopa. Treatments were given for 30 days. Body and testes weight, testicular and cloacal gland volume and GSI of each bird of each group were recorded. Blood samples were collected from the jugular vein for the estimation of serum testosterone. Testes were collected for the estimation of acid phosphatase and histological observations. Body and testis weight, testes and cloacal gland volume, serum testosterone, testicular acid phosphatase and GSI of Cyp fed groups showed significantly decreased value. L-Dopa treated group showed significantly increased value. Cyp + L-Dopa fed group showed significantly increased value of serum testosterone and testicular acid phosphatase level where as other parameters showed no significant difference, but the mean value was higher than those of Cyp group. Histologically, testis of Cyp treated group showed irregularity and variability in seminiferous tubules shape having fewer spermatozoa. L-Dopa group showed enlarged form of seminiferous tubules with abundant spermatozoa and showed full breeding condition. Cyp + L-Dopa treated group exhibited nearly normal appearance of the seminiferous tubules and spermatozoa. It may be concluded that L-Dopa might be a potent protective agent against Cyp induced toxic effect on reproduction in Japanese quail. In view of the nutritional value of poultry products and the importance of poultry industry worldwide finding of this study may aid in the rational development of new strategies of poultry industry management aimed at improving the human health (resources of food and nutrition) and benefiting the economy.

Key words : Cypermethrin, L-Dopa, toxicity, reproduction, Japanese quail.

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INTRODUCTION

White meat and egg products of poultry industries are a rich source of essential component of food and nutrition (Ghafoor *et al*, 2010). Parasitic infection in poultry farm causes concurrent infections which results in loss of productivity. Lice, ticks, mites and flies are most common external parasites of poultry. An infestation with *Argas persicus* (poultry soft tick) represent a major ectoparasitic problem worldwide in poultry industries and is affecting egg and meat production (Hagos and Eshetu, 2005). Cypermethrin is one of the widely used pesticides as anti parasitic medicine to resolve the ectoparasitic infestation in poultry farm along with other practices (Alves *et al*, 2016; Sivajothi *et al*, 2017). Their excessive use is the major source of environmental hazards for

animals and even for human beings, because it gets incorporated in the food chains (Abd-Alla *et al*, 2002). Many pesticides are known to cause degeneration of reproductive organs, inhibition of spermatogenesis, sterility and decrease in hormone and steroid levels. Pyrethroids are derived from natural occurring pyrethrum flowers (*Chrysanthemum cinerariaefolium*) and it has insecticidal properties (Perger and Szadkowski, 1994). *In vitro* study reveals that pyrethroid insecticides including permethrin, fenvalerate and cypermethrin act as anti-androgen chemicals (Xu *et al*, 2008). Among these, Cypermethrin is one of the widely used pesticides and it is considered as an endocrine disruptive chemical (Mnif *et al*, 2011). It affects secondary sexual characters, the processes of oogenesis, spermatogenesis, early onset of

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PROTECTIVE ROLE OF L-DOPA AGAINST CYPERMETHRIN INDUCED TOXICITY ON EGG PRODUCTION, QUALITY, HATCHABILITY AND EMBRYONIC DEVELOPMENT IN JAPANESE QUAIL

Bindushree Baghel and S. K. Prasad*

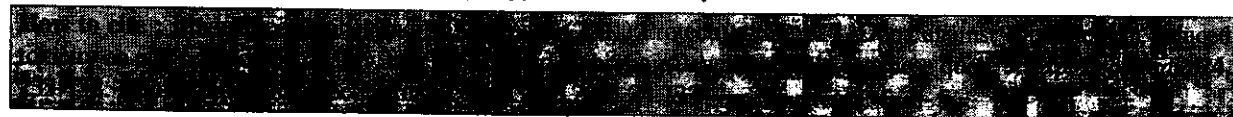
School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur - 492 010, India.

*e-mail: drskprasad2006@gmail.com

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ABSTRACT : The aim of this study was to investigate the protective role of L-Dopa against cypermethrin induced toxicity on egg production, quality, hatchability and embryonic development in Japanese quails (*Coturnix coturnix japonica* belong to family Galiformes). Two experiments were performed. Experiment-I: 36 adult quails (male: female ratio 1:2) were divided into four groups (I-Control, II-Cypermethrin, III-L-Dopa, IV- Cypermethrin +L-Dopa). Cypermethrin (1mg/kg body weight/bird/day/0.1ml normal saline) and L-Dopa (5mg/100mg body weight/bird/day/0.1ml normal saline) were administered for 30 days. Cypermethrin and L-Dopa were administered by oral gavages. Experiment-II: 40 fertilized eggs were divided into four groups as in experiment-I. Cypermethrin and L-Dopa were injected into the air sac at blunt end of the eggs and incubated for 18 days. Results indicated that in the experiment-I, cypermethrin treatment showed lowest rate of egg production, hatchability, fertility and the highest mortality. Quality of egg layed was also lowest. L-Dopa and L-Dopa + cypermethrin treated group showed opposite effects when compared to cypermethrin treated group. In experiment-II, cypermethrin injected eggs showed 0 % hatchability and 100% mortality rate. L-Dopa and L-Dopa + cypermethrin injected eggs showed highest hatchability and lowest mortality rate having normal developing embryo with some organs such as trunk, head, neck, eyeball, beak, wing elbow and limb buds. It may be concluded that L-Dopa play a protective role against cypermethrin induced toxicity on egg production, quality, hatchability and embryonic development in Japanese quail.

Key words : Japanese quail, egg, embryo, L-Dopa, cypermethrin, toxicity.

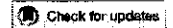


INTRODUCTION

Pesticide is a chemical substance applied for preventing and destroying the pests and insects in order to increase the quality and quantity of agricultural production thereby supplying food at reasonable cost (Abhilash and Singh, 2009). In subcontinent countries, villagers rear poultry breeds to fulfil meat requirement at the local scale (Kumaresan *et al*, 2008). White meat and egg products of poultry industries are a rich source of essential component of daily food (Ghafoor *et al*, 2010). Cypermethrin is one of the widely used pesticides. Lice, ticks, mites and flies are most common external parasites of poultry. Parasitic infection causes other concurrent infections, which results in loss of productivity. An infestation with *Argas persicus* (poultry soft tick)

represent a major ectoparasitic problem worldwide in poultry and is affecting egg and meat production (Hagos and Eshetu, 2005). Cypermethrin is widely used as anti parasitic medicine to resolve the ectoparasitic infestation in poultry farm along with other practices (Alves *et al*, 2016; Sivajothi *et al*, 2017). It is also considered as an endocrine disruptive chemical (Mnif *et al*, 2011). It affects secondary sexual characters, the processes of oogenesis, spermatogenesis, early onset of sexual maturation and sex determination (Crisp *et al*, 1998). Ingestion of cypermethrin with drinking water showed significant decrease on the fertility, testicular and epididymal tissues in male rats (Elbetieha *et al*, 2001). Cypermethrin induces biochemical and teratological changes on different developmental stages of chick embryos (Anwar, 2004). Decrease in the body weight, testes and epididymal,

101



Sexual dimorphism in ultradian and 24h rhythms in plasma levels of growth hormone in Indian walking catfish, *Clarias batrachus*

Raj Naresh Gopal^a, Dhanananajay Kumar^b, Vinay Kumar Singh^c, Atanu Kumar Pati^{d*}, and Bechan Lal^a

^aFish Endocrinology Laboratory, Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi, India; ^bDepartment of Pharmaceutical Engineering and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi, India; ^cCMP Degree College, University of Allahabad, Prayagraj, India; ^dSchool of Life Sciences, Pt. Ravishankar Shukla University, Raipur, India

ABSTRACT

Growth hormone (GH), a key regulator of somatic and reproductive growth in vertebrates, has been extensively studied, although primarily in female fish. Despite numerous reports about sex- and species-specific growth patterns in fish, to our knowledge, there is no report about the 24 h rhythm of plasma GH in male fish. Thus, we aimed to investigate temporal variations in plasma GH levels and the existence of any rhythms therein during the reproductively active months of March to August in the male walking catfish, *Clarias batrachus*. We also aimed to compare the secretory temporal patterns of GH in male–female specimens of *C. batrachus* to decipher sexual dimorphism in GH secretions in fish. After 14 days of acclimation to the natural environment, male catfish (N = 240 in total) were sorted and randomly divided into eight groups for study at ZT0 (sunrise ~06:00 h); 3, 6, 9, 12, 15, 18, and 21. During each month, physical parameters like duration of photoperiod and water temperature were measured. Male catfish (n = 40/month) in all eight groups were sampled (n = 5/group) at each time point under the natural time-of-year 24 h light-dark (LD) cycle. Male catfish were anesthetized and blood was collected through a caudal puncture, centrifuged, and plasma isolated. Plasma GH was measured using a competitive homologous enzyme-linked immunosorbent assay. Further, testes were removed, weighed, and the gonadosomatic index (GSI) was calculated. A significant effect of time and season ($p < 0.05$, two-way ANOVA) on plasma GH level was detected. Cosinor analyses verified the existence of statistically significant ($p < 0.05$) ultradian (12 h) and 24 h rhythms of plasma GH in male *C. batrachus*, with the higher values of Mesor (time series mean) and amplitude (one-half peak-to-trough difference) of the periodicities from March to July. Mapping of the acrophases (peak times) showed two ultradian and one 24 h acrophase of GH during the early photophase and early scotophase from March to August. Distinct sexual-dimorphism in plasma GH Mesors and acrophases was noticed between male and female catfish. GSI values of male catfish indicate males mature a little earlier than females in terms of size and reproductive activity. The findings that plasma GH show 24 h and seasonal fluctuations in a sex-specific manner collectively demonstrate the importance of considering the effect of biological 24 h and seasonal time and sex on the GH level in regulating the physiology of somatic growth and reproduction in catfish.

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KEYWORDS



Sexual dimorphism; growth hormone; diurnal rhythm; ultradian rhythm; season; *Clarias batrachus*

Introduction


Fish, being poikilotherm, are influenced by daily and seasonal variations in photoperiod, temperature, rainfall, physico-chemical, and biological characteristics of the aquatic ecosystem, such as dissolved O₂, CO₂, pH, and salinity. Biological rhythms are recurrent processes, from molecular to behavioral levels, controlled by endogenous oscillators or biological clocks. These rhythmic processes are the output of interactions between the biological clock and external environment (Lamont and Amir 2010) that provide adaptive fitness to organisms by appropriately timing their behavior (feeding, locomotion, and social aggregation) and physiology (growth, reproduction, immune response, and hormone

secretion). In fish, rhythmic secretion of various metabolic and reproductive hormones, such as gonadotropin (De Vlaming and Vodcnik 1977; Harikrishnan et al. 2002; Hontela and Peter 1978; Khan and Thomas 1994), sex steroids (Lamba et al. 1983; Singh and Singh 1987), and thyroid hormones (Eales et al. 1981; Sinha et al. 1992; Stacey et al. 1984) has been reported. In vertebrates, rhythmic secretion of these hormones controls and coordinates growth and reproduction, two crucial physiological processes.

Daily variations in GH secretion have been described in many fish species, such as rainbow trout (Gomez et al. 1996; Le Bail et al. 1991; Niu et al. 1993), Atlantic salmon

CONTACT Bechan Lal  lalbhu@yahoo.co.in  Fish Endocrinology Laboratory, Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi 221005, India.

*Present addresses Vice-Chancellor at Gangadhar Meher University, Sambalpur, Orissa, India- 768004

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Short- and long-duration exposures to cell-phone radiofrequency waves produce dichotomous effects on phototactic response and circadian characteristics of locomotor activity rhythm in zebrafish, *Danio rerio*

Shikha Malik^a, Atanu Kumar Pati^{a,b,c} and Arti Parganiha^{a,c}

^aChronobiology and Animal Behavior Laboratory, School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; ^bSchool of Zoology, Gangadhar Meher University, Sambalpur, India; ^cCenter for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India

ABSTRACT

We examined the effects of short- and long-duration exposure to cell phone radiation (CPR) on phototactic response (PR) and circadian characteristics of locomotor-activity rhythm, respectively, in zebrafish. We exposed four groups (10 in each) randomly selected fish to CPR emitted by a 2300 MHz 4G cell phone for 0.5 h, 1 h, 2 h, 3 h, and 4 h duration at two different time points of a day, i.e. morning and evening, to assess the PR. We also studied the effects of 1 week CPR exposure on circadian rhythm in locomotor activity pattern in eight singly housed zebrafish. We had eight singly housed sham-exposed zebrafish as the control. Results of two-way ANOVA revealed statistically significant effects of the factors *exposure time* and *exposure duration* on the PR of zebrafish. Fish exhibited photo-positive response till 2 h following morning exposure, and thereafter, showed photo-negative response with increased duration of exposure. During evening exposure, the fish were mostly photo-negative. However, 1 week exposure to CPR did not produce any significant effects on the circadian characteristics of locomotor activity rhythm. It is concluded that the CPR might alter phototaxis, but not the parameters of circadian rhythm in locomotor activity pattern of zebrafish.

ARTICLE HISTORY

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KEYWORDS

Cell-phone radiofrequency waves; short- and long-duration exposure; phototactic response (PR); locomotor activity; zebrafish

1. Introduction

Cell phones (CPs) have become one of the most important and indispensable tools in our contemporary life. The extensive use of 4G CP has increased all over the world in the last decade. CPs generate radiofrequency electromagnetic field (RF-EMF) from their antennas. The human body absorbs energy emanated from the CPs. A number of different sources also generate RF-EMF. According to Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), radiofrequency lies in the range from 3 kilohertz (kHz) to 300 gigahertz (GHz). As of May 2018, India occupies the second position after China apropos CP penetration density. A press release (Press Release No. 45/2019) by the Telecom Regulatory Authority of India, New Delhi (2018), put the total number of CP



To which world regions does the valence-dominance model of social perception apply?

Over the past 10 years, Oosterhof and Todorov's valence-dominance model has emerged as the most prominent account of how people evaluate faces on social dimensions. In this model, two dimensions (valence and dominance) underpin social judgements of faces. Because this model has primarily been developed and tested in Western regions, it is unclear whether these findings apply to other regions. We addressed this question by replicating Oosterhof and Todorov's methodology across 11 world regions, 41 countries and 11,570 participants. When we used Oosterhof and Todorov's original analysis strategy, the valence-dominance model generalized across regions. When we used an alternative methodology to allow for correlated dimensions, we observed much less generalization. Collectively, these results suggest that, while the valence-dominance model generalizes very well across regions when dimensions are forced to be orthogonal, regional differences are revealed when we use different extraction methods and correlate and rotate the dimension reduction solution.

Protocol registration

The stage 1 protocol for this Registered Report was accepted in principle on 5 November 2018. The protocol, as accepted by the journal, can be found at <https://doi.org/10.6084/m9.figshare.7611443.v1>.

People quickly and involuntarily form impressions of others based on their facial appearance^{1,2}. These impressions then influence important social outcomes^{3,4}. For example, people are more likely to cooperate in socioeconomic interactions with individuals whose faces are evaluated as more trustworthy⁵, vote for individuals whose faces are evaluated as more competent⁶, and seek romantic relationships with individuals whose faces are evaluated as more attractive⁷. Facial appearance can even influence life-or-death outcomes. For example, untrustworthy-looking defendants are more likely to receive death sentences⁸. Given that such evaluations influence profound outcomes, understanding how people evaluate others' faces can provide insight into a potentially important route through which social stereotypes impact behaviour^{9,10}.

Over the past decade, Oosterhof and Todorov's valence-dominance model¹¹ has emerged as the most prominent account of how we evaluate faces on social dimensions¹². Oosterhof and Todorov identified 13 different traits (aggressiveness, attractiveness, caringness, confidence, dominance, emotional stability, unhappiness, intelligence, meanness, responsibility, sociability, trustworthiness and weirdness) that perceivers spontaneously use to evaluate faces when forming trait impressions¹³. From these traits, they derived a two-dimensional model of perception: valence and dominance. Valence, best characterized by rated trustworthiness, was defined as the extent to which the target was perceived as having the intention to harm the viewer¹⁴. Dominance, best characterized by rated dominance, was defined as the extent to which the target was perceived as having the ability to inflict harm on the viewer¹⁵. Crucially, the model proposes that these two dimensions are sufficient to drive social evaluations of faces. As a consequence, the majority of research on the effects of social evaluations of faces has focused on one or both of these dimensions¹⁶.

Successful replications of the valence-dominance model have only been conducted in Western samples^{17,18}. This focus on the West is consistent with research on human behaviour more broadly, which typically draws general assumptions from analyses of Western participants' responses¹⁹. Kline et al.²⁰ recently termed this problematic practice the Western centrality assumption and argued that regional

variation, rather than universality, is probably the default for human behaviour.

Consistent with Kline et al.'s notion that human behaviour is best characterized by regional variation, two recent studies of social evaluation of faces by Chinese participants indicate that different factors underlie their impressions^{21,22}. Both studies reported that Chinese participants' social evaluations of faces were underpinned by a valence dimension similar to that reported by Oosterhof and Todorov for Western participants, but not by a corresponding dominance dimension. Instead, both studies reported a second dimension, referred to as capability, which was best characterized by rated intelligence. Furthermore, the ethnicity of the faces rated only subtly affected perceptions²¹. Research into potential cultural differences in the effects of experimentally manipulated facial characteristics on social perceptions has also found little evidence that cultural differences in social perceptions of faces depend on the ethnicity of the faces presented^{23,24}. Collectively, these results suggest that the Western centrality assumption may be an important barrier to understanding how people evaluate faces on social dimensions. Crucially, these studies also suggest that the valence-dominance model is not necessarily a universal account of social evaluations of faces and warrants further investigation in the broadest set of samples possible.

Although the studies described above demonstrate that the valence-dominance model is not perfectly universal, to which specific world regions it does and does not apply are open and important questions. Demonstrating differences between British and Chinese raters is evidence against the universality of the valence-dominance model, but it does not adequately address these questions. Social perception in China may be unique in not fitting the valence-dominance model because of the atypically high general importance placed on status-related traits, such as capability, during social interactions in China^{25,26}. Indeed, Tan et al.²⁷ demonstrated face-processing differences between Chinese participants living in mainland China and Chinese participants living in nearby countries, such as Malaysia. Insights regarding the unique formation of social perceptions in other cultures and world regions are lacking.

A full list of author affiliations appears at the end of the paper.

Resources: B.C.J., L.M.D., M.T.L., S.C.L., C.P.C., M.A.V., S.A.S., A.W., Y.Q., K. Ariyabuddhiphongs, S.J., H.M., P. Suavansri, N.T., R.M.S., C.C., A. Kapucu, J. Leongómez, M.V.-A., N.H., C.B., L.A.V., K.B., K.G., Z.J., G.M.M., I.D.S., J.G.L., S.Y.X., W.J.C., M. Seehuus, S. Azouaghe, A.B., J.E., A.d.-G., C.-C.K., J.B.F., C.A.L., A.K.P., P. Kačmár, I. Zakharov, E.B., K.S., C.D.C., J.K.O., J.L.B., B.J.W.D., D.R., W.W.A.S., S.-C.C., G.P., D.M.B.-B., T.B., C.B.Y.T., V.K., H.D.F., G.G., C.S., K.A.S., E.M.O.K., B.S., M. Sirota, G.V.S., T.J.S.L., K.U., E. Vergauwe, K.J., K. Ask, J. Boudesseul, F.R.-D., N.M.M., S.M.J.J., C.K.T., A.D.R., F.K., Á.P., P.T., M. Vianello, A.C., S.L., J. Lutz, M. Adamkovic, P.B., V.C., A.M.F., R.M.C.S.H., J.V.V., N.S.C.-F., M.F.-A., A.M., M. Sharifian, H.L., C.L., M. Voracek, E.M.G., A.A.Ö., M.A.K., C.O., X.Y., S. Alper, P.S.F., C.R.C. Software: B.C.J., L.M.D., J.K.F., G.M.M., I.D.S., N.P., B.P., C.D.C., H.D.F., C.S., K.R.B., R.M.C.S.H., C.R.C., N.A.C. Supervision: B.C.J., L.M.D., J.K.F., M.T.L., S.C.L., M.L.W., N.C.O., A.W., H.M., J.W.L., C.C., A. Kapucu, J. Leongómez, O.R.S., E. Valderrama, M.V.-A., M. Andreychik, E.D.M., C.B., L.A.V., K.B., I.D.S., M.C.P., E.H., W.J.C., M. Seehuus, C.-C.K., J.B.F., C.A.L., P. Kačmár, I. Zakharov, K.S., C.D.C., J.W.S., J.K.O., A.-S.L., J.L.B., J.A.O., B.J.W.D., M.J.B., H.J., V.K., M.F.C., H.D.F., J.P., C.S., E.M.O.K., D.S., B.S., M. Sirota, T.J.S.L., K.U., E. Vergauwe, K. Ask, C.J.J.v.Z., D.W., S.M.J.J., A.C., S.L., K.P., N.K.S., K.W.T., A.M.F., J.V.V., M. Sharifian, M.I., C.L., M. Voracek, A.A., A.A.Ö., M.A.K., S. Alper, P.S.F., C.R.C., N.A.C. Validation: B.C.J., L.M.D., J.K.F., C.C., Q.W., S.Y.X., M. Seehuus, C.L.C., A.K.P., I. Zakharov, J.W.S., E.S., V.K., H.D.F., J.P., M. Sirota, E. Vergauwe, C.J.J.v.Z., P.T., J.H., M. Voracek, M.A.K.

Visualization: B.C.J., L.M.D., J.K.F., H.D.F., M.A.K., P.S.F. Writing (original draft): B.C.J., L.M.D., J.K.F., F.F., Y.Q., C.B., I.G.-S., J.B.F., K.S., B.J.W.D., G.K., H.L.U., H.I., H.D.F., D.I.B., J.P., C.S., D.S., K.L.R., S.M.J.J., A.D.R., N.K.S., J.O., A.A.Ö., M.A.K., P.S.F., N.A.C.

Writing (review & editing): B.C.J., L.M.D., J.K.F., M.T.L., J.A., I.L.G.N., S.C.L., F.F., M.L.W., M.A.V., A.S., D.P.C., A.W., Y.Q., K. Ariyabuddhiphongs, H.M., T.R.E., J. Bonick, J.W.L., C.C., J. Leongómez, B.A., N.H., P. Szecsi, M. Andreychik, E.D.M., C.B.,

N.L., L.A.V., K.B., I.S., S.S., Z.J., I.D.S., M.C.P., J.D.A., E.H., S.Y.X., W.J.C., M. Seehuus, S. Azouaghe, A.B., J.E., J.P.W., E.K., M.P.-P., A.E.B.-S., A.d.-G., J.B.F., V.S., T.E.S., C.A.L., C.L.C., P.C., P. Kujur, A.P., N.P., A.K.P., S.P., M.M.S., B.P., P. Kačmár, I. Zakharov, S.A.-S., E.B., M.T., K.S., C.D.C., J.W.S., J.K.O., A.-S.L., J.L.B., T.D.G., J.A.O., B.J.W.D., G.R., M.J.B., K.H., B.J., G.K., V.A.F., H.L.U., G.P., Z.V., H.I., T.B., N.V.d.L., C.B.Y.T., V.K., M.F.C., H.D.F., D.I.B., G.G., C.S., E.M.O.K., D.S., B.S., M. Sirota, T.J.S.L., K.U., E. Vergauwe, J.S., K. Ask, C.J.J.v.Z., A. Körner, K.L.R., K.R.B., D.W., A.R.G.-E., S.M.J.J., T.K.N., C.K.T., J.H.Z., M. Vianello, N.I., M. Adamkovic, G.B., I.R., V.C., K.P., N.K.S., K.W.T., C.A.T., A.M.F., R.M.C.S.H., J.V.V., B.F., H.L., C.L., E.P., M. Voracek, J.O., E.M.G., A.A., A.A.Ö., B.B.-D., M.A.K., T.G., J.K.M., Y.D., P.S.F., C.R.C., N.A.C.

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Correspondence and requests for materials should be addressed to B.C.J.

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Benedict C. Jones^{1,156}✉, Lisa M. DeBruine^{2,156}, Jessica K. Flake^{3,156}, Marco Tullio Liuzza⁴, Jan Antfolk⁵, Nwadiogo C. Arinze⁶, Izuchukwu L. G. Ndukaihe⁶, Nicholas G. Bloxson⁷, Savannah C. Lewis⁷, Francesco Foroni⁸, Megan L. Willis⁸, Carmelo P. Cubillas⁹, Miguel A. Vadillo⁹, Enrique Turiegano¹⁰, Michael Gilead¹¹, Almog Simchon¹¹, S. Adil Saribay¹², Nicholas C. Owsley¹³, Channing Jang¹³, Georgina Mburu¹³, Dustin P. Calvillo¹⁴, Anna Wlodarczyk¹⁵, Yue Qi¹⁶, Kris Ariyabuddhiphongs¹⁷, Somboon Jarukasemthawee¹⁷, Harry Manley¹⁷, Panita Suavansri¹⁷, Nattasuda Taephant¹⁷, Ryan M. Stoler¹⁸, Thomas R. Evans¹⁹, Judson Bonick²⁰, Jan W. Lindemans²⁰, Logan F. Ashworth²¹, Amanda C. Hahn²¹, Coralie Chevallier²², Aycan Kapucu²³, Aslan Karaaslan²³, Juan David Leongómez²⁴, Oscar R. Sánchez²⁴, Eugenio Valderrama²⁴, Milena Vásquez-Armézquita²⁴, Nandor Hajdu^{25,26}, Balazs Aczel²⁶, Peter Szecsi²⁶, Michael Andreychik²⁷, Erica D. Musser²⁸, Carlota Batres²⁹, Chuan-Peng Hu³⁰, Qing-Lan Liu³¹, Nicole Legate³², Leigh Ann Vaughn³³, Krystian Barzykowski³⁴, Karolina Golik³⁴, Irina Schmid³⁵, Stefan Stieger³⁵, Richard Artner³⁶, Chiel Mues³⁶, Wolf Vanpaemel³⁷, Zhongqing Jiang³⁸, Qi Wu³⁸, Gabriela M. Marcu³⁹, Ian D. Stephen⁴⁰, Jackson G. Lu⁴¹, Michael C. Philipp⁴², Jack D. Arnal⁴³, Eric Hehman³, Sally Y. Xie³, William J. Chopik⁴⁴, Martin Seehuus⁴⁵, Soufian Azouaghe^{46,47}, Abdelkarim Belhaj⁴⁶, Jamal Elouafa⁴⁶, John P. Wilson⁴⁸, Elliott Kruse⁴⁹, Marietta Papadatou-Pastou⁵⁰, Anabel De La Rosa-Gómez⁵¹, Alan E. Barba-Sánchez⁵¹, Isaac González-Santoyo⁵², Tsuyueh Hsu⁵³, Chun-Chia Kung⁵³, Hsiao-Hsin Wang⁵³, Jonathan B. Freeman⁵⁴, Dong Won Oh⁵⁵, Vidar Schei⁵⁶, Therese E. Sverdrup⁵⁶, Carmel A. Levitan⁵⁷, Corey L. Cook⁵⁸, Priyanka Chandel⁵⁹, Pratibha Kujur⁵⁹, Arti Parganiha⁵⁹, Noorshama Parveen⁵⁹, Atanu Kumar Pati⁵⁹, Sraddha Pradhan⁵⁹, Margaret M. Singh⁵⁹, Babita Pande⁶⁰, Jozef Bavolar⁶¹, Pavol Kačmár⁶¹, Ilya Zakharov⁶², Sara Álvarez-Solas⁶³, Ernest Baskin⁶⁴, Martin Thirkettle⁶⁵, Kathleen Schmidt⁶⁶, Cody D. Christopherson⁶⁷, Trinity Leonis⁶⁷, Jordan W. Suchow⁶⁸, Jonas K. Olofsson⁶⁹, Teodor Jernsäter⁶⁹, Ai-Suan Lee⁷⁰, Jennifer L. Beaudry⁷¹, Taylor D. Gogan⁷¹, Julian A. Oldmeadow⁷¹, Benjamin Balas⁷², Laura M. Stevens⁷³,



104



Formulation of anti-larval nanoemulsion: Impact of droplet size on larvicidal activity against malaria vectors in Chhattisgarh, India

Vijayalakshmi Ghosh^{1*}, Raju Ranjha² & Ashwini Kumar Gupta¹

¹SoS in Life Science, Pt Ravishankar Shukla University, Raipur-492 010, Chhattisgarh, India

²National Institute of Malaria Research, Field Unit, Raipur-492 015, Chhattisgarh, India

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Mentha piperita (peppermint) essential oil nanoemulsion was prepared by low energy spontaneous emulsification method. GC-MS analysis revealed the composition of peppermint essential oil and menthol (45.2%) was the major bioactive compound along with menthone (15.39%), neomenthol (8.1%), menthyl acetate (7.7%) and isomenthone (7.4%). Optimization of the nanoemulsion preparation process was done by Response Surface Methodology (RSM) with Central Composite Design (CCD). The droplet diameter and polydispersity index at optimized conditions (15% oil concentration, 25% surfactant concentration and Tween80 as surfactant) were 39.2 nm and 0.22 respectively. Optimized peppermint oil nanoemulsion (OPNE) was optically transparent, spherical in morphology and was stable for 6 months. OPNE formulation demonstrated dose, time and size-dependent larvicidal activity against malaria vectors with LC₅₀ value of 48 ppm and 123 ppm against *Anopheles culicifacies* and *Anopheles stephensi* respectively. The LC₅₀ values were 90 ppm and 163 ppm against *Anopheles culicifacies* and *Anopheles stephensi* correspondingly for the bigger droplet size formulation (PNE, droplet diameter: 129.6 nm) confirming the droplet size-dependent larvicidal activity of the nanoemulsion. The results of this study propose that peppermint oil-based nanoemulsion possibly be used as an eco-friendly larvicide for mosquito vector control strategies.

Keywords: Anopheles mosquitoes, Larvicidal activity, Nanoemulsion, Plant essential oil, Response Surface Methodology

Synthetic insecticides are the most important parts of the mosquito vector control program *i.e.*, growth regulators for insects (*e.g.*, diflubenzuron, methoprene, *etc.*) and organophosphates (*e.g.*, temephos, fenthion, *etc.*). Repeated indiscriminate use of the synthetic pesticides has been reported to have a harmful effect on fish and other non-target organisms, and also they cause the increase in insecticide resistance of arthropods¹. There are reports on malaria vector resistance to DDT (Organochlorine), Malathion (Organophosphate) and Deltamethrin (Pyrethroids) in Chhattisgarh state². Synthetic insecticides also have caused environmental problems such as air, soil and groundwater pollution including toxicity to the aquatic ecosystem. Hence, scientists are looking for the development of more efficient and eco-friendly alternatives to conventional pesticides, which are safe to health of human and further to the environment and the non-target organisms.

Mosquitoes transmit diseases *Le* Barmah Forest fever, chikungunya, dengue, dirofilariasis, Eastern

equine encephalitis, filariasis, Japanese encephalitis, La Crosse encephalitis, malaria, Ross River fever, Saint Louis encephalitis, tularemia, Venezuelan equine encephalitis, West Nile virus, Western equine encephalitis, yellow fever and Zika fever^{3,4}. They also cause a nuisance by biting which can lead to allergic reactions to humans. Hence, mosquito vector control is an essential requirement in control annoyance created by and the epidemic diseases spread by mosquitoes. Malaria is foremost public health concern of the Country and also globally. It is one of the life-threatening diseases and the causative organism is plasmodium parasites. Biting of the infected female anophelines transmits these parasites to human hosts. An estimated 219 million cases of malaria was spread over 90 various countries and resulted in death of 435,000 people in 2017. Although African countries share an unaccountably high score of the global burden of malaria, India shared 4% of the disease burden⁵. There are around one million malaria cases reported in India annually caused by *P. vivax* and *P. falciparum* with around 50% proportion of each⁶. Out of 58 anophelines found in India, Malaria is transmitted by 6 primary vectors and 3 secondary

*Correspondence:
E-mail: vijayalakshmi.ghosh@aigmail.com

ANTIMICROBIAL EFFICACY OF BIOACTIVE COMPOUNDS OF RARE ENDOPHYTIC ACTINOBACTERIA, *Actinoalloteichus cyanogriseus* SIR5 (MK793584)

Geetika Wag[✉], Sunita Datla and Ashwini Kumar Gupta

Microbiology Research Laboratory, School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India

[✉]Corresponding Author: geet.mun08@gmail.com

ABSTRACT

To address the problem of antibiotic resistance in pathogens, our research aimed for endophytic actinobacteria, producers of a diverse array of significant bioactive metabolites. Endophytic actinobacteria SIR5 was isolated from roots of *Sphaeranthus indicus* Linn., and was identified to be *Actinoalloteichus cyanogriseus* via 16S rRNA sequencing. With the accession number MK793584, the gene sequence was deposited to NCBI. In the current study, a rare actinobacteria *Actinoalloteichus cyanogriseus*, has been reported as an endophyte for the first time. Both Microbial Type Culture Collection (MTCC) and Clinical Cultures (CC) were used to investigate the antimicrobial property of the bioactive chemicals synthesized by *A. cyanogriseus* SIR5. A significant zone of inhibitions was recorded against clinical cultures: *B. cereus* (12.16±0.16 mm), *Candida albicans* (12.83±0.44 mm), *E. coli* (15.33±0.33 mm), *S. epidermidis* (11.50±0.28 mm) and MTCC pathogens: *B. cereus* (11.16±0.16 mm), *B. subtilis* (13.33±0.16 mm), *P. aeruginosa* (13.33±0.33 mm), *S. epidermidis* (12.33±0.33 mm). The production of bioactive compound was enhanced by optimization using one factor at a time (OFAT), which was achieved with modified ISP-4 medium (starch - 1% w/v, NH₄NO₃ - 1% w/v, CaCO₃ - 2 g/l, K₂HPO₄ - 1 g/l, MgSO₄ - 1 g/l, NaCl - 1g-l, trace solution - 1 ml/l) with inoculum size - 13%, incubation period - 16 days, pH - 8.0 and temperature - 28°C. **Keywords:** *Actinoalloteichus cyanogriseus*, Bioactive Compounds, Antimicrobial Activity, Endophytic Actinobacteria

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INTRODUCTION

The increased multidrug resistance (MDR) in pathogens as a result of anthropogenic activities in addition to natural processes (through hereditary changes, efflux pump, β lactamases, etc.) is alarming for public health and modern medicine.^{1,2} The situation has resulted in reduced effectiveness of approved antibiotics and thus efforts are being made to find efficient and broad-spectrum antibiotics from actinobacteria which are potential producers of diverse metabolites. Since currently available antibiotics are mainly derived from soil actinobacteria, research on endophytic actinobacteria is underway to replace repetitive discovery of known antibiotics. Endophytic actinobacteria are more likely to be involved in the metabolic pathway of the host plant and thus chances of production of some potential novel bioactive metabolites in addition to chemically similar ones are more.³ Taxane (taxol), an anticancer compound produced by the plants *Taxus brevifolia* and *Taxus baccata*, has also been obtained from its endophyte *Micromonospora* sp. and *Kitasatospora* sp. respectively,⁴ possibly evidencing the involvement of both in their metabolism. Thus to ascertain more efficient compounds, recent research has focused on rare endophytic actinobacteria, an underexplored group of microorganisms.

In this study, a rare actinobacteria, *Actinoalloteichus cyanogriseus* strain SIR5 was procured from the root tissue of medicinal weed *Sphaeranthus indicus* from Raipur, Chhattisgarh and its antimicrobial activity was observed against MTCC and Clinical pathogens. Previously, *A. cyanogriseus* has been isolated from the soils of China and the strain was authenticated to be of family *Pseudonocardiaceae*, based on phylogenetic analysis.⁵ Bioactive alkaloids, caeruleomycins and cyanogranamide, obtained from marine *A. cyanogriseus*, exhibited significant antibacterial, antifungal, anticancer and antiamebic activity.⁶⁻⁸

18

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PROLONGED EFFECTS OF RADIOFREQUENCY ELECTROMAGNETIC RADIATION EMANATED FROM MOBILE PHONE ON GLOBAL DNA METHYLATION AND SPAWNING IN ZEBRAFISH, *DANIO RERIO*

Shikha Malik*, Archana Chourasia and Rohit Kumar Pradhan

School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur - 492 010, India.

*e-mail: shikhamalik19@yahoo.com, arch3103@gmail.com

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ABSTRACT : In this age of global communication, mobile phones have been tremendously used by all human beings especially by young adults. Ionizing radiations are known to damage genetic components and can be lethal, studies on the effect of non-ionizing radiations are contradictory and few. DNA methylation pattern is an important aspect for gene regulation during the developmental phase and seen to occur profoundly during the adult phase on exposure to certain environmental conditions. The present study is an effort to estimate the effects of Radiofrequency Electromagnetic Field emitted from a mobile phone on global DNA methylation changes, egg spawning and body weight in zebrafish. The experiment was conducted in eight groups of zebrafish, with 10 fish per group, where four groups were utilized as control while the other four groups were exposed with mobile phone mediated non-ionizing radiations for 5, 10, 15 and 20 days. Each experiment was performed in triplicate. A Narda Broad Band Meter (NBM)-550 and EF0-391 probe were used for recording the electric field (E-Field) strength of MP radiation. The experiment was conducted in separate rooms for both groups, and after the tentative time period, DNA was isolated from randomly selected zebrafish from each group. Later, DNA methylation was quantified in zebrafish muscle tissues using a MethylFlash Methylated DNA quantification Kit. Statistical analysis reveals that various parameters such as DNA methylation, spawning and body weight showed significant difference between control and exposed groups. While DNA methylation was found to be higher in exposed group than control group, body weight and spawning measured less in exposed group as compared to the control group. The study concludes that prolonged exposure to mobile phone radiations could affect DNA methylation pattern as well as the reproductive machinery in zebrafish.

Key words : Zebrafish, mobile phone radiation, DNA methylation, spawning.

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INTRODUCTION

Mobile Phone (MP) use has become widespread in the current decade (Parasuraman *et al.*, 2017). Recently, 4G-long term evolution (4G-LTE) mobile phones (MPs) are becoming prevalent and provide very fast internet speeds. MPs, with not only their communication facilities but also their ability to access the internet, make it an unavoidable gadget in our current lifestyle. Radiation, which is an integral part of any living organism, lies in the ionizing as well as the non-ionizing zone of the EM Spectrum. The antenna of MPs is located at the rear bottom or the top for transmitting or receiving signals.

All living organisms, including humans are continuously exposed to Radio Frequency Electromagnetic Fields (RF-EMFs). RF-EMFs are emitted from MPs, home appliances and medical devices. Radiofrequency lies between the range from 3 kilohertz (KHz) to 300 gigahertz (GHz) and are conventionally called Radio frequencies (RF). MPs use radio frequency to transmit and receive signals and its radiation varies from device to device. MPR is measured by a quantity known as the Specific Absorption Rate (SAR) value for the particular device. (FCC, Consumer and Governmental Affairs Bureau. Reviewed:10/28/16). SAR is the rate of radiofrequency energy that is absorbed by the human body

*Corresponding author : School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur - 492 010, India.
e-mail: shikhamalik19@yahoo.com, ORCID : <https://orcid.org/0000-0003-1465-6791>



Stress and development phenotyping of Hsp101 and diverse other Hsp mutants of *Arabidopsis thaliana*

Lalit Dev Tiwari¹ · Ritesh Kumar¹ · Vijyesh Sharma¹ · Alok Kumar Sahu² · Balram Sahu² · Subhash Chandra Naithani² · Anil Grover¹

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Abstract

Heat shock proteins or Hsps are critical in mounting plant resistance against heat stress. The complex Hsp spectrum of *Arabidopsis thaliana* plant contains over two hundred proteins belonging to six different families namely Hsp20, Hsp40, Hsp60, Hsp70, Hsp90 and Hsp100. Importantly, the cellular function(s) of most Hsps remains to be established. We aimed at phenotyping of stress and development response of the selected, homozygous *hsp* mutant lines produced by T-DNA insertional mutagenesis method. The heat stress phenotype was assessed for basal and acquired heat stress response at seed and seedling stages. Distinct phenotype was noted for the *hot1-3* mutant (knockout mutant of *Hsp101* gene) showing higher heat sensitivity and for the *salk_087844* mutant (knockout mutant of *Hsc70-2* gene) showing higher heat tolerance than the wild type seedlings. The homozygous *cs808162* mutant (mutant of *ClpB-p* gene encoding for the chloroplast-localized form of Hsp101) did not survive even under unstressed, control condition. *salk_064887C* mutant (mutant of *cpn60β4* gene) showed accelerated development cycling. The *hot1-3* mutant apart from showing different heat response, exhibited development lesions like bigger size of seeds, buds, siliques, and pollen compared to the wild type plants. In response to controlled deterioration treatment of seeds, *hot1-3* seeds showed higher accumulation of reactive oxygen species molecules, higher rates of protein and lipid oxidation and a faster decline in germination rate as compared to wild type seeds. Our findings show that Hsps perform diverse metabolic functions in plant response to stress, growth, and development.

Keywords *Arabidopsis thaliana* · Development · *Hsp101* gene · Heat stress · *Hsp* mutant · T-DNA

Abbreviations

APX	Ascorbate peroxidase	KO	Knockout
AT	Acquired tolerance	MDG	Multiplying mean daily germination
BT	Basal tolerance	PCR	Polymerase chain reaction
CD	Controlled deterioration	PQC	Protein quality control
Clp	Caseinolytic proteases	PV	Peak value
DPS	Days post stress	ROS	Reactive oxygen species
GI	Germination index	SOD	Superoxide dismutase
HS	Heat stress	TAIR	The Arabidopsis information resource
Hsf	Heat shock factor	UTR	Untranslated region
Hsp	Heat shock protein	WT	Wild type
HSR	Heat stress response		
KD	Knockdown		

✉ Anil Grover
anil.anilgrover@gmail.com

¹ Department of Plant Molecular Biology, University of Delhi South Campus, New Delhi 110021, India

² School of Life Science, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010, India

Introduction

For performing the uphill task to survive, grow, and reproduce under heat stress (HS) conditions, plants adopt diverse strategies to minimize the damage and ensure protection of cellular homeostasis during the stress and



छत्तीसगढ़ की माटी में बसा हिंदी का रखवाला कवि विनोद कुमार शुक्ल

डॉ. मधुलता बारा*
श्रीमती रामश्वरी दास**

ABSTRACT

छत्तीसगढ़ की मिट्टी उसकी बोली में रचे बसे मूर्धन्य कवि विनोदकुमार शुक्ल को अपनी जमीन से जितना लगाव है उतना ही मातृभाषा हिंदी से भी, उन्होंने दुनिया को देखा हिंदी में, सोचा हिंदी में और शब्दों के रूप में पिरोया भी हिंदी में ही कवि केवल अपनी सीमा तक नहीं बल्कि इन्होंने अपनी कविताओं के माध्यम से हिंदी का परचम विदेशों तक भी लहराया है। कवि विनोदकुमार शुक्ल अपनी सारी रचनाएँ हिंदी में किए, हों कहीं-कहीं क्षेत्रीयता का प्रभाव दिखना स्वाभाविक है जिसमें आज के समाज का सच्चा यथार्थ है, चित्रण है तो कहीं अपने भीतर संवेदनाओं को बचा लेने की झटपटाहट। कहीं मानवीय मूल्यों को खोने का भय तो कहीं तनाव एवं एकाकीपन के बढ़ने की आशंका। कवि अपने भीतर की मर्मस्पर्शी भावनाओं को बड़ी ही सतर्कता से व्यक्त करते हैं। वास्तव में छत्तीसगढ़ राज्य में हिंदी का ऐसा विलक्षण कवि दुर्लभ है। हिंदी का ऐसा परिचायक, ऐसा रखवाला और विश्वस्तर तक पहुँचाने में उनकी कविताएँ अग्रसर दिखती हैं। देश - विदेश के बीच एक बाँध की तरह कार्य करने में इनकी कविताओं का जवाब नहीं है।

Keywords: हताशा, हत्यारा, बेदखल, खेतिहर, बाजार, कमजोर, इकट्ठा, खटखटाना, भात, भूख, आदिवासी, किसान।

कुछ कविताएँ ऐसी होती हैं जो कभी अतीत के पन्नों में नहीं सिमटती, सदैव वर्तमान बनी रहती हैं ऐसी ही कविताओं के कलमकार हैं कवि विनोदकुमार शुक्ल, जिनकी कविताओं में जब भी झँका जाय तो तभी उसमें वर्तमान दृश्य उभरकर सामने आ जाते हैं। इनकी कविताएँ निज से ज्यादा समूचा जगत् के लिए लिखी गई है, जिसमें मानवीय पक्षों की बकालत है, एक आम आदमी के जीवन की विसंगतियाँ हैं, एक गरीब किसान की समस्या है, एक निर्धन व्यक्ति की पीड़ा है, व्यवस्था के प्रति अंतर्विरोध है, आज के परिस्थितियों में निज को ढालने की विडंबना है।

कितने सारे दृश्य जो सदैव हमारे आसपास घटित होते हैं। जिसमें एक व्याकुल हृदय का कवि उसके भीतर का रहस्य जान उसे हमारे सामने बहुत बेबाकीपन से कहने का प्रयास करता है। कवि ने सर्वप्रथम मानव को मानव बने रहने की घोषणा की है-

“संध्या की पहली तरैया
केवल मैं देखता हूँ।

चारों तरफ प्रकृति और प्रकृति की ध्वनियाँ हैं
यदि मैंने कुछ कहा तो
अपनी भाषा नहीं कहूँगा
मनुष्य ध्वनि कहूँगा। (1)

कवि की झटपटाहट स्पष्ट दिखती है कि, कवि मनुष्यता की ध्वनि से सबके भीतर वह सारे भाव भर देना चाहते हैं कि, लोग अपना - पराया सब भुलाकर केवल मनुष्यता के रंग में रंग जाएँ, वे मानवीय भावनाओं का संचार करने के साथ - साथ अपनी दुनिया को बचा लेना चाहते हैं आतंक, भय, तनाव, कड़वाहट और विसंगतियों से। वे दुनियाँ को इन सब विद्रुपताओं से बचाकर किसी अन्य जगह जा बसने की कल्पना करते हैं जिसमें केवल मनुष्य और मनुष्यता के सारे गुण बसते हों। कवि अपनी भाषा में कितने अनोखे ढंग से कहते हैं -

*सहा. प्राध्यापक पं. रविशंकर शुक्ल वि. वि. रायपुर (छ.ग.)

**पी. एच. डी. (शोधार्थी), पं. रविशंकर शुक्ल वि. वि. रायपुर (छ.ग.)

निराला के काव्य में लोकजीवन के विविध रंग

□ डॉ. मधुलता बारा*
श्रीमती रामश्वरी दास**

ABSTRACT

"कहीं सावन का आगमन, कहीं वृक्षों की हरियाली, ऋतुओं का स्वागत तो कहीं कोयल की मधुर गान, पक्षियों का कलरव, वर्षा की बूँदें, प्रिय का संगम तो विरह की तपीस ये तो लोकजीवन के रंग हैं, जो बिखरे हैं चहुँओर। कवि निराला ने इन सारे विविधताओं को समेट लिया है अपनी कविताओं में, और प्रस्तुत किये हैं अपने निराले रंग - ढंग में जिसमें उनका शब्द विन्यास देखते ही बनता है।"

Keywords: कलरव, लोकजीवन, सराबोर, मुखौटा, हरियाली

छायावाद में कल्पनाओं की प्रधानता है। कवि सूर्यकान्त त्रिपाठी निराला छायावादी कवियों के कतार में एक श्रेष्ठ कवि के रूप में गिने जाते हैं। कवि निराला अपने नाम को सार्थक करते हैं उनकी कविताओं में कहीं सूरज के जैसा तेज तो कहीं निरालेपन की झलक है। केवल कल्पनालोक में विचरण करना इन्हें भाता नहीं है, इन्होंने जीवनभर में जहाँ - जहाँ यात्राएँ की उसकी छटा, उसकी झलक उनकी कविताओं में अवश्य दिख पड़ती हैं।

निराला को कभी अकेलापन बैचन करता है तो कभी भूखा बालक, कभी तिलमिलाती धूप में पत्थर तोड़ती स्त्री की मजबूरी, तो कभी गरजते बादल से डरता मन, कभी वियांग में तड़पती प्रेयसी तो कभी प्रकृति का मनोरम दृश्य देखकर उनका कवि हृदय उद्वेलित हो उठता है।

निराला के काव्य में लोकजीवन के विविध रंग देखने को मिलते हैं, इसमें स्पष्ट है कि, कवि केवल कल्पना लोक में नहीं, उनका संबंध वास्तविक जीवन और उनकी जीवन शैली के इर्द गिर्द घूमती है। स्पष्ट है कि कवि जो देखता है, अनुभव करता है, उसके लिए वह अपने हृदय और मन के बगीचे से शब्दों के पुष्प चुनता है और मन के बगीचे से शब्दों के पुष्प चुनता है और उसे वाक्यों के घागे से पिराते जाता है। कवि निराला बहुमुखी लोकजीवन के पक्षों को बड़ी ही खूबसूरती एवं मार्मिकता से उभारते हैं। निराला ने अपनी कविताओं में अधिकतर प्रकृति के मनोरम दृश्य, खेत - खलिहान, ग्रामीण जीवन, कभी वर्षा, कभी

किसान और कभी उनकी पीड़ा अपने पीड़ा अपने दुख - संताप को व्यक्त करते हैं।

उन्होंने अपनी प्रथम संग्रह 'अनामिका' में संकलित कविता 'खुला आसमन' में लिखा है -

"दिखीं दिशाएँ, झलके पेड़,

चरने को चले ढोर - गाय - बैस - भेड़,

खेलने लगे लड़के छेड़ - छाड़

लड़कियाँ घरों को कर भासमान।" (1)

एक कवि का हृदय बड़ा कोमल होता है, वह सुक्ष्म - से - सुक्ष्म वस्तुओं को भी कल्पना से विस्तार दे सकता है, वे खिली - खिली धूप को देख, चरने जाते गाय - बैलों की झुण्ड को देख उसे अपने कविता में अंकित कर देते हैं और आगे लिखते हैं -

"लोग गाँव - गाँव को चले,

कोई बाजार, कोई बरगद के पेड़ के तले

जाधिया - लँगोटा ले, सँभले,

तगड़े - तगड़े सीधे नौजवान।" (2)

ग्रामीण दृश्य को कितनी बारीकी से निहारते हैं, बरसात के बाद आसमान खुल गया है जिससे लोगों की एक झुण्ड बरगद के नीचे बैठ आपस में वार्तालाप किया करते हैं, वह एक पुरानी प्रथा है जो अब तक चल रही है। कवि अपने जीवन में भी निराले ढंग के थे नगेन्द्र ने लिखा है -

**Iron Man of Silver World – An Enquiry into Alchemy of
Shri Vishwakarma Silver House**

H. M. Jha Bidyarthi*, A. K. Srivastava**, Mayur A. Dande***,
P. M. Kuchar**** & S. M. Mishra*****



Abstract

One hundred and thirty-five years ago, Keshavramji Jangid, one of the three sons of Shoramji Jangid and a native of Ramgad village under Churu district of Rajasthan relocated to a small town Khamgaon in the neighboring State of Maharashtra and resumed with his family business of making silver articles. He was a great artisan and trailblazer who had crafted a pure silver made small moving train attached with bogies carrying edibles kept on the round dining table of the then king of Ramgad. This lasting invaluable legacy was entrusted to his adopted son Jawaharmalji Jangid with unbending stiff directions. "Work with integrity evaporates scarcity. Generations may perish as an aftermath of ill and filthy ways of earning. Customers come willingly and gladly where righteousness resides." The lighthouse suggestions were practiced in letter and spirit by Jawaharmalji and he succeeded in expanding the silver business manifold. In 1937, his son Chiranjilalji Jangid augmented the business and shifted it from the sarafa (jewelry) market to own land and showroom named "Shri Vishwakarma Silver House" (in short SVSH). The fifth generation of the Jangid family under the capable leadership of Jagdish Prasad Jangid who entered the business in his early teens saw enormous diversification of silver articles consisting of thousands of varieties ranging from a few grams to 250 kilograms. Dr. Kamal Jangid who is currently one of the partners of this House represents the sixth generation of the family who despite being himself an M.B.B.S., dedicated to leapfrog the family legacy and associated his son Rahul – the seventh generation of this family – too with this business. SVSH is a national brand today with automated processes of sheet making, molding and wire making to cater customized solutions to fulfill the demands of a huge customer base including Indian celebrities, top-notch industrialists, shrines, and temples. SVSH chose not to register for Hallmark as the purity of silver under Hallmark is 92.50% whereas the purity of silver articles designed by SVSH stands at 99.50%. Based on primary research this case highlights archetypal and vintage business's credibility which is in a position to edify and cultivate the entrepreneurial and innovative mindsets, specifically in the pioneering stage.

About the Authors

*Professor and Head, Department of Business Administration and Research, Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Buldhana, Maharashtra, India. Email ID: jmjhabidyarthi@rediffmail.com.

**Professor, Dean and Director, Institute of Management, Pt. Ravishankar Shukla University, Raipur, Chattisgarh, INDIA. Email ID: asish_ik@rediffmail.com

***Assistant Professor, Department of Business Administration and Research, Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Buldhana, Maharashtra, India. Email ID: mayurd8@gmail.com.

****Assistant Professor, Department of Business Administration and Research, Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Buldhana, Maharashtra, India. Email ID: pmkuchar@gmail.com

*****Assistant Professor, Department of Business Administration and Research, Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Buldhana, Maharashtra, India. Email ID: satyamohan84@gmail.com



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Author(s): Anuraag Agarwal (search.aspx?key=Anuraag Agarwal), Sanskrity Joseph (search.aspx?key=Sanskrity Joseph)

Email(s): Email ID Not Available

Address: Research Scholar, Institute of Management, PRSU Raipur
Supervisor, Institute of Management, PRSU Raipur.

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A review on Effect of e trust and e risk on Consumers of retail e markets in India: A Comparative Study Based on Sociodemographic Variables

Anuraag Agarwal¹, Dr.Sanskrity Joseph²

¹Research Scholar, Institute of Management, PRSU Raipur

²Supervisor, Institute of Management, PRSU Raipur

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Abstract: Most companies run their online portals to sell their products / services online. The potential growth of online shopping has given rise to the idea of conducting online shopping research in India. Trust is one of the biggest barriers to success in Internet media. Lack of confidence and the risks involved can prevent online customers from participating in e-commerce. This investigation goals to investigate how electronic consumers develop their initial confidence orobtainingpurposeswith e retailers. The present study attempts to draw value information that impacts the e trust and e risk on shopping behaviour of Indian e shopper and their possible implications one retailer's product offerings. The study intends to identify key variables and construct which has a significant influence one trust and e risk in India. The researcher through literature review has identified few dimensions of trust and risk which will be explored on the basis of sociodemographic variables to get broad picture and to arrive at conclusions. The data was collected through Questionnaires.

Keywords: e risk, e trust, e retail markets, online shopping, e-commerce

1.Introduction

E-commerce refers to "buying information, products and services through computer networks" (Kalakota&Whinston, 1996). Bloch, Pigneur, and Segev (1996) expanded it to include "support for any kind of business transaction through digital infrastructure". Online shopping is a process of e-commerce through which patrons can directly contact electronic suppliers orobtaining goods or facilities from online stores (Chaffey, 2009, p. 88).



Mobile Shopping Adoption: Research Insights

Ms. Asha Sahu¹, Dr. G. K. Deshmukh^{2,*}

^{1,2}Institute of Management, Pt. Ravishankar Shukla University, Raipur

*Corresponding Author: gkd16@yahoo.co.in

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17

Abstract: Mobile shopping is the new attraction among the customers and retailers. High tech life, smart connectivity, advanced mobile phones and busy lifestyles have paved the way of mobile shopping adoption. Mobile commerce is progression of e-commerce and mobile shopping is considered as a subset of m-commerce. Mobile shopping has created opportunity for retailers as well customers and has developed new means of marketing. In a past few decades' mobile commerce industry has seen tremendous growth and mobile shopping is most desired applications of m-commerce. Though there is huge potential of mobile shopping but yet a long way is to be travelled in the emerging economies. Mobile shopping is at infancy stage in many developing nations and hence researchers can contribute more towards the literature of mobile shopping. This paper is an attempt to throw some light on mobile shopping adoption studies.

Keywords: Mobile Shopping, M-shopping, M-commerce, Mobile shopping adoption, Technology acceptance

Introduction

The marketing model all around the globe is changing gradually and hence Retailers have reorganized their way of reaching out to their customers. Marketing have been revolutionised from product based marketing to the relationship marketing and from traditional marketing to digitised marketing. Not only MNCs but small retailers have also shown significant evolution in their way of doing business. They have improved their sales channels and have upgraded themselves with changing trend and lifestyles of the customers. Marketers have identified potential of mobile facilities for reaching out to their customers in speedy and timely manner. Due to innovative offerings of mobile devices and multi-functionality features utilisation of mobile devices such as: Smart phones and tablets have seen exponential growth and have created opportunities for technological advancements which are ultimately leading to more convenient and efficient way of living (Groß, 2015a; Chen, 2013).

Mobile commerce is an igniting alternative sales channel and is of huge potential in today's era. Mobile Commerce refers to all sort of monetary transactions, directly or indirectly carried out with the use of wireless telecommunication network (Barnes, 2002). Mobile commerce is defined as transactions done through mobile or internet using mobile devices (Chong, 2013). Mobile commerce, Mobile shopping, Mobile banking etc. are an interesting topic and has drawn attention of academicians and industrialists since past few decades. Mobile shopping is the most popular service offered by mobile commerce; it is contemporary consumer buying practices. With the passage of



18

MOBILE BANKING ADOPTION: A REVIEW

Asha Sahu¹, Dr. G. K. Deshmukh^{2*}

¹Research Scholar, Institute of Management, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India
²Assistant Professor, Institute of Management, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

*Corresponding Author :Dr. Hory Sankar Mukerjee

Principal (Education, Training and Assessment), Infosys Limited., Bhubneshwar, India
Email:ashasahu31@gmail.com¹, gkd16@yahoo.co.in², hsm123in@yahoo.com*

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Abstract

The world has undergone a major shift with the technological development impacting life of a common man. It has also changed the way of doing business. Business has already evolved from traditional business to online business and now shifting towards mobile operated business. Present study is an attempt to review the articles published on mobile banking adoption during 2010 to 2018 by using keywords like m banking, mobile banking, m banking adoption etc. from different reputed publishers and journals and present comprehensive knowledge on mobile banking adoption studies. Findings of reviewed literature reveals that variables like perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, facilitating conditions, social influence, awareness, positively affects the adoption of mobile banking services whereas variables like security, perceived risk, complex process, technical problems, improper security, and inadequate knowledge hinders the adoption of mobile banking. This study theoretically adds existing body of knowledge in the area of mobile banking adoption in specific and mobile commerce in general and helps future researchers, banks, marketers and other practitioners while providing useful insights for directed decisions. This paper presents crux of crux of mobile banking adoption literature within a decade. This paper provides overview of reviewed literature, key variables, objectives, findings, limitations, and future research suggestions in tabular form. The insights of the paper will be fruitful in promoting designing, customising and successfully implementing mobile banking technologies in the new markets.

Keywords: Mobile banking, M banking, Mobile banking adoption, Systematic Review of Literature, Review of Literature

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INTRODUCTION

Technology has impacted all walks of human life (Kurzweil, 2005) and gradually improved the quality of life (Changchit&Chuchuen 2018). Not only it has impacted our personal life but also it has transformed the way business is conducted. Advantages that technology offers mainly to business organizations include "increase in efficiency" and "operating cost" (Laukkanen&Lauronen, 2005; Leung &Matanda, 2013). Due to these reasons banks also adopted technology and that has transformed the banking scenario. Banking has been advanced from branch banking to internet banking to mobile banking just because of emergence of self-service technologies (SSTs). In recent years, smart phones have become an integral part of consumers' lives (Singh, Srivastava & Srivastava, 2010) due to which mobile banking is gaining momentum. From bankers perspective mobile banking is a way of offering financial services through smartphones (Pousttchi and Schurig, 2004). Whereas from customers perspective mobile banking simply refers to accessing bank account and performing banking transactions and availing various banking services in smart phone (mobile) either through banking application or through wireless internet. Mobile banking is getting popularized due to several reasons such as: (i) smart phone penetration, (ii) availability of mobile network (The World Bank, 2009), (iii) convenience, (iv) user friendliness (Alalwan et al., 2015), (v) any time - anywhere access (Lee & Chung, 2009). Mobile banking allows customers to perform, throughout day and night, fund transfer, recharge, bill payments, balance enquiry, mini statement, cheque book request, SMS alerts etc. (Zhou et al., 2010; RBI, 2014). It also helps in knowing transaction details, location of banks and ATMs, exchange rates; handling card related issues like activation and blocking of cards; availing insurance and mobile brokerage services etc. (Tiwari & Buse, 2007).

This review paper is an endeavour to explore the literature on mobile banking adoption and to classify these studies based on their perspectives on mobile banking adoption. This paper highlights major factors due to which mobile banking was adopted by customers. Research gap of the research papers were identified and presented in the form of suggestion to future researchers. Systematic and precise review of earlier research presented in this paper will not only enhance conceptual understanding but also it will save time and effort of future researchers and academicians while providing crux of mobile banking adoption literature within a decade in tabular form. After introduction, review methodology is discussed in the next section, followed by literature analysis, results & discussions, implications, limitations & future research agenda and conclusions.

REVIEW METHODOLOGY

Research Objectives

The present paper aims: (i) to present comprehensive view of research conducted in the area of mobile banking adoption by consumers, (ii) to enhance conceptual foundation through systematic and systematized review, (iii) to provide suggestions for future research.

Data Sources

The data was collected from secondary sources. Search for journal articles related with consumers' mobile banking adoption was made using key words like m-banking adoption, mobile banking adoption, and mobile commerce services adoption through: (i) search engines - Google and Google Scholar and (ii) Infibnet consortium. Collected articles belong to J-Gate, Science Direct, Research Gate, Emerald, SAGE, Springer, Taylor & Francis.

Social Media Influence Towards Digital India Initiatives

G. K. DESHMUKH, ARIJIT GOSWAMI AND ASHA SAHU

Abstract: In the present paper authors attempt to explore how does social media influences people towards various facilities offered by Government of India under Digital India Initiatives. Influence of social media was studied with respect to formation of perceived ease of use, perceived usefulness, social influence and perceived risk, which further causes intention to adopt facilities offered under digital initiatives by Government of India. Data for the purpose of study was collected through Google forms from respondents residing in state of Chhattisgarh. Total 98 responses were received and analysed through SPSS using statistical techniques like multiple response analysis, correlation. It was found that respondent's attitude, perceived ease of use, perceived usefulness, perceived risk and social influence created by social media causes intention to adopt facilities offered under digital initiatives by Government of India. Except perceived risk all other factors exercised significant positive influence.

Keywords: Digital initiatives, Digital India Program, Social Media Influence, Attitude, Perceived ease of use, Perceived usefulness, Perceived risk, Social influence, Intention to adopt.

Introduction

21st Century is an era of digitization and information revolution, every sphere of globe has been influenced with the evolution of technological advancement. Internet technology abridged the distances between places and paved way for real time audio as well video conversation between the people living in different parts of the globe using social media apps like whatsapp, skype etc. Social media apps and sites are very much popular due to connectivity, reachability, ease of use, and convenience. Social media sites (Facebook, Instagram, LinkedIn, Twitter etc.) provide platform for interaction between citizen to citizen, business to citizen, government to citizen. Government departments are interacting with citizens through social media platforms for disseminating information and for social

Dr. G. K. Deshmukh is Assistant Professor, Institute of Management, Pt. Ravishankar Shukla University, Raipur (CG); Arijit Goswami is Research Scholar, Institute of Management, Pt. Ravishankar Shukla University, Raipur (CG) and Asha Sahu is Research Scholar, Institute of Management, Pt. Ravishankar Shukla University, Raipur (CG)

Factors triggering impulse buying: A study among millennials at Raipur City

Bhavna Prajapati , Dr. G.K. Deshmukh, Arijit Goswami
Assistant Professor, ITM University Raipur
Assistant Professor, Institute of Management
Assistant Professor, ITM University Raipur

Abstract

The aim of this study is to understand the elements influencing the millennial of Raipur city who opt to buy in shopping malls. For this the survey was done with 180 respondent of Y generation who were born after 1980. These generations of consumers are technologically sound and are open to new experiences. They likely have a different shopping style. The researcher collected the data through the convenient sampling method. After regression analysis he found the factors which impacts millennial in their impulse buying. It is seen that in this world of so much fashion and flamboyance the millennials get tempted towards many things and land up purchasing those things. The purchase of many things by a millennial is not always planned. At times factors like financial independence encourages them to buy a product which is not pre decided. It is also seen that the product promotion and visual merchandising also influence the impulse buying. Apart from all other factor the role of demographic factors can't be isolated. The impulsive buying is being affected by the factors; which can be justify by framed hypothesis. Keywords: Impulse Buying, Trigger, Millennial

1. Introduction

Now these days the consumers are very much dynamic in nature. They change their behaviour as per the change in time. That impacts in buying of the products also. The varieties in the product and the offers offered by the marketer drag the attention of the consumer toward purchasing. The different buying options and visual displays allure the millennial towards shopping. As we all know India is a land of rich culture and heritage, and we have several festivals to celebrate and it is well planned and well structured. But the latest trends and shopping carnival and jaw dropping offers drive the millennials, the Y generation crazy and trigger them to purchase a product which is neither essential nor planned. This leads them to Impulse buying. (Beatty & Ferrell, 1998) The purchase of products which is done spontaneously or without proper planning is an impulse purchasing. The decision to buy a product which is done on immediate basis and it is unplanned tends to impulse buying.

In this latest scenario the consumers are exposed to various shopping options. In yesteryears the options were limited for shopping and now the time has changed, consumers have various options to purchase. The foreign brands and new products make a statement for the consumer and especially the millennial who all are exposed to internet which provides them several options to shop. Indian consumers have a sea change in the behaviour of shopping and it is quit noticeable because of the entrant of various foreign brands, having growth in the retail industry that to organized, the spending capacity, changing culture and lifestyle along with demographic segmentation (Muruganatham and Bhakat, 2013).

For the Y generation customer impulse buying a buzz word which means they are very much unplanned in nature while buying a product. Here the customer's emotions and feelings has to play a greater role. Triggering occurs to an individual due to various factors such as store environment, display of products, and visibility of the brand. The placement of the products in the malls and it's accessibility to the consumers trigger them to make a purchase decision.



Global Business Review

Investigating Influence of Moderators in Adopting Internet: Indian Seniors Perspective

Hory Sankar Mukerjee, G. K. Deshmukh , Dewashish Mukherjee, Nidhi Chawla

First Published March 23, 2020 Research Article

<https://doi.org/10.1177/0972150920908690>



Abstract

Abstract

Present study identifies Indian seniors' intention to use the internet and actual usage along with influence of age, gender, education and experience as moderators. This study proposes modifications in unified theory of acceptance and use of technology (UTAUT) model while adding education as moderators and also studied relationship between facilitating conditions (FC) and behavioural intention. The proposed research model was empirically tested by data collected from 371 Indian seniors above the age of 50 years through offline survey. The collected data were analysed using structural equation modelling (SEM) and multiple moderation analysis. The result revealed that performance expectancy (PE), effort expectancy (EE), subjective norm (SN), technology anxiety (TA) significantly influence elders' behavioural intention (BI) to use and adopt internet except FC. Further BI resulted in actual system use which is also determined by FC. Actual system use is predicted by three variables: learning, place of access and health conditions. In this study only age and gender were emerged as moderators. Findings of the study have important implications particularly to understand determinants of Indian seniors' intention to use the internet and actual usage along with influence of moderators.

Keywords

Keywords

Adoption intention, seniors, UTAUT, moderation, SEM

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Business Perspectives and Research



Risk Management in Global CRM IT Projects

G. K. Deshmukh, Hory Sankar Mukerjee, U. Devi Prasad

First Published February 2, 2020 Research Article

<https://doi.org/10.1177/2278533719887005>



Abstract

Abstract

Global information technology projects are risky with failure rates for customer relationship management information technology (CRM IT) projects estimated to 70 percent. These failures are often due to multiplicity of factors including poor risk management. The project management literature points out four broad types of risks: technical, external, organizational, and other risk factors. Project manager's basic job, therefore, becomes to manage the risks and ensure that an IT project is steered to completion while meeting the objectives. Unmanaged risks run into chances of failure and ultimately impacting the CRM project and the reputation of the consultant. Payne and Frow's (2005) advocates the need for a structured study on the information technology implementations of these projects. The objectives of the study are to investigate: how project risks in CRM- IT implementations impact the final outcome and how the risk management process adopted by the IT project manager impacts the final outcome of the project. The research was conducted administering questionnaire to 135 project managers. It was found that project risk impact cost, time, and technical performance and risk management process impacts planning, support of customers as well as top management.

Keywords

Keywords

Risk, risk management, global CRM, CRM implementation, technology, CRM solutions

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An Efficient and Secure, ID-based Authenticated, Asymmetric Group Key Agreement Protocol for Ubiquitous Pay-TV Networks

Shaheena Khatoon¹, Sk Md Mizanur Rahman², Raylin Tso³, Mohammed F. Alhamid⁴

¹ School of Studies in Mathematics, Pt. Ravishankar Shukla University, India

² Information and Communication Engineering Technology (ICET), Centennial College, Canada

³ Department of Computer Science, National Chengchi University, Taiwan

⁴ Department of Software Engineering, King Saud University, Saudi Arabia

shaheenataj.28@gmail.com, SRahman@centennialcollege.ca, raylin@cs.nccu.edu.tw, mohalhamid@ksu.edu.sa

Abstract

Internet-of-Things (IoT) based applications are rapidly gaining popularity. Smart home is one of them; home security and safety, home automation, energy management and health surveillance are some applications of smart homes. Smart homes have enormous potential as well as enormous threat to security and privacy of the end users. Pay TV is considered as the likely entry points for IoT services into smart homes. Pay TV has evolved security techniques very similar to of IoT based smart homes services. Pay TV is an application of broadcast encryption schemes in which premium content is broadcasted only to subscribed users. The broadcaster needs assurance that only subscribed user can access premium content, so the program is encrypted with a group key shared among all subscribers. Thus, to share the key, Pay-TV systems require efficient and secure group key agreement (GKA). This research proposes an efficient and secure, dynamic, ID-based authenticated, asymmetric group key agreement (AAGKA) protocol for Pay-TV networks. Security is proved under the assumptions of the discrete logarithm problem (DLP) and decisional Diffie-Hellman problem (DDHP). Finally, comparison of the protocol with state-of-art protocols shows that the proposed protocol is highly efficient.

Keywords: Internet-of-Things (IoT), Authentication, Asymmetric group key agreement, Bilinear pairing, Pay-TV network

1 Introduction

Smart homes, an IoT based application is next big thing in the rapidly growing technology-based lifestyle. Pay-TV has much to offer to the fast-developing smart home era. Over the years, Pay-TV had gained trust among the customers with secure data management and determination without compromising the privacy of the subscribers. In order to avail the benefits of smart homes and IoT, consumers have to allow the

new technology to go deeper into their homes.

With established subscriber relationship, Pay-TV can enable IoT to manage smart homes with robustness and reliability and without any attack on their privacy.

Group key agreement (GKA) protocols provide a secure and robust approach to establishing group session keys for public networks and hence aim to provide secure communication over an insecure network. Wu et al. [20], introduced the concept of the asymmetric group key agreement (AGKA) protocol, in which all group members compute a common secret group key and only group members can broadcast secret messages to the group. In asymmetric protocols, unlike in symmetric protocols, all group members compute a common group encryption key (GEK) and hold different group decryption keys (GDGs).

The authenticated asymmetric protocol proposed here has the following advantages: (1) messages can also be broadcasted by any non-registered member in the group (using the GEK); (2) asymmetric protocols use short signatures to achieve mutual authentication; and (3) the protocol complements dynamic networks by maintaining backward and forward secrecy. Thus, an authenticated, asymmetric group key agreement (AAGKA) protocol preserves benefits of both the GKA protocol and broadcast encryption.

In a Pay-TV system, broadcasters generate revenue by charging subscribers for viewing programs. Thus, broadcasters need a mechanism so that only the paid subscribers can view the program. We present only a brief discussion here of the specific requirements of Pay-TV systems, but greater detail may be found in [7-8, 11, 13]. A Pay-TV system is asymmetric with respect to computational and communication capabilities between the broadcaster and the subscribers. Since the broadcaster has greater computational capabilities than the subscribers, a GKA protocol for Pay-TV should place greater computational and communication load on the broadcaster than on the subscribers.

Further, a key agreement protocol for Pay-TV must

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Mosquito repellent and larvicidal perspectives of weeds *Lantana camara* L. and *Ocimum gratissimum* L. found in central India

Sharma M., Alexander A., Saraf S., Saraf S.,
Yishwakarma U.K., Nakhate K.T., Ayazuddin

¹Bangta College of Pharmaceutical Sciences and Research, Kharak, Ind Road, Phulaj, 490024, Jabalpur, India
²Central Institute of Pharmaceutical Research and Development, Bhopal, 462010, Bhopal, Madhya Pradesh, India
³University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010, Chhattisgarh, India
⁴Ajay Kumar Garg Engineering College, Gwalior, 501009, Uttar Pradesh, India

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Abstract

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Pharmacy



Stimuli-responsive In situ gelling system for nose-to-brain drug delivery

Agrawal M.,¹ Saraf S.,¹ Saraf S.,¹ Dubey S.K.,¹ Puri A.,¹ Gupta U.,¹ Kesharwani P.,¹ Ravchandiran V.,² Kumar P.,³ Naidu V.G.M.,⁴ Murty U.S.,⁵ Ajazuddin

¹ Institute of Pharmaceutical Sciences, Banars Hindu University, Varanasi, India

² Rungta College of Pharmaceutical Sciences and Research, Narsa Road, BHU-400014, Chhatnagarh, India

³ University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India

⁴ Department of Pharmacy, Institute of Technology and Science, BITS-PILANI, Pilani, Rajasthan, India

⁵ RTA Structure and Design Institute, RNA Biology Laboratory, Center for Research and Innovation, NCI-Frederick, P.O. Box 38, United States

Correspondence: ajazuddin@bhu.ac.in

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Abstract

The diagnosis and treatment of neurological disease is always seen as an utmost challenge for research fraternity due to the presence of BBB. The intranasal route

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Recent strategies and advances in the fabrication of nano lipid carriers and their application towards brain targeting

Agrawal M.¹, Saraf S.², Saraf S.², Dubey S.K.³, Puri A.⁴

Patel R.J.¹, Ajazuddin¹, Ravichandran V.¹, Murty U.S.⁵

Alexander A.S.⁶

¹Department of Pharmaceutics, ...

¹Rungta College of Pharmaceutical Sciences and Research, Kankar Road, Bilai, 490024, Chhattisgarh, India

²University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010, Chhattisgarh, India

³Department of Pharmacy, Jala Institute of Technology and Research, Jala, 381015, Gujarat, India

⁴RNA Structure and Design Section, RNA Biology Laboratory (RBL), Center for Cancer Research, NCI-Fredrick, NIH, Frederick, United States

⁵Department of Mathematics, ...

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Abstract

In last two decades, the lipid nanocarriers have been extensively investigated for their drug targeting efficiency towards the critical areas of the human body like CNS, cardiac,

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
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Formulation strategies of nano lipid carrier for effective brain targeting of anti-ad drugs

Alexander A.^a  , Agrawal M.^b , Saraf S.^c , Saraf S.^c , Ajazuddin^b ,

Chougule M.B.^{d, e, f} 

 Save all to author list

^a Department of Pharmaceutics, National Institute of Pharmaceutical Education and Research (NIPER-Guwahati), Department of Pharmaceutics, Ministry of Chemicals & Fertilizers, Govt. of India, NH 37, NITS Mirza, Kamrup, Guwahati, 781125, Assam, India

^b Rungta College of Pharmaceutical Sciences and Research, Kohka-Kurud Road, Bhilai, 490 024, Chhattisgarh, India

^c University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492 010, Chhattisgarh,

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Biomedical applications of microemulsion through dermal and transdermal route

Shukla T.^a, Upmanyu N.^a, Agrawal M.^b, Saraf S.^c, Saraf S.^{c, d},

Alexander A.^b

Save all to author list

^a School of Pharmacy & Research, People's University, By-Pass Road, Bhanpur, Bhopal, 462037, MP, India

^b Rungta College of Pharmaceutical Sciences and Research, Kohka-Kurud Road, Bhilai, 490 024, Chhattisgarh, India

^c University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492 010, Chhattisgarh, India

^d Durg University, Govt. Vasudev Vaman Patankar Girls' P.G. College Campus, Naka, Durg, Raipur, 491 001, Chhattisgarh, India

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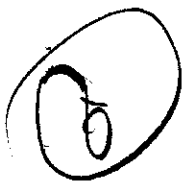
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26-21



In-line treatments and clinical initiatives to fight against COVID-19 outbreak

Agrawal M.^a, Saraf S.^b, Saraf S.^b, Murty U.S.^c, Kumbkar S.B.^d

Roy D.^e, Joshi P.^e, Sable D.^e, Choudhary Y.K.^e

Kesharwani P.^f, Alexander A.^f

[Send article to author](#)

^a Bungal College of Pharmaceutical Sciences and Research, Kopka-Karud Road, Bilai, 490024, Chhattisgarh, India

^b University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010, Chhattisgarh, India

^c National Institute of Pharmaceutical Education and Research (NIPER-Guwahati), Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Govt. of India, Sila Katamur (Mahaganjak), Changari, Kamrup, Guwahati, 781101, Assam, India

^d Clinical Development Services Agency (An Extramural Unit of Translational Health Science & Technology Institute, Dept of Biotechnology, Ministry of Science & Technology, Govt. of India) ICMR Biosch Science Cluster, Jrd Milestone, Gurgaon - Faridabad Expressway, Faridabad, 141001, India
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Chromatographic Fingerprinting and Quantitative Analysis of Marker in the Extract of *Gloriosa superba* Tubers Collected from Some Region of Chhattisgarh

Rakesh Tirkey, Swarnlata Saraf*

University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, INDIA.

ABSTRACT

Background: *Gloriosa superba* (Family: *Liliaceae*) is commonly known as Kalihari in India and has been used by several indigenous communities to treat a snake bite, skin diseases and joint pain. It has been also scientifically reported for many pharmacological activities such as hypoglycaemic, hepatoprotective, anticancer, anti-inflammatory. Present work is an effort to develop validated HPTLC method for the detection and quantification of chief constituent in the tuber extract of *Gloriosa superba*. **Methods:** HPTLC analysis of tuber extract has been performed on Silica gel 60 F₂₅₄ (10 cm x 10 cm) plates with mobile phase consisting toluene, ethyl acetate and diethylamine (02:08:02, v/v/v). Densitometric scanning of the plate was performed at 371nm by using CAMAG TLC scanner III equipped with visionCAMS version 2.4.172072 (CAMAG) and developed method was also validated for accuracy, precision and robustness as per ICH guidelines. **Results:** present work has confirmed the rich content of colchicine in tuber extract of *Gloriosa superba*. The calibration curve was linear in the selected range of 0.4-1.2 µg/spot and regression equation found to be

$y = 0.0285x + 0.0074$. the correlation coefficient (r) was 0.9978 for the regression equation. The LOQ and LOD was 0.170 µg/spot and 0.056 µg/spot respectively. The average recovery of colchicine at three levels was 99.5, 98.6 and 99.6 %, which indicated the remarkable reproducibility of the method. **Conclusion:** findings revealed that the developed method is simple, precise, and accurate for quantitative analysis of *Gloriosa superba*, and it might be useful for quality control of herbal medicine.

Key words: Chromatography, Kalihari, Quantitative, HPTLC, *Liliaceae*

Correspondence

Prof. Swarnlata Saraf

Professor, University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, INDIA.

Phone no: +91 0771-2282832

Email: swarnlata.saraf@gmail.com

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INTRODUCTION

Gloriosa superba is enormously valued in Indian folk medicine and its tremendous medicinal potential has been well mentioned in the Ayurveda for the treatment of various ailments.¹ It is usually known as "kalihari" in India, belonging to family *Liliaceae*, deciduous climbing shrub with **Appealing** wavy-edged yellow and red flowers.²⁻⁵ Leaves are ovate, lanceolate and twist at the tip that empowers the plant to climb 10 feet or higher; the stem is 1-2 meter high; tuber are perennial and V or L shaped, roots are fibrous; flowers are large singular and axillary.⁶⁻⁸ It is widely dispersed around most tropical and subtropical nations such as Africa, India, Sri Lanka, Bangladesh, Myanmar and Malaysia.^{9,10} As a folkloric medicine, seed and tuber part of *Gloriosa superba* has been used in the tribal region of different countries to treat diseases like chronic ulcer, leprosy, intestinal worm, joint pain, snake bite, skin diseases etc.^{6,11-14} It has been also claimed for several therapeutic potentials by many *in-vitro* and *in vivo* screening for hypoglycaemic, anticancer, hepatoprotective, anthelmintic, anti-inflammatory, analgesic, antimicrobial, antivenom, and antifungal activity.^{13,15-22} In last few years, it has been mostly researched for its chemotherapeutic nature against various carcinomas such as Lung cancer (A549) cell line, breast cancer (MCF-7 and MDA-MB231) cell line, pancreatic carcinoma (PANC-1) cell line and bacteria.^{21,23} Results of antimicrobial and anticancer studies were significant, which suggested that the medicinal properties of *Gloriosa superba* could be attributed to its precious alkaloidal content. This plant contains a number of alkaloidal compounds, which are mainly colchicine, colchicoside, and other colchicine derivatives.²⁴ Nowadays, the various advanced analytical techniques (HPLC, GCMS and NMR-spectroscopy)

has also contributed to identify some other colchicine derivatives such as N-formyl-N-deacetylcolchicine, 3-demethylcolchicine, β and γ-lumicolchicine.²⁵⁻²⁸

Gloriosa superba is part of the traditional medicinal system of India and its therapeutic potential has also proven in different pharmacological screening. Hence, for its therapeutic use as herbal medicine, there is great need of a precise validated method for qualitative and quantitative determination of its marker constituents.²⁹ Therefore, the present work is intended to develop a chromatographic profile for the quantification of marker compound in tuber extract of *Gloriosa superba* by using a validated HPTLC method.³⁰

MATERIALS AND METHODS

Plant material and chemicals

The tuber part of plant *Gloriosa superba* was collected during the month of September from some region of Korba (Chhattisgarh, India). Tubers were cleaned with water and dried under the shade then coarsely powdered and stored in airtight containers for further study.^{31,32} The plant was identified and authenticated by Dr. N.K. Dubey, Department of Botany, Banaras Hindu University, Varanasi (U.P.). Herbarium specimen of *Gloriosa superba*, bearing voucher specimen number *Lilia*. 2018/02 was deposited in the Department of Botany, Banaras Hindu University, Varanasi.

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1253

20-21

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Extraction of catechins from green tea using supercritical carbon dioxide

Agrawal M.¹, Dubey S.K.¹, Khan J.¹, Siddique S.², Asazuddin³, Saraf S.⁴, Saraf S.⁵, Alexander A.¹

Corresponding author:

¹ Rungta College of Pharmaceutical Sciences and Research, Bilaspur, Chhattisgarh, India

² Department of Pharmacy, Birla Institute of Technology and Science, Pilani, Rajasthan, India

³ University Teaching Department of Pharmacy, Sardar Sarabhai Institute of Medical Sciences, Vadodra, Gujarat, India

⁴ Patel College of Pharmacy, M.D. Jyotsna Prasad Institute of Health Sciences, Bilaspur, Madhya Pradesh, India

⁵ Email: sssarafa@birla.ac.in

1 | M. Agrawal | 5 | S. K. Dubey | S. Siddique | J. Khan | A. Asazuddin | S. Saraf | S. Saraf | A. Alexander

Supercritical CO₂

Abstract

Carbon dioxide is widely applied in its supercritical state for extraction of bioactive compounds due to its non-toxic and environment friendly nature. The supercritical fluid extraction is based on the solvation behavior of supercritical fluid, and the extraction efficiency is affected by different factors such as sample preparation, type of solvent, and various extraction parameters such as pressure, temperature, solvent flow rate,

1259

Nano-Lipid Carriers as a Tool for Drug Targeting to the Pilosebaceous Units



Shweta Ramkar¹, Abhishek K. Sah², Nagendra Bhuwane¹, Ishwari Choudhary¹, Narayan Hemnani¹ and Preeti K. Suresh^{1,*}

¹University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010 (C.G.), India; ²Department of Pharmacy, Shri G. S Institute of Technology & Science, 23, Park Road, Indore - 452003 (M.P.), India

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Abstract: The pilosebaceous unit is the triad comprising of hair follicle, arrector pili muscle, and sebaceous gland. Drug delivery to and through the hair follicles has garnered much attention of the researchers and the hair follicles represent an attractive target site *via* topical applications. They are bordered by capillaries and antigen-presenting cells, connected to the sebaceous glands and the bulge region of the hair follicle anchors the stem cells. The nano lipid carriers have the propensity to penetrate through the skin *via* transcellular route, intracellular route and follicular route. It has been established that nano lipid carriers have the potential for follicular drug delivery and provide some advantages over conventional pathways, including improved bioavailability, enhanced penetration depth, fast transport into the skin, tissue targeting and form a drug reservoir for prolonged release. This review describes the pilosebaceous unit (PSU) and related diseases and the recent lipid-based nanotechnology approaches for drug delivery to the follicular unit as well as related issues. Different types of nano lipid carriers, including ethosomes, liposomes, nanoparticles, solid lipid nanoparticles (SLNs), and nano lipid carriers (NLCs) have been reported for follicular drug delivery. Targeted drug delivery with nano-lipid carriers has the potential to augment the efficacy of drugs/bioactives to treat diseases of PSU. This review systematically introduces the activities of different formulations and the use of nano lipid carriers in treating PSU related disorders like alopecia, acne, and hirsutism.

Keywords: Hair follicles, skin, lipids, nanocarrier, drug delivery, topical, skin disease, targeting.

1. INTRODUCTION

The skin, which is also known as "cutis", is the largest human organ in the body and an excellent biological barrier. Despite being normally less than 2 mm in thickness, the skin contributes about 4% to the body weight. According to permeability, it is 102–104 times less permeable than a blood capillary wall [1]. Skin consists of four layers viz, stratum corneum (nonviable epidermis), viable epidermis, dermis, and subcutaneous tissues, as shown in Fig. (1). The epidermal cell forms a major appendage of the epidermis, the pilosebaceous unit (PSU). The PSU includes the hair follicle, hair shaft, adjoining arrector pili and the associated sebaceous gland [2]. There are about 5 million hair follicles covering the human body and around 100000 follicles located on the scalp. Very few new hair follicles are formed after birth, and the number of hair follicles begins to decrease after the age of 40 years [3]. The hair follicle of the PSU not only presents a significant portal for entry of topically applied molecules but can also serve as a drug depot. Sebaceous glands are a type of holocrine glands found on all over the surface of the body except the palms, soles and dorsum of the feet [4]. They are most dense and are present in the largest numbers in the face and scalp, which is the site of origin of acne. Their size and number depend on the size of the associated hair follicles as sebum, which is used for hair care [5].

2. ORGANIZATION AND FUNCTION OF THE PILOSEBA-CEOUS UNIT

2.1. Hair Follicle as a Drug Target

The hair follicle of the pilosebaceous unit is a crucial entry point for drug applied topically, and additionally, it also acts as

a drug reservoir. Slow clearance rate by sebum flow and hair growth, facilitates the drug carriers to build a depot inside the hair follicle where they are secluded from contact with clothing and are not easily washed off [6]. The hair follicle comprises of three primary layers, with the outermost layer being continuous with the epidermis. This layer is indispensable for the drug delivery functions and possibly offers an extensive surface area for absorption below the skin [7, 8]. There are various target sites for drug delivery, as discussed below and illustrated in Fig. (2A).

- Infundibulum (acroinfundibulum) assists in the growth of stratum corneum and stratum granulosum layer.
- The lower region of the infundibulum (infracinfundibulum) may get an incessant loss of epidermal differentiation toward the isthmus, and serves as one of the vital points of entry for applied contents.
- The sebaceous gland serves as a prospective therapeutic target site, and is a crucial component in acne etiology and androgenic alopecia.
- The wide network of blood capillaries nourishes the upper follicle and sebaceous glands, which presents an opportunity for systemic drug delivery.
- The bulge region, located underneath the sebaceous glands, is comprised of stem cells with high proliferative capacity and thereby accountable for the reconstitution of the follicle. This may be a probable target site for actives(s).
- The hair-bulb region comprises of hair-matrix cells and controls hair growth and pigmentation.
- The hair follicle is also an abode for many regulatory receptors for epidermal growth factor, retinoic acid and transforming growth factor, and is also potential drug delivery target [9-12].

*Address correspondence to this author at the University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010 (C.G.), India; Tel: 91-771-2262832; E-mail: suresh.preeti@gmail.com

1258



Polymers in topical delivery of anti-psoriatic medications and other topical agents in overcoming the barriers of conventional treatment strategies

Krishna Yadav¹ · Akanksha Soni¹ · Deependra Singh¹ · Manju Rawat Singh¹

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Abstract

In recent decades, topical treatments to dermal disorders have shown ineffectiveness in delivering the medication at a particular location without a suitable drug carrier. Psoriasis treatment is hindered because of the ineffective delivery and efficacy of conventional pharmaceutical treatment. In conventional medication formulation approach, it is difficult to breach the transdermal layer of a skin membrane for topical drugs, i.e. cyclosporine, methotrexate. This problem is further complicated by extreme disease-associated conditions such as hyperkeratosis and irritation. Intending to assure better drug delivery carriers, this review emphasizes the therapeutic efficacy of polymers and their potential to deliver the drug into the deeper layer of the skin membrane. The polymers are essential in structural and physiochemical perspectives as it works as a carrier for the medication. A vast variety of delivery carriers is available nowadays but their applicability in such dermal cases like psoriasis is still lacking due to less knowledge on an appropriate polymer. The current investigation of suitable polymer would assist in brushing our expertise to optimize the advantages of a wide spectrum of polymers to fulfill the topical targeting of psoriasis.

Keywords Psoriasis · Hyperkeratosis · Inflammation · Polymeric carrier · Immune-mediated skin disorder

Introduction

Psoriasis is an inflammatory, chronic autoimmune disorder of the skin that affects epidemiologically 1–3 percent of the world's population with a negative effect on patient life (Yadav et al. 2018b; Pradhan et al. 2018). Psoriasis is a multiple-factor disease regulated by abnormal keratinocyte proliferation and migration of T cells to the skin by stimulated immune systems. Later, the T cell release cytokines and chemokines, which ultimately regulate disease etiology including aggravating inflammation and premature hyperkeratosis (Elder et al. 2010; Rahman et al. 2015; Yadav et al. 2018a).

The initiation and progression of the disorder are regulated by the immune system in individuals with a genetic susceptibility to psoriasis. The pathomechanism is orchestrated to stimulate various mediators, such as cytokines,

chemokines, and growth factors, to facilitate hyperkeratosis, epidermal thickening, neovascularization, and keratinocyte proliferation (Sala et al. 2018). Physiologically, induction of T lymphocytes and inflammatory infiltrates into the skin is responsible for hyperkeratosis in which antigen-presenting cells conjugate with MHC, leading to large cytokines being recruited, i.e. TNF- α , Interleukin-23 (IL-23), and IL-17 playing key functions in the production of inflammatory psoriatic lesions (Roberts et al. 2017). The studies revealed that IL-17 and IL-23 are crucially involved in psoriasis pathogenesis (Tonel et al. 2010; Kuwabara et al. 2017). A sequential process that occurred during the pathogenesis of psoriasis has been demonstrated in Fig. 1.

The treatment of psoriasis involves topical application through the cream, lotion, gel as well as phototherapy, or/and systemic therapy depending on the rigorousness of disease as mild to severe. Topical therapy was frequently utilized for psoriasis treatment but the major challenge includes deliverance of active constituents into the transdermal layer (Chandrashekhara 2012; Pradhan et al. 2018; Abed et al. 2019). Several specific drugs are now commonly used for topical treatment of psoriasis in variable dosage formulations. Despite all challenges of topical treatment including low

✉ Manju Rawat Singh
manjursu@gmail.com

¹ University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010, India



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Research paper

Topical delivery of fluocinolone acetonide integrated NLCs and salicylic acid enriched gel: A potential and synergistic approach in the management of psoriasis

Madhulika Pradhan^a, Krishna Yadav^b, Deependra Singh^b, Manju Rawat Singh^{b, *}^a Rungta College of Pharmaceutical Sciences and Research, Kohka, Bhilai, 490024, India^b University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, 492010, India

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ABSTRACT

Psoriasis is a chronic autoimmune inflammatory disease of the skin that tends to affect around 2–3% of the global population. As a cascade of events occurs concurrently during psoriasis pathogenesis, treatment with a therapeutic combination is primarily concerned. The conventional formulation containing a combination of anti-inflammatory corticosteroid and the keratolytic agent is frequently employed for topical therapy of psoriasis, but their efficacy remains low. Therefore, the present work aimed to explore the efficacy of Fluocinolone Acetonide (FA) loaded NLCs and plain Salicylic Acid (SA) containing novel gel (FSG) for effective management of psoriasis. For comparative study plain FA, and SA containing conventional gel (PFSG) formulation was also prepared. The FSG formulation exhibited prolonged release of FA for more than 24 h, whereas the PFSG formulation released more than 90% of FA within 7 h. Ex-vivo permeation study revealed negligible absorption of drugs into the systemic circulation from both the FSG and PFSG formulations; nevertheless, the dermal pharmacokinetic investigation revealed significantly higher ($P < 0.05$) retention of FA from FSG formulation as compared to PFSG formulation. Confocal laser scanning microscopic study confirmed strict confinement of FA loaded NLCs to the epidermal and deep dermal layer of the skin whereas PFSG was largely restricted to the outer layer of skin. No skin irritation was reported in vivo, upon topical application of FSG formulation, whereas slight irritation was reported for PFSG formulation. Results of histopathological studies proposed that FSG could effectively alleviate the psoriatic manifestations in the IMQ prompted model. This examination was additionally aligned with PASI scoring. Further, the findings of the ELISA study revealed that the FSG significantly reduced the concentration of prime pathogenic cytokines (TNF- α , IL-17, and IL-22) as compared to PFSG and IMQ groups. Thus, the overall findings suggest greater efficacy of nanocarrier enriched gel formulation than plain gel formulation.

1. Introduction

Psoriasis is an immune arbitrated inflammatory skin disorder up-setting about 2–3% of the global population [1,2]. The disease usually displays extremely inflamed and sharply defined erythematous plaques covered with silvery scales [3–5]. Silvery scaling occurs due to the hyper-proliferation of the epidermis, inadequate cornification, and preservation of nuclei in the cells of the stratum corneum. Histopathological changes include hyperplasia of the epidermis with immature differentiation of keratinocytes, presence of inflammatory cytokines, and augmented vascularization [6,7]. Disease etiology is multi-factorial favored by environmental and genetic factors triggering the

immuno-histological changes in the skin [8,9].

Currently, topical therapy, phototherapy, and systemic therapy remain prevailing therapeutic approaches for the management of psoriasis [10]. Among these options, the topical treatment is the first choice; however, if this approach becomes futile or relentless for psoriasis condition, systemic therapy is followed [11,12]. Nevertheless, phototherapy and systemic approach are associated with ill effects, including skin cancer, multiple organ toxicity, hypertension, etc. Therefore, topical therapy remains an inevitable option for psoriasis treatment [13]. However, patient devotion towards topical treatment is restricted owing to frequent dosing with the subsequent decrease in patient's acceptance and dose-dependent side effects allied with conventional

* Corresponding author. University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, (C.G.), 492010, India.
E-mail address: manjursu@gmail.com (M.R. Singh).

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1258

ORIGINAL ARTICLE

Development and Characterization of *Costus Speciosus* Rhizome Extract Based Antimicrobial Liposomal Gel

Adeep Kujur*

University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India 492010.

*Corresponding Author E-mail: adeepkujuruiop@gmail.com

ABSTRACT

Objective: Liposome based formulations are quite popular nowadays for effectively treating different dermal disorders. Different synthetic and plant based drugs are successfully used for liposome preparation for better potential effect. Use of herbal extract into liposome results reduction in side effects as in case of synthetic drugs. *Costus speciosus* rhizomes possess good antibacterial potential, assuring its greatness as potent plant active of this plant. Alcoholic extract of *Costus speciosus* rhizomes were found to be more active towards the bacterial species than the aqueous extract. Therefore, this rhizomes extract was incorporated into liposomes for enhanced activity, upon topical application. The main objective of the present research work is to develop this potent rhizome extract into a nano formulations i.e. liposomes and to fabricate its novel topical liposomal gel for anti-microbial activity. Methanolic Rhizome Extract (MeRE) was incorporated into liposomes by thin film hydration method. The batch having lipid ratio i.e. Soya lecithin: Cholesterol (3:1); MeRE concentration 70 mg with entrapment efficiency $71.5 \pm 0.9\%$ was finalized. The vesicle size was found to be $3.3\mu\text{m} \pm 0.4$. In vitro drug diffusion and skin retention from liposomal gel was found to be $63.3\% \pm 1.2$ and $24.02\% \pm 0.28$ respectively. Stability studies indicated that formulation was stable over a period of 3 months when stored at 2-8°C.

Conclusions: The fabricated gel formulation showed a promising drug delivery vehicle for topical delivery of *Costus speciosus* rhizome extract and could be successfully used for the treatment of dermal microbial infections.

Keywords: *Costus speciosus*, Methanolic Rhizome Extract (MeRE), Antibacterial, In vitro drug diffusion.

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INTRODUCTION

The fruitful management of pharmacokinetics as well as the tissue distribution of any drug is the main goal during the development of new drug delivery system. To achieve the above target, variety of delivery systems such as microspheres, nanoparticles, lipoproteins, micellar systems and liposomes are used in the past for several years. Among these, most useful delivery system has been liposomal drug delivery system. Liposome has the ability of to carry a wide variety of substances. Based on their structural properties and harmless nature of their components, liposomes have been very popular to treat variety of therapeutic conditions [1]. Liposomes are the promising carriers as they are having potential to incorporate with variety of small drug molecules, proteins, nucleotides and plasmids as well. Liposomes can be easily formulated and refined to different sizes, compositions, charges and lamellarity [2].

On topical application of liposomal formulation, the liposomes are easily absorbed and merged with the cellular membranes of the skin. During this process, the drug loaded liposomes release the active materials into the cells. Due to the interaction of liposomal formulation with the corneocytes and of the intercellular lipids, it results in the softening and smoothening of skin [3]. Liposomes are capable of reaching the deeper layers of skin with high dose of drugs as well as it reduces the percutaneous absorption and unwanted side effects [4].


A wide variety of synthetic and herbal drugs are successfully incorporated into liposome for enhanced efficacy [5]. Liposomes are most suitable for plant extract delivery vehicles. Examples like turmeric, carrot extract, papaya extract, aloe-vera, green tea extract are reported for successful delivery through

1259

61

✓ Statistically optimized calcipotriol fused nanostructured lipid carriers for effectual topical treatment of psoriasis

Pradipao M.L., Alexander A., Singh M.R., Singh D., Saraf S., Saraf S.S., Yadav K.C., Ajazuddin^{*}

 [ORCID iD](#)

[†]Rungta College of Pharmaceutical Sciences and Research, Kukra, Kharajpur, Jhansi - 310014, Chhattisgarh, India

[‡]National Institute of Pharmaceutical Education and Research (NIPER), Chhatrapati Sambhaji Maharaj Health Sciences Institute, Kharajpur, Jhansi, India. Email: pradipao@nicer.ac.in, ajazuddin@nicer.ac.in

[§]University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur - 492010, Chhattisgarh, India

3

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Abstract

Present work focuses on the development and optimization (box-behken design) of calcipotriol (CP) loaded nanostructured lipid carrier (NLC) emulsion for topical treatment of psoriasis. In this regard, CP-NLCs were prepared, optimized, and investigated *in vitro* for various physical parameters. Further, the optimized batch of CP-



20-21

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Medical Hypotheses

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Multifaceted targeting of cationic liposomes via co-delivery of anti-IL-17 siRNA and corticosteroid for topical treatment of psoriasis

Krishna Yadav ^a, Deependra Singh ^a, Manju Rawat Singh ^a, Madhulika Pradhan ^b

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Abstract

Psoriasis is a chronic autoimmune disorder that affects the skin to alter its structure and physiology and express the phenotypic function of abnormal epidermal cell growth through a cascade of molecular, and cellular intervention. The histological changes in skin include inflammation, scaling, hyperproliferation of epidermis resulting in thickening of the skin, under the influence of altered immunopathogenesis. The zone of activity for the therapeutic targeting of psoriasis is viable epidermis involving various cellular events regulating the whole progression of the disease manifestation. Therefore, therapeutic targeting of psoriasis through the systemic route would be imprecise and associated with numerous side effects. Small interfering RNA (siRNA) molecules have emerged as a powerful class of therapeutics for treating psoriasis. However, successful targeted delivery of naked siRNA into the skin is hampered due to physicochemical features, proneness to enzymatic degradation, and unavailability of effective delivery carriers. The steroidal medications are the most preferred choice among existing conventional topical formulations; however, they also have their drawbacks like poor aqueous solubility, deprived drug penetration across the skin, reduced half-life, dose-dependent side effects, and reduced patient compliance. In the present study, we hypothesize the development of a liposomal gel formulation for co-delivery of siRNA (siRNA against IL-17A) and a steroidal drug (Clobetasol propionate) to target different pathogenic events of psoriasis leading to the accomplishment of synergistic therapeutic effect.

FEEDBACK

1261

95

20-24

COVID-19 Information

Public health information (CDC)

Research information (NIH)

SARS-CoV-2 data (NCBI)

Prevention and treatment information (HHS)

Español

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Novel Suberoylanilide Hydroxamic Acid Analogs Inhibit Angiogenesis and Induce Apoptosis in Breast Cancer Cells

Gopikrishna Moku ¹, Swathi Vangala ¹, Venu Yakati ¹, Chaitanya Chakravarthi Gali ², Soumen Saha ¹, Vijay Sagar Madamsetty ¹, Amber Vyas ³

Affiliations

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Abstract

Background: Histone deacetylases (HDACs) are the enzymes that catalyze the removal of the acetyl group from lysine residues and regulate several biological processes. Suberoylanilide hydroxamic acid (SAHA) is a notable HDAC inhibitor that exhibited remarkable anti-proliferative efficiency by alleviating gene regulation against solid and hematologic cancers.

Aim: The aim of this study was to develop new chemotherapeutic agents for breast cancer treatment, therefore, a novel series of Suberoylanilide hydroxamic acid (SAHA) analogs were investigated as anticancer agents.

Methods: We designed and synthesized a novel series of analogs derived from SAHA by substituting alkyl, alkoxy, halo, and benzyl groups at different positions of the phenyl ring. The newly synthesized analogs were assessed for their cytotoxic potential against four human cancer cell lines in comparison with healthy cell lines, using several biological assays.

Results: SAHA analogs displayed significant cytotoxic potential with IC50 values ranging from 1.6 to 19.2 μM in various tumor cell lines. Among these analogs, 2d (containing 3-chloro, 4-floro substitutions on phenyl moiety), 2h (containing 3,4-di chloro substitutions on phenyl moiety), and 2j (containing 4-chloro, 3-methyl substitutions on phenyl moiety) showed significant cytotoxic potential with IC50 values ranging from 1.6 to 1.8 μM in MCF-7 (breast carcinoma) cell line. More importantly, these analogs were found to be non-toxic towards healthy primary human hepatocytes (PHH) and mouse fibroblast cells (NIH3T3), which represent their tumor selectivity. These analogs were further analyzed for their effect on cell migration, BrdU incorporation, Annexin V-FITC and cell cycle arrest (Sub-G1 phase). Remarkably, analogs 2d, 2h, and 2j displayed significant HDAC inhibition than the parent SAHA molecule. Further studies also confirmed that these SAHA analogs are efficient in inducing apoptosis, as they regulated the expression of several proteins involved in mitochondrial or intrinsic apoptosis pathways. Findings in the Chick Chorioallantoic Membrane (CAM) assay studies revealed anti-angiogenic properties of the currently described SAHA analogs.

Conclusion: From anti-proliferative study results, it is clearly evident that 3,4-substitution at the SAHA phenyl ring improves the anti-proliferative activity of SAHA. Based on these findings, we presume that

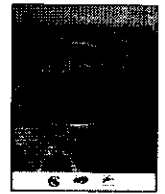
1264



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Review article

Quantum dots: Prospectives, toxicity, advances and applications

Bina Gidwani^b, Varsha Sahu^a, Shiv Shankar Shukla^b, Ravindra Pandey^b, Veenu Joshi^c, Vikas Kumar Jain^d, Amber Vyas^{a,*}^a University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, CG, India^b Columbia Institute of Pharmacy, Tekari, Raipur, CG, India^c Center for Basic science, Pt. Ravishankar Shukla University, Raipur, CG, India^d Department of Chemistry, Government Engineering College, Raipur, C.G, India

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ABSTRACT

Quantum Dots are fluorescence type semiconductor nano sized particles. They are made up of either heavy metal or inorganic material with size range from 2 to 10 nm. The word quantum dots itself indicates its quantum confinement and optical properties. They contain same number of electrons and atoms, hence are called as artificial atom. Quantum dots consist of two free functional groups for binding with drug molecule. Surface modification of quantum dots through covalent and/or non-covalent binding affects and alters the properties of drug molecule. Their cellular delivery is mediated by passive transport, facilitated delivery and active transport. The outer shell of quantum dots is made of semiconductor material which provides the surface for bio-conjugation leading to improvement in aqueous solubility. This provides effective surface area for binding of drug with the targeting molecule. The unique feature being that the material of shell reduces the toxicity of core of quantum dots. Various functionalization and surface modification makes them suitable for application in pharmaceutical field such as biomedical imaging, drug delivery, drug release study and diagnosis. Toxicity of quantum dots depends upon the size, material used, dose, route of administration and capping material. The regulatory status of quantum dots is not yet clear; still they are regarded as safe to use. The first clinical trial of quantum-dot technology in humans was approved by USFDA in 2011. With the advances in technology; most of the chemotherapeutics and cytotoxic drugs are delivered as quantum dots for improved/enhanced pharmacological action.

1. Introduction

One of the invention in nanotechnology; comprises nano-sized particles called as Quantum dots (QDs), which have gained lot of popularity among researchers' over past two decades because of their interesting physical and chemical properties. Quantum dots are fluorescent type of semiconductor nanoparticles, which are composed of core material enclosed within a shell of another semiconductor material with a diameter of 2–10 nm. The size of QDs reflects the properties like optical property, absorbance and photoluminescence in dependent manner [1]. The name quantum dots itself indicates its quantum confinement and optical properties. This specific property makes them suitable candidate for biological function and imaging. They have great potential towards imaging, sensing, tracking and real time monitoring. QDs are also known as artificial atom because of the presence of same number of electrons and atoms, demonstrating their movement in three dimensions

with narrow electronic energy level [2,3]. The selection of quantum dots depends on their application in various fields. The semiconductor outer shell of QDs are made of heavy or inorganic material like cadmium (Cd), selenium (Se), Zinc oxide (ZnO), silica etc. which are coated with shell material and provides a specific site for the conjugation and reduces their toxicity.

In drug delivery system; biocompatible quantum dots like carbon quantum dots, graphene quantum dots and zinc oxide quantum dots are used which contribute towards the aqueous solubility. For example - carbon quantum dots are preferred for the delivery of mitomycin (anti-cancer agent) [3,4]. For imaging and sensing purpose semiconductor quantum dots are mostly used such as ZnCuInS/ZnS quantum dots and CdTe quantum dots. QDs coated with organic acid are used for *in-vivo* cellular imaging of tumor and *in-vitro* cell staining [5]. Quantum dots possess a rigid structure which provides a large surface area for the drug conjugation, where the drug is not encapsulated in quantum dots but is

* Corresponding author.

E-mail addresses: beenagidwani@gmail.com (B. Gidwani), amber.vyas@gmail.com (A. Vyas).<https://doi.org/10.1016/j.jddst.2020.102308>

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1265

Regulatory Framework Of Herbal Medicine In Mexico

Sanyam Gandhi*¹, Dr. Akhilesh Tiwari*², Dr. Amber Vyas³, Megha Joshi

1- International strategy product lead, Tekada pharmaceutical limited, London, England

2- Assistant professor, Institute of pharmacy, Vikram University, Ujjain (M.P.)

3- Assistant professor, Institute of pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G.)

4- Institute of pharmacy, Vikram University, Ujjain (M.P.)

Abstract

Recently there has been a shift in universal trend from synthetic to herbal medicine, which we can say "Return to Nature". Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents. Botanical medicine represents an important share of the pharmaceutical market. Natural products compounds discovered from medicinal plants (and their analogues thereof) have provided numerous clinically useful drugs in the treatment of chronic and or acute disease and still remain as an essential component in the search for new medicines. So, these traditionally used plants can be explored effectively in order to find New Chemical Entity for the treatment of chronic and acute disease. The herbal industry shares about US \$100 billion with good growth potential. Hence this field is having greater future perspectives. Review was performed systematically by review of literature published in journals and websites of different regulatory agencies, then after study of all the literatures which will summaries details related to registration of herbal product in Mexico. It covers legal aspects, procedural details, GMP and labeling requirements. It is very common trend globally to register herbal medicines and Mexico is one the country in that list. So the present work might provide a path for pharmaceutical companies who wise to sell their product in Mexico. This paper gives details about registration of herbal medicines in Mexico.

Keywords:- Herbal medicines, GMP, Scientific names, Regulatory Agency, Mexico

1.0 Introduction

Conventional medicines are those which contain traditional knowledge that developed over generations in various cultures. The oldest record of herbal medicine is found in Indian, Chinese, Greek, Roman, Syrian and Egyptian literature science about 5000 years.¹ As per WHO about 80% of world population is using products based on medicinal herbs and Plants and market share of conventional medicine is increasing exponentially.² As per the World Bank report there is about 15% growth in the trade of medicinal plants and raw materials. As number of patients seeking alternate and herbal therapy is growing globally However, recent findings indicate that all herbal medicines may not be safe as severe consequences are reported for some herbal drugs.³ Most herbal products in the market today have not been subjected to drug approval process to demonstrate their safety and effectiveness. So regulatory agencies are also working continuously to set perfect regulatory framework for manufacturing and marketing of herbal products. But transformation of traditional knowledge in to modern regulatory frameworks is a big challenge. The Mexico guidelines on for cultivation and collection of medicinal plants advise local



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journal homepage: www.elsevier.com/locate/saaPhytochemical screening and determination of phenolics and flavonoids in *Dillenia pentagyna* using UV-vis and FTIR spectroscopyTarun Kumar Patle^a, Kamlesh Shrivastava^{a,*}, Ramsingh Kurrey^a, Seema Upadhyay^b, Rajendra Jangde^c, Ravishankar Chauhan^d^a School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur 492 010, Chhattisgarh, India^b School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur 492 010, Chhattisgarh, India^c University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur 492 010, Chhattisgarh, India^d National Center for Natural Resources, Pt. Ravishankar Shukla University, Raipur 492 010, Chhattisgarh, India

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ABSTRACT

Here, we report an ultrasonic-assisted extraction (UAE) of phytochemicals from bark, leaves, sepals, fruits, and seeds of *Dillenia pentagyna* (Roxb) using different organic solvents such as chloroform, ethanol, and n-hexane. The preliminary phytochemical screening results showed that the ethanolic extract is enriched with phenolics, flavonoids, tannin, saponin, alkaloid, and terpenoids. The profiling of phytochemicals is carried out employing UV-Vis and Fourier-transform infrared (FTIR) spectroscopy analyses. The higher amount of phenolic compounds obtained in the ethanolic extract of bark and leaves as compared to other parts of the plant. Consequently, a higher amount of total flavonoid compounds unveiled in the bark of targeted species. The ethanolic extract of bark and leaves showed good free radical scavenging activity using DPPH with inhibition percentage of $90.58 \pm 1.89\%$ and $76.46 \pm 1.58\%$, respectively, in comparison to standard ascorbic acid at $10 \mu\text{g/mL}$. Moreover, the half-maximal inhibitory concentration (IC_{50}) value of bark and leaves are 5.64 and $6.54 \mu\text{g/mL}$, respectively, in comparison to standard ascorbic acid. With the best of our knowledge, it is the first report pertaining to characterization and quantification of phenols and flavonoids as well as the investigation of the medicinal property in *D. pentagyna*.

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1. Introduction

There are about 300,000 plant species whose phytochemicals with diverse structures and properties are elucidated [1]. These phytochemicals are divided into two major categories, firstly primary metabolites such as carbohydrates, lipids, proteins; and secondly, secondary metabolites like alkaloids, terpenoids, and phenolic compounds. The primary metabolites are responsible for the growth and development of plants; whereas secondary metabolites play an important role in defense mechanisms against the environmental pollutants, insects, and other foreign threats to the plant [2]. Among, these phenolic compounds and flavonoids are considered to be a very important class of biomolecules having a significant medicinal property for the human being. The basic structure of phenolic compounds (gallic acid, caffeic acid, ferulic acid, protocatechuic acid, and coumaric acid) consists of a phenolic ($\text{C}_6\text{H}_5\text{OH}$) ring, the carboxylic acid ($-\text{COOH}$) and hydroxyl groups ($-\text{OH}$). Moreover, flavonoids are polyphenols that contain at least two phenolic rings and further categorized into different sub-class such as

flavonols, flavonones, flavones, flavanolols, flavan-3-ols, and isoflavones [3–5]. The antioxidant activity of phenolic compounds and flavonoids is directly proportional to the presence of the hydroxyl ($-\text{OH}$) group in the sample. Further, the positions of hydroxyl groups also affect the ability of free radical scavenging activity [6,7]. The phenolic compounds have already been shown many pharmacological activities such as antimicrobial, antioxidants, anticancer, and antidiabetic [8–10].

Nowadays, the entry of toxic substances through food and drinking water generates free radicals which induce several diseases in the human body. It is due to the free radicals of reactive oxygen species attack on fatty acids, DNA, proteins, lipids, and initiate a rapid destructive chain reaction to damage the cell membranes [11]. The phenolic compounds and flavonoids play a significant role in preventing the damage caused by free radicals [12,13]. Thus, the characterization and determination of phytochemicals such as phenolic compounds and flavonoids in plant samples are essential to know the mechanism of these compounds against various biological activities. Here, different plant parts of *Dillenia pentagyna* (Roxb.) is chosen for the extraction and determination of bioactive components, and free radical scavenging activity of phenolic compounds and flavonoids is investigated.

* Corresponding author.

E-mail address: kshrivas@gmail.com (K. Shrivastava).



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Promising herbs for the management of inflammation associated with various pathological conditions - A Review

Adeep Kujur^{*1}, Rakesh Tirkey¹, Vaibhav Tripathi², Pushpendra Kumar Sahu¹¹University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India²Royal College of Pharmacy, Raipur- 492001, Chhattisgarh, India**Article History:****ABSTRACT**

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Ailments with ignescent etiopathology have expanded in rate lately. Medications utilized for restorative administration of such provocative ailments are alleviating the disease and yet additionally countering genuine perilous outcome. Allopathic medications really pejorate the disease condition in patients, particularly with rheumatoid joint pain and osteoarthritis. Add to this the huge number of individuals detriment by these medications, as well as their huge expenses and the need of using reciprocal means become obvious. On the other hand, natural medicines offer one engaging approach to decrease the use of allopathic non-narcotic anti-phlogistic agents. The reason for administering herbs incorporate long accounts of utilization, a broad examination on various natural constituents, the relative simplicity of administration profile, economical and magnificent security records. So far, Many Phyto-constituents are investigated for numerous therapeutic applications, albeit a large fraction of these reports are of scholarly interest, only some of them get a pass for clinical preliminaries. Future exploration should look into the molecular mechanisms of various therapeutic applications of the natural plants in different ailments associated with inflammation. This review is a compilation of anti-inflammatory natural agents along with reported action path. We have summarized all necessary information regarding the title with the aid of best possible sources.

***Corresponding Author**

Name: Adeep Kujur

Phone: +91-8103599558

Email: adeepkujuruiop@gmail.com

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INTRODUCTION

Inflammation is considered as an in-vivo intrinsic reaction, which becomes evident to shield the body

from toxic and unwanted boosts, bringing about the edema of tissues, torment, or even damage at a cellular level. The primary purpose behind this system is to fix and return the harmed tissue to the normal condition. The expansion in the size of the vessels is seen around the inflamed loci (i.e., neutrophils, macrophages, and lymphocytes) during the starting phases of inflammation. However, in consecutive time, numerous sorts of cells arrive at neutrophils, trailed by macrophages within 48 hours and lymphocytes following a few days. It is notable that the bio-chemical disturbances of cells happen during inflammation, prompting the arrival of arachidonic acid, and further goes through two metabolic precursor pathways known as the lipoxygenase and cyclooxygenase pathways.

1263

BENTHAM
SCIENCE

Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

Buddhadev Layek¹, Bina Gidwani², Sakshi Tiwari³, Veenu Joshi⁴, Vishal Jain³ and Amber Vyas^{3,*}

¹Department of Pharmaceutical Sciences, North Dakota State University, Fargo, North Dakota 58105, USA; ²Columbia Institute of Pharmacy, Raipur (C.G.), India; ³University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India; ⁴Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India

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Abstract: Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different liposomal formulations commercially available for cancer therapy.

Keywords: Cancer, chemotherapeutics, drug delivery, liposomes, nanostructured lipid carriers, solid lipid nanoparticles, targeted drug delivery.

1. INTRODUCTION

Cancer is the second leading cause of death globally, with one in every six deaths attributable to cancer [1]. According to GLOBOCAN 2018, an estimated 18.1 million new cancer cases and 9.6 million cancer deaths occurred in 2018 [2]. By 2040, the estimated global burden is expected to rise to 27.5 million new cancer cases and 16.3 million cancer deaths. Current cancer therapies include surgical resection of tumors, radiation therapy, and chemotherapy. Among different strategies, chemotherapy has been extensively applied in clinics, particularly in the treatment of advanced cancer cases. However, most of the chemotherapeutic drugs suffer from poor solubility, low bioavailability, and unfavorable pharmacokinetic profile [3]. Furthermore, conventional chemotherapeutics lack sufficient cancer selectivity and inevitably kill both cancer cells and rapidly proliferating healthy cells, causing unwanted adverse effects. Hence, there is an urgent need to develop suitable drug delivery systems capable of achieving high accumulation in tumor tissues while sparing the surrounding healthy tissues [4].

Nanotechnology can serve as a useful tool to circumvent the limitations stated above and enhance the outcome of cancer treatment. Nanocarriers are submicron colloidal drug carrier system with a size range of 10–1000 nm (typically <500 nm) [5, 6]. In general, the drug molecule is dissolved, adsorbed, entrapped, encapsulated, or attached to a nanomatrix. Nanocarriers, owing to their nanoscale sizes and high surface area to volume ratio, can alter the basic properties and bioactivity of its payload [7]. Over the past few decades, nanocarriers have been extensively used in cancer therapy because of their ability to improve the bioavailability and pharmacokinetics of chemotherapeutic drugs while facilitating preferential accumulation at the tumor tissue [8–10].

Tumor-selective accumulation of nanomedicines is primarily relying on the passive targeting of solid tumors through enhanced permeability and retention (EPR) effect, as illustrated in Fig. 1. Unlike small-molecule drugs, nanocarriers cannot pass through the tight endothelial cell junctions of normal blood vessels. However, solid tumors are often characterized by abnormal vascular networks and exhibit leaky blood vessels (endothelial pores of 40 to 1000 nm) compared to those of healthy tissue (≤ 8 nm) [11]. Thus, nanoparticles can extravasate into tumor tissues through the leaky vasculature [12]. As the lymphatic system in tumors is mostly absent or dysfunctional, the inefficient drainage facilitates the retention of nanoparticles in the tumor tissues [13–15]. Furthermore, the physicochemical properties of nanocarriers can be fine-tuned by altering their sizes, shapes, compositions, and surface properties. For instance, rationally designed nanocarriers with specific dimensions and suitable surface properties (e.g., zwitterionic or neutral PEG) display longer residence time in systemic circulation without opsonization and preferentially accumulate in tumor tissues [16–18].

To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among the nanocarriers, lipid-based formulations such as liposomes, solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLC), and lipid-polymer hybrid nanoparticles have received considerable attention in cancer treatment due to their distinct advantages over other colloidal nanocarriers. Lipid-based nanocarriers made up of biocompatible and biodegradable lipids, such as phospholipids, cholesterol, and triglycerides, and hence these systems are less toxic as compared to other nanocarriers, such as polymeric nanoparticles [19, 20]. They can encapsulate both the hydrophilic and hydrophobic drugs with high loading capacity, display high temporal and thermal stability, and offer prolonged and controlled drug release profile [21, 22]. Further, surface modification with polyethylene glycol (PEG) enables lipid-based nanocarriers to evade mononuclear phagocyte system (MPS) and ameliorate circulation half-life for better thera-

*Address correspondence to this author at the University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492010, Chhattisgarh, India; Tel: +91-771-2262832; E-mail: ambervyas@gmail.com

99

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Aromatase Inhibitors for the Treatment of Breast Cancer: A Journey from the Scratch

Pooja Ratre^{1, #}, Keerti Mishra^{1, #}, Amit Dubey², Amber Vyas³, Akhlesh Jain^{1, *} and Suresh Thareja^{1, *}

¹School of Pharmaceutical Sciences, Guru Ghasidas Central University, Bilaspur-495 009 (C.G.), India; ²Chhattisgarh Council of Science and Technology, Raipur-492 014 (C.G.), India; ³University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur-492 010 (C.G.), India

Abstract: Background: Estrogens are essential for the growth of breast cancer in the case of premenopausal as well as in postmenopausal women. However, most of the breast cancer incidences are reported in postmenopausal women and the concurrent risk surges with an increase in age. Since the enzyme aromatase catalyses essential steps in estrogen biosynthesis, Aromatase Inhibitors (AIs) are effective targeted therapy in patients with Estrogen Receptor positive (ER⁺) breast cancer. AIs are more effective than Selective Estrogen Receptor Modulators (SERMs) because they block both the genomic and nongenomic activities of ER. Till date, first, second and third-generation AIs have been approved by the FDA. The third-generation AIs, viz. Letrozole, Anastrozole, Exemestane, are currently used in the standard treatment for postmenopausal breast cancer.

Methods: Data were collected from Medline, PubMed, Google Scholar, Science Direct through searching of keywords: 'aromatase', 'aromatase inhibitors', 'breast cancer', 'steroidal aromatase inhibitors', 'non-steroidal inhibitors' and 'generations of aromatase inhibitors'.

Results: In the current scenario of breast cancer chemotherapy, AIs are the most widely used agents which reveal optimum efficacy along with the least side effects. Keeping in view the prominence of AIs in breast cancer therapy, this review covered the detailed description of aromatase including its role in the biosynthesis of estrogen, biochemistry, gene expression, 3D-structure, and information of reported AIs along with their role in breast cancer treatment.

Conclusion: AIs are the mainstream solution of the ER⁺ breast cancer treatment regimen with the continuous improvement of human understanding of the importance of a healthy life of women suffering from breast cancer.

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1. INTRODUCTION

Aromatase (Estrogen synthetase or Estrogen synthase, E.C. 1.14.14.1) is a microsomal member of the cytochrome P450 (CYP450) super-family associated with gene CYP19 or CYP19A located on chromosome 15 [1, 2]. This P450 gene super-family is very vast, having about 480 members belonging to 74 different families, out of which cytochrome P450_{arom} is the core member of family 19. CYP450 are heme-containing enzymes, accountable for the binding of C-19 androgenic steroid substrate and activating a series of reactions leading to the formation of the phenolic ring (A) (Fig. 1) present in estrogen [3]. Aromatase is extremely specific for its substrate viz. androgens. In estrogen biosynthesis or steroidogenesis, aromatase plays a major role by catalysing the rate-determining and concluding steps. The steroidogenesis process involves three successive oxidative steps and estrogen is obtained as the end product. The first two steps are accompanied by CYP450 and the third step is aromatization that results in the synthesis of estrogen [4]. The role of aromatase and steroid sulfatase in the synthesis of estrogen is depicted in Fig. (2). Aromatase is found in

many tissues, including gonads (granulosa cells), brain, adipose tissue, placenta, blood vessels, skin and bone [1]. It is an important factor in sexual development via producing female sex hormone, estrogen, which helps to fuel the growth of hormone receptor-positive breast cancer.

A numbers of *in vitro* as well as *in vivo* studies have been performed for aromatase that showed the aromatase expression is maximum in or around breast tumour sites [5]. The site specific presence makes aromatase as a legitimate target for the management of breast cancer [6]. There are several environmental factors that alter the activity of the aromatase enzyme, such as age, obesity, gonadotropins, insulin, alcohol and smoking, which increase the activity of aromatase; in contrast, prolactin, anti-mullerian hormone and the common herbicide glyphosate tend to decrease aromatase activity [7]. Aromatase excess syndrome in boys can cause gynecomastia and in girls precocious puberty and gigantomastia. In both sexes, early epiphyseal closure leads to short stature. This is due to mutations in the CYP19A1 gene encoding for aromatase and is inherited in an autosomal dominant fashion [7]. Mutation of gene CYP19 causes aromatase deficiency syndrome, which is inherited in an autosomal recessive way [8]. Accumulations of androgens during pregnancy may lead to virilization of a female at birth (males are not affected). Females will have primary amenorrhea. Individuals of both sexes will be tall, as lack of estrogen does not bring the epiphyseal lines to the closure [8, 9]. The non-aromatase factors

*Address correspondence to these authors at the School of Pharmaceutical Sciences, Guru Ghasidas Central University, Bilaspur-495 009 (C.G.), India; E-mail: sureshthareja@gmail.com and E-mail: akjain.ie@gmail.com

[#]These Authors contributed equally to this work.

1267

Investigation of Effect of Phytoconstituents Aloe Emodin and Quercetin on Bioavailability of Albendazole

Harsh Verma¹, Ravindra Kumar Pandey^{1,*}, Shiv Shankar Shukla², Bina Gidwani², Amber Vyas³

¹Department of Pharmacognosy, Columbia Institute of Pharmacy Tekari, Raipur, Chhattisgarh, INDIA.

²Department of Pharmaceutical Analysis and Quality Assurance, Columbia Institute of Pharmacy Tekari, Chhattisgarh, INDIA.

³Department of Pharmaceutics, University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, INDIA.

ABSTRACT

Background/Aim: Albendazole is a drug with benzimidazole nucleus and is poorly absorbed from the gastrointestinal tract due to its low aqueous solubility. The objective of present work was to study the effect of two phytoconstituents aloe emodin and quercetin on the bioavailability of albendazole. **Materials and Methods:** Estimation was done through UV spectroscopy and HPLC analysis using different concentration of both the phytoconstituents. **In-vivo** study was conducted to investigate the pharmacokinetics and pharmacodynamic parameters. **Results:** Results revealed no change in T_{max} of albendazole and significant changes were observed in C_{max} values. The C_{max} was maximum i.e. 0.138 $\mu\text{g/ml}$ when 20mg/kg of quercetin was added as compared to aloe-emodin. The increase in bioavailability of Albendazole was due to the presence of flavonoids in quercetin. The retention time of albendazole as estimated through HPLC chromatogram was found to be 3.2 minutes with acetonitrile and phosphate buffer as the mobile phase. However, albendazole was not detectable in 24 hr plasma sample and values of AUC were found to be zero in all the concentration of aloe emodin and quercetin. **Conclusion:** Thus, the phytoconstituents rich in flavonoids could be used to increase the bioavailability of poor soluble drugs.

Key words: Albendazole, Aloe emodin, Quercetin, Bioavailability, Pharmacokinetics.

INTRODUCTION

Albendazole (ABZ) is a benzimidazole category drug which is poorly absorbed from the gastrointestinal tract due to its poor aqueous solubility. ABZ is relatively insoluble in water and other organic solvents; this hinders its absorption behavior in the body. In the mouse and rat, oral absorption of ABZ is about 20-/30% and in cattle, it is about 50%, compared to about 1-5% in humans.¹ Use of herbal products as medicine has increased tremendously now a day's all over the world due to their therapeutic effect and fewer adverse effects as compared to modern medicines. Nature is a good source of medicine about 60% of anticancer drugs and 75% of anti-infective drugs approved from 1981-2002 could be traced to natural origin.

Natural products, as used by the general population, are usually complex mixtures of many compounds.² Both the putative active ingredient(s) and other constituents present in that mixture have the potential to cause interactions with various classes of drugs. Such interactions include induction or inhibition of metabolizing enzymes and drug efflux proteins. It is now claimed and proved that the naturally occurring dietary supplements can modulate hepatic and enterocytic CYP activity. Several flavonoids, which constitute one of the primary classes of active constituents in most herbs, appear to be capable of modulating P-gp³ Co-administration of herbal bioactive constituents with the therapeutic drugs may lead to increased absorption due to

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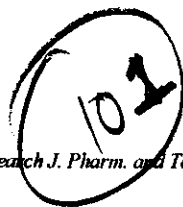
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Correspondence:
Dr. Ravindra Kumar Pandey
Professor, Department of
Pharmacognosy, Columbia
Institute of Pharmacy
Tekari, Raipur-493111,
Chhattisgarh, INDIA.
Phone: +91 9826229321
E-mail: ravindraop@gmail.
com



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REVIEW ARTICLE

Bora Rice: Natural polysaccharide polymer for drug delivery

Amber Vyas*

University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G).

*Corresponding Author E-mail: ambervyas@gmail.com

ABSTRACT:

People believed that safe synthetics are okay, but natural is best. Natural polymers play an important role as excipients in any dosage form. The natural polymers are polysaccharides so, they have become broader considerations in pharmaceuticals because of its accessibility and biocompatibility. The utilization of natural polymers in the drug delivery keeps on being a territory of escalating research regardless introduction of new engineered polymers. Starch is a naturally occurring polysaccharide polymer and has vital intrinsic properties that have made its pharmaceutical applications possible. Rice is one of the major sources of starch worldwide. Assam Bora rice (*Oryza sativa L.*, Japonica variety), a gathering of glutinous rice of Assam, has been accounted to contain up to 90% starch. The Bora rice is a festival food in Assam, is described by its dull smooth appearance and consists of basically amylopectin and traces of amylase; it is otherwise called waxy or clingy rice. This review emphasizes the pharmaceutical utility of Bora rice and its starch as a characteristic polymer for drug delivery. It is preferred as a mucoadhesive matrix in a controlled release drug delivery system since it is exceptionally clingy and has splendid gelling property. Additionally, the rice is a typical staple and is biocompatible and promptly accessible subsequently, marked as 'GRAS' (Generally Regarded as Safe), which is fundamental rules for any substance to be utilized in food and pharmaceuticals. This article reviews the literature on Assam bora rice and depicts their varied applications and future use in the drug delivery system.

KEYWORDS: Assam Bora rice, starch, natural polymer, mucoadhesive agent, drug delivery system.

INTRODUCTION:

Any pharmaceutical formulation contains two ingredients- active pharmaceutical ingredient and excipients. Excipients help in the manufacturing of dosage form and it also improves physicochemical parameters of the dosage form. Polymers play an important role as excipients in any dosage form [1]. The advances in drug delivery have simultaneously urged the discovery of novel excipients which are safe and fulfill specific functions and directly or indirectly influence the rate and extent of release or absorption [2]. A large number of plant-based pharmaceutical excipients are available today. Many researchers have explored the usefulness of plant-based materials as pharmaceutical excipients. Synthetic polymers are toxic, expensive, have environment related issues, need long development time for synthesis and are freely available in comparison to

naturally available polymers. However the use of natural polymers for pharmaceutical applications is attractive because they are economical, readily available, non-toxic and capable of chemical modifications, potentially biodegradable and with few exceptions and also biocompatible. The fact for increase in importance of natural plant based material is that plant resources are renewable and if cultivated or harvested in a sustainable manner, they can provide a constant supply of raw materials [3]. However, substances from plant origin also pose several potential challenges such as being synthesized in small quantities and in mixtures that are structurally complex, which may differ according to the location of the plants as well as other variables such as the season. This may result in a slow and expensive isolation and purification process. Another issue that has become increasingly important is that of intellectual property rights. The plant based polymers have been studied for their application in different pharmaceutical dosage forms like inatrix controlled system, film coating agents, buccal films, microspheres, nanoparticles, viscous liquid formulations like ophthalmic solutions,

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1269



Exploring the Relationship Between Character Strengths and Meditation: a Cross-Sectional Study Among Long-Term Practitioners of Sahaja Yoga Meditation

Tommy Hendriks¹ · Joshua Pritikin² · Rajeev Choudhary³ · Chad Danyluck⁴

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Abstract

A growing body of research has associated the practice of meditation with the development of character strengths. Sahaja Yoga (SY) is a spiritual practice designed to help people develop a set of character strengths. The primary goal of the current work is to determine whether practitioners of SY meditation endorse signature strengths. Using the VIA Inventory of Strengths 120, we conducted a survey to measure the character strengths among 310 daily practitioners of SY meditation and compared them to a matched sample from the database of the VIA Institute on Character. Practitioners of SY meditation endorsed seven signature strengths, relative to non-meditators: spirituality, forgiveness, gratitude, self-regulation, teamwork, appreciation of beauty, and hope. Findings suggest that the practice of SY meditation may be related to a unique and broad set of character strengths. The findings pave the way for research identifying signature strength development in other group contexts.

Keywords Character strengths · Meditation · Sahaja Yoga · Kundalini · Spirituality

✉ Tommy Hendriks
t.hendriks_2@tilburguniversity.edu

¹ Department of Human Resource Studies & Department of Developmental Psychology, Tilburg University, Warandelaan 2, 5037 AB Tilburg, the Netherlands

² Virginia Institute for Psychiatric and Behavioral Genetics, Virginia Commonwealth University, Richmond, VA, USA

³ Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

⁴ Department of Psychology, Carleton University, Ottawa, Ontario, Canada



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Original

Effect of eight-week core muscles strength training on physical fitness and body composition variables in male players of team games

S. K. Anant^{a*}, R. Venugopal^b

^a College of Veterinary Sciences and A.H. Chhattisgarh Kamdhenu University, Durg, India.

^b School of Studies in Physical Education, Ravishankar Shukla University Raipur, Chhattisgarh, India.



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ABSTRACT

Objective: To find out the effect of core muscles strength training for eight weeks (five days/week) on fitness and body composition variables in male players of team games.

Methods: Fifty five male players were selected for the study. Subjects were randomly divided into experimental (n: 30) and control group (n: 25). Lateral trunk endurance, endurance and explosive power of leg, abdominal muscles endurance, body weight, body fat percentage, essential fat mass, non-essential fat mass, absolute total body fat and body surface area were measured before and after intervention.

Results: The significant effect of core training program was observed ($p < 0.05$) in lateral trunk endurance, explosive power of leg, abdominal muscles endurance (respectively; 38.29%, $p < 0.001$; 10.57%, $p < 0.001$; 71.23%, $p < 0.002$). Also, significant changes were found in bodyweight, fat %, essential fat, non-essential fat, absolute total body fat, body surface area, lean body and fat free body mass (respectively; F: 28.88, $p < 0.001$; F: 4.25, $p: 0.41$; F: 28.88, $p < 0.001$; F: 5.37, $p < 0.001$; F: 5.80, $p: 0.20$; F: 27.93, $p < 0.001$; F: 2.40, $p: 0.141$; F: 2.03, $p: 0.16$).

Conclusion: The eight-week core muscles strength training program used in this study was very effective for producing significant benefits to fitness level performance and body composition, as well as lowering the weight of male players.

Keywords: Core training; Swiss ball exercises; Body composition; Muscles activation.

Efecto del entrenamiento de fuerza muscular del Core de ocho semanas en las variables de aptitud física y composición corporal en jugadores masculinos de juegos de equipo

RESUMEN

Objetivo: Averiguar el efecto del entrenamiento de fuerza de los músculos del Core durante ocho semanas (cinco días / semana) sobre las variables de estado físico y composición corporal en jugadores masculinos de juegos de equipo.

Métodos: Cincuenta y cinco jugadores masculinos fueron seleccionados para el estudio. Los sujetos se dividieron aleatoriamente en grupo experimental (n: 30) y grupo control (n: 25). La resistencia lateral del tronco, la resistencia y el poder explosivo de la pierna, la resistencia de los músculos abdominales, el peso corporal, el porcentaje de grasa corporal, la masa de grasa esencial, la masa de grasa no esencial, la grasa corporal total absoluta y el área de superficie corporal se midieron antes y después de la intervención.

Resultados: Se observó el efecto significativo del programa de entrenamiento del Core ($p < 0.05$) en la resistencia lateral del tronco, la potencia explosiva de la pierna y la resistencia de los músculos abdominales (38.29 %, $p < 0.001$; 10.57%, $p < 0.001$; 71.23%, $p < 0.002$ respectivamente). Además, se encontraron cambios significativos en el peso corporal, % de grasa, grasa esencial, grasa no esencial, grasa corporal total absoluta, área de superficie corporal, masa magra y masa corporal libre de grasa (F: 28.88, $p < 0.001$; F: 4.25, $p: 0.41$; F: 28.88, $p < 0.001$; F: 5.37, $p < 0.001$; F: 5.80, $p: 0.20$; F: 27.93, $p < 0.001$; F: 2.40, $p: 0.141$; F: 2.03, $p: 0.16$, respectivamente).

Conclusión: El programa de entrenamiento de fuerza muscular del Core de ocho semanas utilizado en este estudio fue muy efectivo para producir beneficios significativos para el rendimiento del nivel de condición física y la composición corporal, así como para reducir el peso de los jugadores masculinos.

Palabras clave: Entrenamiento Core; Ejercicios pelota suiza; Composición corporal; Activación muscular.

* Corresponding author.

E-mail-address: shabirnant@gmail.com (S. K. Anant).

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Optical properties of rare earth (Ce) and transition metal (Ti) doped ZrO₂ phosphors

Ugendra Kurrey^{1*}, Nameeta Brahme² and D.P. Bisen²

¹ Govt. C.L.C. Arts & Science College., Patan, Durg, Chhattisgarh, India

² School of Studies in Physics and Astrophysics, Pt. Ravishankar Shukla University Raipur, Chhattisgarh, India

* Corresponding author E-mail: kurrey7947@gmail.com, namitabrahme@gmail.com

Abstract. Thermoluminescence and Photoluminescence of un-doped as well as Titanium (Ti³⁺) & Cerium (Ce³⁺) doped ZrO₂ phosphors, prepared via solid-state reaction method. For the characterization of the sample FTIR, XRD, EDAX and FESEM study were done. FTIR confirms the presence of conventional impurities (such as NO₃, OH-) present in the prepared sample. Structural characterization technique (XRD) shows the monoclinic formation and reveals the average grain size in the nano region. EDAX study confirms the chemical composition and through FESEM morphological status is studied. For kinetic parameters study thermoluminescence studies is carried out and try to correlate the XRD results with thermoluminescence behavior of prepared phosphors. Photoluminescence emission spectra show the blue and green emission band for Ti and Ce doped ZrO₂ phosphors respectively.

1. Introduction

Phosphors are most commonly used materials in photonics as well as in optics fields due to its superior hardness, high refractive index, optical transparency, chemical stability, high thermal expansion coefficient, low thermal conductivity and high thermo-mechanical resistance. Zirconium Oxide (ZrO₂) phosphors are most promising host material in the field of electro-optical materials, due to its electrical, mechanical, chemical and optical characteristics. Zirconia has a wide band gap (= 5.4 eV) semiconductor material, has good optical transparency and low phonon energy of 470 cm⁻¹ [1]. This will increase the number and probability of radiative transition and reduce non radiative multiphonon relaxation [2,3]. And hence, it has vast application areas in oxygen sensor, Solid State electrolytes, thermal barrier coatings, and in the field of photonics [4,5,6]. Zirconia is a IV group member, in periodic database table and the main source of zirconia is Baddeleyite (ZrO₂) and zircon (zirconium ortho-silicate ZrSiO₄). Hafnium, Hematite (Fe₂O₃) Fe and Ti are the major impurities found in a commercial zirconia due to closeness in their crystal radii (Zr⁴⁺ 0.79 Å⁰, Hf⁴⁺ 0.78 Å⁰) [7].

ZrO₂ exhibits three polymorphs with increasing temperature at a normal atmospheric pressure: the monoclinic phase (m-ZrO₂) that is stable from room temperature (RT) to 1175°C; the tetragonal phase (t-ZrO₂) stability ranges between 1175°C to 2370°C and cubic phase (c-ZrO₂), exceptional stable at 2370°C to 2750°C (melting point). However, the substitution of dissimilar elements into the ZrO₂ host develops oxygen ion vacancies and as a consequence the phase of the phosphor material stabilized through charge compensation mechanism [8,9]. Phosphors or luminescent materials are mostly inorganic materials consisting of a host lattice intentionally doped with impurities or activators.



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Full length article

Generation of cold white light by using energy transfer process in single phase Ce^{3+}/Tb^{3+} co-doped $CaSrAl_2SiO_7$ phosphor

Shweta Sharma^a, Nameeta Brahma^b, D.P. Bisen^c, Pradeep Dewangan^d, Ritu Gupta

^a Department of Physics, Adarsha Science, J. B. Arts and Birla Commerce College, Dhamangaon (Rly), Maharashtra 444607, India

^b School of Studies in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010, India

^c Department of Physics, Faculty of Science, Shri Rawatpura Sarkar University, Raipur, Chhattisgarh 492010, India

^d Department of Physics, National Institute of Technology, Raipur 492010, India

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ABSTRACT

Single phased $CaSrAl_2SiO_7$ phosphor singly doped with different concentrations of trivalent cerium and terbium; and co-doped with varying Tb^{3+} concentration were prepared by standard solid state reaction (SSR) method. The crystallinity and particle morphology of the product samples were analysed by using XRD and TEM characterizations. Photoluminescence characterizations of singly doped and co-doped samples were studied in detail. $CaSrAl_2SiO_7:Ce^{3+}, Tb^{3+}$ phosphor exhibit a broad blue emission band at 410 nm and some sharp emission bands in blue green and yellow regions, which originate from Ce^{3+} and Tb^{3+} ions, respectively. By increasing the concentration of Tb^{3+} ions while fixing Ce^{3+} concentration in the host lattice energy transfer takes place from Ce^{3+} to Tb^{3+} ions which create luminescence emission in white region. $CaSrAl_2SiO_7:Ce^{3+}, Tb^{3+}$ phosphors are proved to be promising candidates for white lighting for outdoor illumination.

1. Introduction

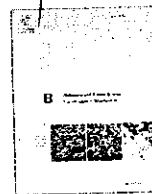
Phosphors that are the luminescent materials are widely utilized in our daily life; some of the best applications of phosphors are color television screen, fluorescent lamps, scintillators, dosimeters, X-ray storage, screen intensifying phosphors, sensors, LEDs, watch dials, laser materials etc. The white light sources based on light emitting diode have so many valuable advantages as compare to conventional incandescent lamps. White LEDs have longer lifetime, better reliability, environmentally characteristics and higher efficiency which provide significant contractions in power consumption and pollution from fossil fuel power plants. In recent years, researchers have been concentrating on investigation of single composition white-light-emitting phosphors that are excited by UV-LED to prevent some difficulties like the cross-color, instability of color temperature, and expensive cost problems. The process of co-doping of sensitizer and activator into one host matrix is one of the best ways to fabricate a single-phased white-light-emitting material by utilising the principle of energy transfer from sensitizer to activator. Now a days the white light can be obtained from co-doping of divalent and trivalent rare earth elements in a single phase host, white light emission was investigated in Eu^{2+} , Mn^{2+} co-doped $Ca_8MgY(PO_4)_7$, Ce^{3+} , Tb^{3+} co-doped $Ba_2Ln(BO_3)_2Cl$ ($Ln =$

Gd and Y), Ce^{3+} , Dy^{3+} co-doped $Ca_3(P_{1-x}B_xO_4)_2$ and Dy^{3+} , Sm^{3+} co-doped $Lu_3Ga_5O_{12}$ systems. Due to predominant $^5D_4 \rightarrow ^7F_5$ transition (545 nm) of Tb^{3+} ion it is the best candidate for green luminescence among all rare earth ions. However, within the 4f configurations of the Tb^{3+} ion, the electric dipole transitions is both spin and parity forbidden, which results in the weak absorption intensity in the near UV region and the narrow width. Therefore a suitable sensitizer is must for the Tb^{3+} activated phosphors. From the very beginning to recent years, Ce^{3+} ion is proven to be an excellent sensitizer for Tb^{3+} ion. Ce^{3+} ion transfer a fraction of its energy to Tb^{3+} ion depending up on its lowest 5d electronic state and broad absorption and emission bands associated with 4f – 5d transitions.

In the present work we synthesized a novel single phase $CaSrAl_2SiO_7:Ce^{3+}, Tb^{3+}$ phosphor by solid state reaction (SSR) method for generation of cool white-light emission. Photoluminescence (PL) behaviour shows that the present co-doped phosphor covers the entire range of visible region which can create cool white emission which was resulted from the energy transfer from Ce^{3+} to Tb^{3+} ions. To the best of our knowledge, luminescence properties and energy transfer between Ce^{3+} and Tb^{3+} in $CaSrAl_2SiO_7$ host lattice have not been reported so far. PL spectrum of Ce^{3+}, Tb^{3+} co-doped sample was compared with PL spectra Ce^{3+} and Tb^{3+} single doped sample. Preparation of powder samples was

^{*} Corresponding author.
E-mail address:

(S. Sharma).



Studies on structural properties, luminescence behavior and zeta potential of Dy³⁺ doped alkaline earth *ortho*-silicate phosphors

Ganesh Ram Banjare^a, D.P. Bisen^b, N. Brahme^a, Chitrkant Belodhiya^a

^a School of Studies in Physics & Astrophysics, Pt. Ravishankar Shukla University, Raipur (C.G.) 492010, India
^b Department of Physics, Government Engineering College, Raipur (C. G.) 492015, India



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ABSTRACT

Alkaline earth orthosilicate (Sr₂SiO₄) phosphor doped with Dy³⁺ was synthesized by a traditional high-temperature solid-state reaction method. XRD analysis confirmed the formation of the phosphor with the orthorhombic crystal structure and their phase purity was checked using theoretical fitting Rietveld refinement. Zeta potential measurements of parent phosphor in different medium were performed to check its stability. The surface morphology and the elemental composition of the phosphors were examined using SEM and EDX, respectively. The optical behavior is determined by PL analysis. CIE coordinates of the phosphors represents the white light emission characteristics of Sr₂SiO₄:Dy³⁺ phosphors. Due to white light emission characteristic, this work will open a new window for its use in W-LED applications. Thermoluminescence (TL) behavior of phosphor was studied and its TL kinetic parameters were estimated based on computerized glow curve deconvolution (CGCD) fitting.

1. Introduction

Recently, Solid State Lighting (SSL) based white light emitting diodes (W-LEDs) is the topic of research and considered as lighting system for future generation. White light emission through White light emitting diodes (WLEDs) shows lots of advantages over the traditional fluorescent and incandescent lamps because of lightweight, small size, long lifetime, pollution-free, flat packaging, good stability, high luminous efficiency, and environment-friendly characteristics along with energy savings. Now, researchers have proposed various technologies to generate white light by coupling of blue/UV (Ultraviolet) LEDs with the phosphors. At present, several strategies have been followed by the researchers to develop w-LEDs with high quantum efficiency and better color rendering index (CRI). There are two common approaches to produce white light (i) a yellow emitting YAG:Ce³⁺ phosphor pumped with blue LED, (ii) combination of RGB phosphors excited by UV-LED. First approach has some drawbacks such as low CRI, halo effect, high CCT and the second approach suffers from low luminescent efficiency due to re-absorption of blue light. Therefore it has drawn much attention of the researchers to solve the above difficulties. Many researchers have focused to find out the single phase white light emitting phosphors with high luminosity and CRI, when excited by Ultraviolet

(UV) or near - Ultraviolet (n - UV). Nowadays, rare earth doped phosphors are on demand in the market due to its wide applications in various fields. Especially Europium (Eu), Cerium (Ce) and Dysprosium (Dy) doped silicate phosphors have better spectroscopic properties i. e. emission and excitation spectra. Dy³⁺ doped phosphors shows two emission peaks at 460–480 nm (Blue region) and 570–590 nm (yellow region) simultaneously, although the combination of yellow and blue emission gives white light. By adjusting the yellow to blue intensity ratio (Y/B) value appropriately, it is possible to obtain pure white light from Dy³⁺ activated phosphors. To obtain, efficient white light emitting phosphor, selection of the host is a key factor. Now, silicate based phosphors have been investigated because of their properties of stability (Physical, Chemical and Crystal structure). Among the various silicate based phosphors, *ortho*-silicates has proved to be excellent candidate for the white light emission in SSL applications as it exhibits long-wavelength excitation properties, facile synthesis and cheap raw material (SiO₂). In the *ortho*-silicates such as Ca₂SiO₄, Ba₂SiO₄, CaBaSiO₄, CaSrSiO₄ etc., Sr₂SiO₄ is the suitable and potential candidate for W - LEDs because of wide lighting applications. Sr₂SiO₄ has two crystallographic phases namely α - Sr₂SiO₄ and β - Sr₂SiO₄ and it is easy to find the desired single phase by changing the synthesis conditions and calcinations temperature as per requirement

^{*} Corresponding author at: School of Studies in Physics & Astrophysics, Pt. Ravishankar Shukla University, Raipur (C.G.) 492010, India.
 E-mail addresses: (G. Ram Banjare).

Photoluminescence and comparative thermoluminescence studies of UV/ γ -irradiated Dy³⁺ doped bismuth silicate phosphor

Ekta Chandrawanshi¹ · D. P. Bisen¹ · Nameeta Brahme¹ · Ganesh Banjare¹ · Tripti Richhariya¹ · Yugbodh Patle¹

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Abstract

A series of Bi₄Si₃O₁₂:Dy³⁺ phosphor have been synthesized via conventional solid-state reaction method and its luminescence properties were investigated as near cool white light emitting and long afterglow phosphor. Crystal structure and phase structure characterization is determined using X-ray diffraction (XRD). SEM and EDS. Rietveld structural refinement and XRD confirms that prepared sample exhibit pure cubic structure [space group I-43d]. Photoluminescence spectra of both doped and undoped Bi₄Si₃O₁₂ phosphor were efficiently excited in the range of 200–450 nm, and prepared phosphor under 272 nm excitation exhibit three emission peaks located at 463 nm (blue), 482 nm (blue) and 576 nm (yellow) corresponding to ³P₁ → ¹S₀, ⁴F_{9/2} → ⁶H_{15/2} and ⁴F_{9/2} → ⁶H_{13/2} transitions. Characteristic emission peaks of Dy³⁺ centered at 482 nm and 576 nm were assigned for white light emission. The calculated Commission Internationale de l'Eclairage (CIE) chromaticity confirms that with Dy³⁺ doping, the luminescence co-ordinates of Bi₄Si₃O₁₂ phosphor shift to near white (x=0.316, y=0.358) region which is close to commercial pc-LED (Blue LED + YAG:Ce³⁺) (x=0.320, y=0.320) co-ordinates. Computation of correlated color temperature 6184 K endorses that prepared phosphor is cool in nature and can be served as white light emitting phosphor. Comparative thermoluminescence study of UV and γ -irradiated Bi₄Si₃O₁₂:Dy³⁺ phosphor is performed for the dosimetry application. TL intensity is recorded maximum at 30 min under UV irradiation (256 nm), and for γ irradiation, it was recorded at 10 kGy dose rate. γ -irradiated Bi₄Si₃O₁₂:Dy³⁺ phosphor TL study is reported for the first time at different dose rate and concentration for high dosimetry application. The defect characteristic is examined, Trap depths and other kinetic parameters are also evaluated by Chen's peak shape method. Decay and fading measurement under UV/ γ irradiation are performed to examine the long after glow properties of prepared samples. TL emission spectrum studies are also performed.

1 Introduction

The development of the long lasting phosphors has been a subject of keen interest during last decade [1]. Rare-earth-doped inorganic phosphor emitting white light has broad application in the field of display devices, solid-state lighting, medical devices, smart agriculture and dosimetry [2]. This very potential application of rare-earth-doped phosphor has always drawn keen interest of researchers from past few decades. Compared to other solid-state lighting devices, LEDs have its own merits such as high luminescence efficiency, long lifetime, and low-energy consumption. One of the most prominent and general way for generation of white

LEDs is using yellow Ce³⁺ YAG phosphors excited by blue LED chip [3].

Radiation detection devices are important to identify the external or internal contamination from which our environment or humans have been exposed to. No single device can detect all the radiations. Thermoluminescence properties of Dy³⁺ doped Bi₄Si₃O₁₂ phosphor under UV/ γ irradiation has been studied and can be a promising candidate for TL dosimetry application. An important aspect of the present work is to provide an efficient luminescent material having low toxicity, good TL dosimetry application and also a phosphor which have long after glow silicon-based micro-structure system for generation of white light.

Bismuth compound has received very little attention as a host material for optical application in spite of their promising features. Indeed, most of the photoactive properties of bismuth compounds have been exploited for catalyst or electrochemical applications rather than optical devices and dosimetry application [1, 4]. Bi³⁺ ions in Bi₄Si₃O₁₂ are

✉ Ekta Chandrawanshi
16shru@gmail.com

¹ School of Studies in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur, C.G. 492010, India

A comparative photoluminescence and Judd–Ofelt study on aluminosilicate phosphors

Tripti Richhariya¹ · Nameeta Brahme¹ · D. P. Bisen¹ · Anil Choubey² · Yugbodh Patle¹ · Ekta Chandrawanshi¹

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Abstract

In this article, un-doped and (0.01) Eu^{3+} -activated series of $\text{M}_2\text{Al}_2\text{SiO}_7$ ($\text{M} = \text{Ca}, \text{Sr}, \text{Ba}$) phosphors have been prepared via traditional high temperature solid-state reaction method. Phase purity and structural characterization of prepared phosphors were done by XRD. Estimated particle size of un-doped and Eu^{3+} activated $\text{M}_2\text{Al}_2\text{SiO}_7$ ($\text{M} = \text{Ca}, \text{Sr}, \text{Ba}$) phosphors are 23.77, 19.76, 14.19 nm, 27.38, 18.21 and 16.84 nm, respectively, using Scherrer formula. To confirm the elemental composition and presence of hydrated phase EDX and FTIR analysis were performed. Photoluminescence studies and Judd–Ofelt (J–O) analysis were done. Photoluminescence studies show that all the doped phosphors show intense red emission centered at 618 nm, 619 nm and 613 nm, when excited at 394 nm due to $^5\text{D}_0$ – $^7\text{F}_j$ ($j = 0, 1, 2, 3$) transition of Eu^{3+} . Calculated CIE coordinates of all the phosphors are very close to commercial phosphor $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$. Calculated Judd–Ofelt (J–O) parameter reveals that Ω_2 is greater than Ω_4 and in all the three cases it is much greater for $\text{Ba}_2\text{Al}_2\text{SiO}_7$. Thus, these phosphors can act as potential candidate for novel red-light-emitting phosphor.

1 Introduction

In the present era of science and technology, various techniques are emerging day by day to make our life simpler. Of these technologies the one is lighting system, which is essential for the present day. Development of solid-state lighting has made a great revolution in this field which uses LED's, OLED's for lighting purpose. But now a day's various researchers get much attracted towards the development of WLED's because they have high efficiency, long after-glow and ecofriendly properties. Generally, WLED's can be developed by two ways, the first one is by combining the Ce^{3+} -doped YAG (most commonly used commercial yellow phosphor) with a InGaN blue LED chip while the second one is to introduce the UV LED chip coated with three colors (Red, Green and Blue), but there are several disadvantages of these two methods for generating WLED's; like color rendering index is not good, correlation color temperature is high and scarcity of red component [1–3]. Thus,

it is very essential to develop phosphor, which generate red component because it is the most essential component of white light-emitting diodes (WLED's) [4].

The main building blocks of phosphors are host matrix and activator. Therefore, for preparing the efficient phosphor the choice of host matrix and activator is the most important task. Besides sulfides and aluminates, silicate-based phosphors are used because they have high chemical stability and good water resistance properties [5]. The second most important point is the choice of activator. Mostly, rare earth ions act as a good activator because they have large number of energy levels and hence produce a wide emission in ultraviolet, visible and infrared region of electromagnetic spectrum. In order to generate the red-light emitting phosphor, Eu^{3+} is the widely used rare earth ion because it produces most intense emission peak in between 610 and 620 nm [4, 6]. Several works have been done on alkaline earth aluminosilicate phosphors. Guanghan Li et al. investigated luminescent properties of $\text{Sr}_2\text{Al}_2\text{SiO}_7:\text{Ce}^{3+}, \text{Eu}^{2+}$. Photoluminescence and scintillation properties of Ce^{3+} -doped $\text{Sr}_2\text{Al}_2\text{SiO}_7$ had reported by Taiki Ogawa et al. and Qi Ye et al. reported the long persistent and PSL properties of $\text{Sr}_2\text{Al}_2\text{SiO}_7:\text{Eu}^{2+}/\text{Tm}^{3+}$ etc. [7–11], but no systematic studies have been made to compare all the three $\text{M}_2\text{Al}_2\text{SiO}_7$ ($\text{M} = \text{Ca}, \text{Sr}, \text{Ba}$) phosphors. $\text{Ba}_2\text{Al}_2\text{SiO}_7$ is first time reported in this article.

Tripti Richhariya
triptirichhariya21@gmail.com

¹ School of Studies in Physics and Astrophysics, Pt. Ravi Shankar Shukla University, Raipur, C.G. 492010, India

² M. J. College, Kohka, Junwani Road, Dist.: - Durg, Bhilai, C. G. 490023, India



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Original research article

Study of Photoluminescence, Thermoluminescence, and Afterglow properties of Dy³⁺ doped Ba₂ZnSi₂O₇ phosphor

Yugbodh Patle^{a,*}, Nameeta Brahme^{a,*}, D.P. Bisen^a, Tripti Richhariya^a, Ekta Chandrawanshi^a, Anil Choubey^b, Manju Tiwari^c^a School of Studies in Physics and Astrophysics, Pt. Ravi Shankar Shukla University, Raipur, (C.G.), 492010, India^b M.J. College, Kohka, Junwani Road, Bhilai, Dist: Durg C.G., 490023, India^c Indira Gandhi Krishi VishwaVidyalaya, Raipur, (C.G.) 492012, India

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ABSTRACT

Barium Zinc Silicate Ba₂ZnSi₂O₇ (BZS) phosphor doped with Dysprosium (Dy³⁺) was prepared at 1200 °C in the air by a solid-state reaction method. The prepared phosphor shows an efficient blue and yellow emission centered around 480 nm and 580 nm, respectively under UV excitation, which is believed due to incorporation of Dy³⁺ ion. The optimum concentration for Dy³⁺ ion is at 2 mol% and concentration quenching is attributed to exchange interaction. The CIE diagram is drawn for the whole series of phosphor samples prepared and it confirms that emission color had, indeed, tuned with the incorporation of Dy³⁺ ion in the BZS samples. The afterglow properties and Thermoluminescence (TL) have also been studied. TL curve confirms the presence of at least four traps in the phosphor material. The present results suggest BZS:Dy³⁺ phosphor is a promising one for display and dosimetry application.

1. Introduction

The light-emitting diode (LED) is the best choice at the moment among the most energy efficient devices to produce light. Presently phosphor converted LEDs receives much attention, so there is a considerable amount of research involved in search of new phosphor materials for better white light emission. Inorganic phosphors are widely studied materials for this purpose. These inorganic phosphors are available in various forms such as aluminate, silicate, phosphate, etc. [1–3]. Doping plays a very important role for the enhancement of luminescent properties of the inorganic phosphor. The rare-earth elements are used extensively for this purpose because of their intrinsic properties which are due to their unpaired 4f electrons. It enhances their chemical, optical and electronic characteristics. Due to this unique electronic configuration, rare earth doped inorganic phosphor produces a wide emission, which covers the range from ultraviolet to near infra-red region. Hence, rare-earth doped materials are always preferred as potential candidates for making multicolor light-emitting devices [4]. Among the rare-earth ions, Dy³⁺ is the center of attraction due to its white light emission property. In general, Dy³⁺ phosphor gives two strong emission peaks in blue and yellow regions. Near-white light emission can be achieved by altering the ratio of the intensity of yellow to blue. Thus, Dy³⁺ activated phosphor materials have drawn much attention, because of their applications as promising single-phase white emitting phosphors [5]. These phosphors always contain some intrinsic defects and incorporation of impurity may create new defects. These defects play an especially important role in the

* Corresponding authors.

E-mail addresses: yugbodhpatle2793@gmail.com (Y. Patle), namitabrahme@gmail.com (N. Brahme).

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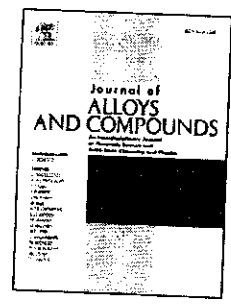
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Synthesis and concentration dependent luminescent characterization of BaMgSiO₄: Eu³⁺ phosphor



Bhuneshwar Verma, R.N. Baghel, D.P. Bisen, N. Brahme, A. Khare

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1279



Investigation of structural and thermal response of Sm³⁺ doped Sr₃MgSi₂O₈ phosphors

Pradeep Dewangan^{1,2} · D. P. Bisen¹ · Nameeta Brahme¹ · Shweta Sharma¹ · Raunak Kumar Tamrakar³ · Ishwar Prasad Sahu⁴

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Abstract

Present study deals with the effect of Sm³⁺ doping on crystal and optical behaviour of Sr₃MgSi₂O₈. For these studies prepared phosphor was characterized by using X-ray powder diffraction and luminescence spectra by recording excitation and emissions spectra. Emission spectra have emission wave lengths centered at 490 nm and 545 nm. Effect of Sm³⁺ ion concentration shows dipole–dipole interaction was responsible for the quenching shown by phosphor. The thermoluminescence curves were used to define the ability of the trap to trapping the carriers for Sm³⁺ doped Sr₃MgSi₂O₈ phosphor.

Keywords Sr₃MgSi₂O₈:Sm³⁺ · Solid state reaction method · Luminescence

1 Introduction

Rare earth doped Sr₃MgSi₂O₈ phosphors have been broadly contemplated by scientists inferable from their interesting physical and optical properties. These nanomaterials have been used in device fabrication, enthusiasm for examination of their conceivable ease of use in various fields of gadget applications. They may take jobs in part of gadgets, for example, opto-electronics, sensors, identifiers, im-petuses, luminescent and bio-medical gadgets. A few kinds of silicate-based phosphor have been found and examined (Talwar et al. 2009; Klasens et al. 1957; Barry 1968; Blasse et al. 1968; Liu et al. 2014; Pan et al. 2011).

✉ Pradeep Dewangan
pradeep_dewangan15@rediffmail.com

¹ SoS in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010, India

² Department of Physics, Faculty of Science, Shri Rawatpura Sarkar University, Raipur, Chhattisgarh 492015, India

³ Department of Applied Physics, Bhilai Institute of Technology (Seth Balkrishnan Memorial), Near Bhilai Power House, Durg, Chhattisgarh 49100, India

⁴ Department of Physics, Indira Gandhi National Tribal University, Amarkantak, Madhya Pradesh 484887, India

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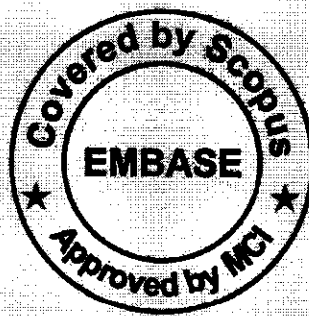


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Effect of computerized biofeedback relaxation on stress related physiological parameters

Mahendra Kumar¹, Priyamvada Srivastava², Manoj K. Sahu¹, Saparya Tripathi^{1*}

¹Department of Psychiatry, Pt. JNM Medical College Raipur, Chhattisgarh, India

²Department of Psychology, Pt. RSU University, Raipur, Chhattisgarh, India

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*Correspondence:

Dr. Saparya Tripathi,

E-mail: saparya.tripathi@gmail.com

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ABSTRACT

Background: Mental health diseases such as insomnia, anxiety, stress and depression all have a close relationship with the autonomic nervous system. The physiological parameters of autonomic activity viz. galvanic skin resistance, electromyography, respiration and pulse rate can be regulated with the help of computerized biofeedback relaxation training. The main objective of this study was to see the effect of computerized biofeedback relaxation training on psychophysiological parameters of autonomic activity.

Methods: In the present study 40 high stress post graduate students were selected. All participants were randomly divided into two group i.e. computerized biofeedback relaxation training (group-1) and placebo group (group-2). Forehead muscle tension, respiration rate, pulse rate and galvanic skin resistance were assessed, and inventories measuring stress were administered pre-randomization. Descriptive, Paired sample 't' test, F-test and Mann-Whitney U test were used to analyze the data with the help of SPSS 16 version.

Results: Biofeedback group reported a significant change in muscle tension ($p=0.27$), respiration rate ($p=0.01$) and galvanic skin response ($p=0.35$) after relaxation but at the same time control group reported moderate increase in muscle tension. Additionally, the computerized biofeedback group was able to maintain the stress level while the control group had a significant increase in the stress level over the 10 days of relaxation training.

Conclusions: Biofeedback relaxation useful alternative therapy for management of stress and emotional disturbance in graduate students. During a stressful period this may also be helpful to promote overall psychological health.

Keywords: Stress, Computerized biofeedback relaxation training, Galvanic skin resistance, Electromyography, Respiration rate, Pulse rate

INTRODUCTION

Prevalence of Non-communicable diseases is at upsurge even after government's meticulous efforts on part of early diagnosis and treatment. Mental health problems are no different. In India also, nearly 9% of the population are affected by one or more type of mental health problems. According to the National commission macroeconomics and health (NCMH) 6.5% of the Indian population has some form of serious mental disorders.

WHO reported that India has one of the highest case of depression in the world approximately 8-12% of Indians suffer from depression in any phase of life. Stress and anxiety are significant predictor for psychological and physiological illness similar to mental stress associated with the damage of cognitive function.¹⁻⁵ There is a very important need to find other innovative methods for the management of mental health problems.

Physiological parameters of humans such as heart rate, galvanic skin response (GSR) and facial expressions are

1285



SOCIO-ECONOMIC PROFILE AND ACHIEVEMENT MOTIVATION Level OF THE ENTREPRENEURS IN ANIMAL HUSBANDRY – A COMPARATIVE STUDY OF TRIBAL AND NON-TRIBAL OF BASTAR DISTRICT (CHHATTISGARH)

Raj Kamal Roy

Research Scholar, School of Regional Studies and Research, Pt.Ravishankar Shukla University, Raipur-492010, C.G.

Nister Kujur

Associate Professor, School of Studies in Sociology and Social Work, Pt.Ravishankar Shukla University, Raipur-492010, C.G.

Mitashree Mitra

Former Professor and Head, School of Regional Studies and Research, Pt.Ravishankar Shukla University, Raipur-492010, C.G.

Abstract

Aim and Objective: The aim of the present study is to identify and compare the socio-demographic and economic profile and degree of need for achievement of two entrepreneur groups (Tribal and Non-Tribal) engaged in animal husbandry business in Bastar district of Chhattisgarh state. It also aims to investigate the magnitude of the relationship between variables of socio-economic status and need for achievement in both the groups.

Subjects and Methods: The present research study was explanatory as well as exploratory in nature. The study was conducted in the tribal dominated Bastar district of Chhattisgarh. Both, the simple and purposive random sampling methods, were used to draw a sample of 300 entrepreneurs engaged in animal husbandry business. Eligible participants that fulfilled the inclusion criteria, such as those who were engaged in cattle/dairy farming, goat farming, piggery farming, poultry farming and Kadaknath farming entrepreneurship for more than one year etc. were included in sample. 150 Tribal and 150 Non-Tribal entrepreneurs were purposively selected from 45 villages of all seven blocks of Bastar district of Chhattisgarh. The interview schedule was administered to collect the information to fulfill the objectives. Modified Kuppaswamy's socio-economic status (SES) scale (2019) was used to measure socioeconomic status of a family and Achievement Motive Test (ACMT) developed by Bhargava (1994) was used to assess the degree of need for achievement. Data were analyzed using SPSS.

Conclusion: The findings revealed that family income, occupation and socio-economic status were significantly varied between Tribal and Non-Tribal entrepreneurs. Socio-economic status is significantly associated with the educational level and Achievement Motivation Level in both the entrepreneur groups. Non-Tribal entrepreneurs were high achievers than the Tribal. Thus it can be concluded that education and motivation play an important role to inculcate entrepreneurial spirit

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138

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जनजातीय समुदाय में मातृत्व एवं बाल स्वास्थ्य की स्थिति : कांकेर जिला के अंतागढ़ तहसील के विशेष संदर्भ में

अरख राम बघेल*
रविशंकर कुजूर**

शोध सारांश

भारत के अधिकतर राज्यों में गर्भवती महिलाओं; नवजात बच्चों और शिशुओं की स्वास्थ्य संबंधी स्थितियाँ काफी कमजोर हैं और उन पर कई क्षेत्रों में तुरंत ध्यान देने की आवश्यकता है। भारत सरकार ने 1996-97 में "प्रजनन एवं बाल स्वास्थ्य कार्यक्रम" प्रारंभ किया था एवं गुणवत्तापूर्ण सेवाएं प्रदान करने और बहुमुखी उद्देश्य प्राप्त करने की आशा की थी। छत्तीसगढ़ में भौगोलिक दृष्टिकोण से अनेकों असमानताएं हैं। यहां जनजातीय बाहुल्य आबादी है इनका जीवन स्वास्थ्य समस्याओं के ईदगीर्द होती है। क्षेत्र के लोगों में प्रजनन मातृत्व एवं बाल स्वास्थ्य संबंधी संकेतों की स्थिति काफी खराब है। प्रस्तुत अध्ययन में मातृत्व एवं बाल स्वास्थ्य की स्थिति को ज्ञात करने का प्रयास किया गया है।

Keywords: अन्तागढ़, जनजाति, मातृत्व एवं बाल स्वास्थ्य।

प्रस्तावना :

महिलाओं एवं बच्चों की स्वास्थ्य की स्थिति के संबंध में प्रधानमंत्री पं. जवाहरलाल नेहरू कहा था कि-किसी राष्ट्र की महिलाओं की सेहत देखकर उस राष्ट्र की स्थिति बतायी जा सकती है। इसका तात्पर्य यह है कि एक स्वस्थ महिला अपने परिवार की देखभाल व पोषण संबंधी आवश्यकताओं को सुचारु रूप से क्रियान्वित करने में उसकी हमत्ती भूमिका होती है। छत्तीसगढ़ जनजातीय बाहुल्य आबादी वाला राज्य है, कांकेर में आधे से अधिक लगभग 55 प्रतिशत आबादी जनजातियों का है। जनजातीय क्षेत्र के महिलाओं एवं बच्चों के स्वास्थ्य की स्थिति काफी खराब है। वर्तमान में यहां के लोगों में स्वास्थ्य के प्रति जागरूकता, सोंच-विचार के मामले में काफी पीछड़ा है। शासन द्वारा स्वास्थ्य के स्तर में सुधार लाने और स्वास्थ्य सेवाओं के विस्तार के लिए अनेक कदम उठाये गये हैं, किन्तु आदिवासियों के कुछ शिक्षित परिवार को छोड़कर इनकी बड़ी आबादी आज भी अंधविश्वास, भूत-प्रेत, जादू-टोना आदि में विश्वास करता है, जो इनके स्वास्थ्य स्तर को सीधे प्रभावित करती है।

जनजातीय महिलाओं की स्वास्थ्य व उनके प्रजनन शक्ति के स्तर पर सामाजिक-आर्थिक परिस्थितियाँ जैसे-शिक्षा का स्तर, रहन-सहन, आवास, विवाह की आयु, बच्चों के जन्म के बीच अंतर आदि कारक ऐसे हैं जो मातृत्व एवं बाल स्वास्थ्य के स्तर को प्रभावित करता है। इसके फलस्वरूप इन क्षेत्रों में

मातृ-मृत्यु एवं शिशु मृत्युदर अधिक देखने को मिलता है। वैश्विक परिप्रेक्ष्य में देखें तो भारत में सभी जीवित जन्म लेने वाले बच्चों का 19 प्रतिशत शिशु मृत्युदर तथा 27 प्रतिशत मातृ-मृत्यु दर है।

वर्ष 1984 की स्वास्थ्य नीति; जिसमें 2001 तक सबके लिए स्वास्थ्य नारा दिया गया था; इसमें वर्ष 2001 तक प्रति 1,00,000 जीवित जन्म पर एम.एम.आर. (मातृ मृत्यु) 300 तक नीचे लाने का निश्चय किया गया था। किन्तु 2005 में एम.एम.आर. की आंकड़ा 400 से उपर बनी हुई थी। इसी तरह शिशु मृत्यु (आई.एम.आर.) 2004 में यह प्रति 1000 जीवित जन्म पर 64 थी जो पिछले दो दशकों में बढ़कर 70 के आस-पास पहुंच गई थी।

गर्भवती महिलाओं को प्रसव पूर्व; प्रसव के समय एवं प्रसवोत्तर अवधि में पूर्ण देख-भाल उपलब्ध कराना अनिवार्य शर्त है, किन्तु अध्ययनगत क्षेत्र की महिलाओं एवं बच्चों में यह शर्त को पूर्ण करना किसी चुनौति से कम नहीं है। इसका दूश-परिणाम यह हो रहा कि इनमें मातृत्व एवं शिशु देख-भाल की स्थिति बेहद खराब हो गई है। चौबे, कैलाश (1998), ने अपने अध्ययन में बस्तर के जनजातीय लोगों के आहार में पोषक-तत्वों का अभाव होने के कारण इन्हें रोगों का अधिक खतरा होना तथा कमजोर रोग-प्रतिरोध क्षमता होने और आहार संबंधी आदतों का दोषपूर्ण होना, खाद्य पदार्थों का घयन, निर्धनता, अज्ञानता एवं परम्पराएं आदि कुछ ऐसे कारक हैं, जो उनकी पोषण को प्रभावित करता है। मिनी एवं मौली (2005) ने इसके लिए जिम्मेदार कारक

*शोधार्थी - समाजशास्त्र एवं समाजकार्य अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ. ग.)

**सह प्राध्यापक - समाजशास्त्र एवं समाजकार्य अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ. ग.)

1296

54

20-2

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Relevance of Marxist Approach in the Study of Indian Society

Dr. Hemlata Borkar Wasnik * &
Satish Kumar Borkar **

Abstract

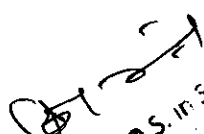
Karl Marx's thinking and philosophy - collectively known as "Marxism" - has shaped human societies in significant ways, specifically through spread of communism and socialism across many countries.


It has been more than a hundred years since Marx propounded his views on capitalism and resulting inequality, and yet they remain relevant. India, since its independence, has seen periods of high growth since economic liberalisation. Yet, a large section of Indian society lives in poverty. It is natural to ask if Marxist approach is relevant in understanding and addressing the issues of inequality in Indian societies. It can be argued that communism in general and Marxism in particular, has had only a limited influence in Indian context.. This article attempts to present a more balanced view of relevance of Marxist approach in Indian society.

Keywords: *Karl Marx, Industrialization, Mechanization, Exploitation, Revolution, and Development.*

* Assistant Professor, School of Studies in Sociology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh Email: hemlataborkar@gmail.com

** Senior Research Associate, Indian Institute of Technology, Mumbai Email: Satishborkar07@gmail.com

 Head,
S.O.S. in Sociology & Social Work,
Pt. Ravishankar Shukla University.

 1297



जनजातियों की सामाजिक-आर्थिक स्थिति पर नक्सलवाद का प्रभाव

अध्ययन और प्रस्तावना

अध्ययन, आचार्य, समाजशास्त्र एवं समाज कार्य अध्ययन शाला, पीएच. रविशंकर, राष्ट्रीय विश्वविद्यालय रायपुर, छत्तीसगढ़, भारत

भारत एक विशाल जनसंख्या वाला देश है। यहाँ पर विविध समुदाय को जोग निसाह करता है। भारत की कुल जनसंख्या का 8.9 प्रतिशत भाग जनजातियों का है ये जनजातियाँ सुदूर घने जंगलों एवं पहाड़ी क्षेत्रों में निवास करती है। छ.ग. राज्य भी एक जनजाति वाला राज्य है। यहाँ जनगण 7.8 प्रतिशत जनजाति निवास करती है। यहाँ की अधिकांश जनजातियाँ ग्रामीण क्षेत्रों में निवास करती है। बस्तर संभाग के कांकेर जिले के दुर्गकोंदल विकासखंड के अंदर निवास करने वाली जनजातियाँ सुदूर घने पहाड़ी क्षेत्रों में निवास करती है। बस्तर संभाग का यह क्षेत्र नक्सल प्रभावित क्षेत्र के अंतर्गत आता है। भारत में नक्सलवाद, प्रकृ. उत्पत्ति परिधम-बंगाल से हुई थी। 1987 में चारू मजूमदार एवं कानू साख्यान के द्वारा इस शब्द का प्रयोग किया गया था। माफसवादी एवं लेनिनवादी विचारों से प्रभावित होकर चारू मजूमदार ने सामाजिक असमानता के विरोध में 1985 में कम्यूनिस्ट पार्टी का गठन किया था। कम्यूनिस्ट पार्टी के गठन का मुख्य उद्देश्य जनजातियों को जमींदारों के शोषण से बचाना था। उनके सामाजिक अस्तित्व को बनाए रखना था। प्रारंभ में छोटे-छोटे किसान एवं मजदूर अपनी गिरवी जमीन को छुड़वाने के लिए हथियारबंद नक्सलवादी विचारधारा को अपनाया करते थे। सन 1972 में चारू मजूमदार की मृत्यु के परिणाम इसने हिंसा का रूप ले लिया। आज नक्सलवाद एक बड़ा संगठन बनकर उभर कर आया है।

छत्तीसगढ़ राज्य में नक्सलवाद का उदय 2003 से माना जा रहा है। छत्तीसगढ़ राज्य का सर्वाधिक नक्सल प्रभावित क्षेत्र बस्तर संभाग है। यहाँ अक्सर नक्सली वारदात होते रहते हैं और इसका सीधा प्रभाव जनजातियों की सामाजिक-आर्थिक स्थिति पर पड़ता है। छत्तीसगढ़ के बस्तर संभाग में नक्सलवाद के उदय होने का कारण बहुराष्ट्रीय कंपनियों का विरोध करना है क्योंकि इन कंपनियों को खुलने से संपूर्ण जनजाति समाज प्रभावित होने वाला था। नक्सलवादी संगठनों का उदय होने के पीछे अन्य कारण जनजातीय समुदाय के जीविकोपार्जन के साधनों पर बहुराष्ट्रीय कंपनियों के आधिपत्य को हटाने के लिए नक्सलवादी संगठनों का उदय होने माना जाता है परंतु वर्तमान में नक्सलवादी संगठनों का दहरात इतना अधिक बढ़ गया कि लोगों का जीना दुभर हो गया है। प्रस्तुत शोध आलेख में जनजातियों के सामाजिक-आर्थिक स्थिति पर नक्सलवाद के प्रभाव का अध्ययन किया गया है। यह शोध आलेख प्राथमिक तथ्यों पर आधारित है। प्राथमिक तथ्यों का संकलन साक्षात्कार-अनुसूची उपकरण के माध्यम से किया गया है।

मूल शब्द: जनजाति, नक्सलवाद, सामाजिक-आर्थिक प्रभाव

प्रस्तावना

भारत एक विशाल देश है। 2011 की जनगणना के अनुसार यहाँ की कुल जनसंख्या 121 करोड़ है। इनमें से 10.04 प्रतिशत आबादी जनजातियों की है अर्थात् कुल जनसंख्या का 8.8 प्रतिशत भाग जनजातियों का है। भारत की अधिकांश 89.97 प्रतिशत जनजातियाँ ग्रामीण क्षेत्रों में एवं केवल 10.3 प्रतिशत जनजातियाँ शहरी क्षेत्रों में निवास करती है। छत्तीसगढ़ राज्य में जनजातियों का प्रतिशत 7.8 है।

छत्तीसगढ़ राज्य के अधिकांश जनजातियाँ बस्तर संभाग में निवास करती है। बस्तर संभाग के अंतर्गत कांकेर जिले के विकासखंड दुर्गकोंदल का भी शामिल किया गया है। दुर्गकोंदल विकासखंड एक जनजाति वास्तव्य विकासखंड है। ये जनजातियाँ घने सुदूर जंगलों एवं पहाड़ी क्षेत्रों के बीच अपना जीवन यापन कर रही है। इन क्षेत्रों में लगभग 10 वर्षों से नक्सलवाद की घटनाएँ घटित होती जा रही हैं। इन क्षेत्रों के जनजातियों पर नक्सलवाद के प्रभाव को देखने के लिए यहाँ के जनजातीय समुदाय से तथ्यों का संकलन किया गया है। नक्सलवाद वर्तमान समय की सबसे बड़ी दुर्घटना है। नक्सलवाद की घटनाओं का सुनने पर लगता है कि इसने लाखों आरुतों का बर्बाद किया है क्या संघर्ष में नक्सलवाद ने जनजाति समुदाय का नुकसान पहुंचाया है? इस प्रश्न का उत्तर तभी मिल सकता है। जब यहाँ के समुदाय का आगाँ से तथ्यों का संकलन किया जाए। प्रस्तुत अध्ययन इस दिशा में एक प्रयास कहा जा सकता है।

अध्ययन का उद्देश्य - जनजातियों की सामाजिक-आर्थिक स्थिति पर नक्सलवाद के प्रभाव को जात करना।
अध्ययन पद्धति - अध्ययन पद्धति का चार भागों में वर्गीकृत किया गया है।

- (अ) अध्ययन क्षेत्र का संक्षिप्त परिचय- छत्तीसगढ़ राज्य में कुल 27 जिले हैं। कांकेर जिला छत्तीसगढ़ राज्य का 15वाँ जिला है पूर्व में यह बस्तर जिले के अंदर सम्मिलित था। वर्तमान में इसे एक स्वतंत्र जिला घोषित कर दिया गया है। यह बस्तर संभाग का सबसे बड़ा शहर है। कांकेर जिला के अंतर्गत सात विकासखंडों का शामिल किया गया है। दुर्गकोंदल विकासखंड इनमें से एक है। अध्ययन क्षेत्र राउलवाडी एवं पंडावरी ग्राम पंचायत दुर्गकोंदल विकासखंड से 15 किलोमीटर की दूरी पर स्थित है। राउलवाडी की कुल जनसंख्या 1044 है इनमें 916 जनजाति परिवार है। पंडावरी की कुल जनसंख्या 622 है तथा यहाँ जनजाति परिवार की संख्या 436 है।
- (ब) उत्तरदाताओं का चयन- प्रस्तुत अध्ययन हेतु राउलवाडी से 40 तथा पंडावरी से 20 अर्थात् कुल 60 उत्तरदाताओं का चयन उद्देश्यपूर्ण विनर्शन के द्वारा किया गया है।
- (स) तथ्य संकलन हेतु प्रयुक्त उपकरण एवं प्रविधि- प्रस्तुत अध्ययन प्राथमिक सातों एवं अनुभवजन्य तथ्यों पर आधारित है। प्राथमिक तथ्यों का संकलन हेतु साक्षात्कार-अनुसूची उपकरण का

1296



महात्मा गांधी के समाजवादी व मानवतावादी विचारों का विश्लेषण

हेमन्ता शोकर चावनिफ

सहायक प्राध्यापक, समाजशास्त्र महाविद्यालय, पं. एमिअर शुक्ल विश्वविद्यालय, रायपुर, उत्तीसगढ़, भारत

सारांश

समाजवादी एवं मानवतावादी विचारों की अनछाया एक व्यापक अनछाया है इसके अंतर्गत नैतिक समाजता, सामाजिकर समावेशी विकास, आर्थिक समता एवं सदाचार पूर्ण व्यवहार को रखा जा सकता है। स्वतंत्रता प्राप्ति के पूर्व देश में काफी असमानताएं भी रंगभेद, जातिवाद, कृषास्व, नैतिक भेदभाव, शैथिल्य अमानता से जुड़ी घटनाएं आम तौर पर जिसके कारण से एक वर्ग विशेष लोगों का ही समाज पर प्रभुत्व था तथा समाज को नहीं में डूब गया था शोषक एवं शोषित वर्ग। इससे समाज में काफी द्विजक घटाने पर विचार लेनी थी तथा उन घटनाओं का निरोध करने की किसी में किमत भी नहीं होती थी, और जेग सुपचाय नव के अन्तर्गत घटना का समाप्त करने में। उक्त समाज न्याय व्यवस्था एक दम चटिन भी केवल विशेष वर्ग का व्यक्ति ही इतका जान ले सकता था, आम व्यक्तियों के लिए न्याय व्यवस्था का कोई महत्व नहीं था। इन विचारों को जो सामाजिक कार्यकर्ताओं जैसे एजायम मोहन, ईशर चंद्र विद्यासागर, के.के.चंद्र सेन, डॉ. भीमराव अम्बेडकर, महात्मा गांधी एवं एम.ए. सदाचर वल्लभ माई एटएल, स्वामी दयानंद सरस्वती ने एक साथ मिलकर इन विचारों को समाज से दूर करने का प्रयास किया। महात्मा गांधी ने सामाजिक अत्याचार से संबंधित कार्य कार्य किए जिन्हें वे स्वदेशी वस्तुओं के उपयोग, सामाजिक अस्पृश्यता की रोकथाम, महिला शिक्षा, महिला सक्रियता एवं जन स्वाधिनता से संबंधित कार्य हैं। इसके अलावा मानवतावाद एक समाजवाद पर भी इन्होंने कार्य किए हैं।

प्रस्तुत अध्ययन में गांधी जी के समाजवादी एवं मानवतावादी विचार धाराओं का विश्लेषण करने का प्रयास किया है। प्रस्तुत शोधपत्र द्वितीयक स्रोतों पर आधारित है।

शब्द सूची: समाजता, स्वतंत्रता, सामाजिक न्याय, महिला एवं मानवता

प्रस्तावना

महात्मा गांधी एक सामाजिक विचारक, समाजसेवक एवं शक्तिशाली नेता। सामाजिक विचारक एवं दार्शनिक होने के कारण इन्होंने सामाजिक विकास हेतु समाजवादी एवं मानवतावादी विचारों का सुझाव किया। इनका मत था कि जब तक समाज में असमानता, अस्पृश्यता एवं शोषण का अंत नहीं होगा तब तक समाज का विकास होना असंभव है, इसलिए इन्होंने जमींदारी प्रथा, मालगुजारी प्रथा अस्पृश्यता, नैतिक शोषण एवं वर्ग भेद को दूर करने के लिए अथक प्रयास किया, यह हेतु आंदोलन किया एवं अग्रसर पर बैठे। इनके आंदोलन का केवल एक फलसाफे होता था, नरभेद, नैतिक असमानता, महिला शोषण एवं विदेशी वस्तुओं का निरोध करना। वे महिला शिक्षा, सामाजिक एवं नैतिक समाजता के पक्ष पर थे। वे कुरीत अयोगों के विस्तार एवं स्वदेशी वस्तुओं के उत्पादन एवं उपयोग को बढ़ाना देना चाहते थे इस हेतु इन्होंने चरखा का प्रचार प्रसार किया तथा छाती बर्छों के उपयोग को प्रोत्साहित किया।

गांधी जी का सामाजिक विकास में बहुत अधिक योगदान है, इन्होंने समाज के हर तबके के व्यक्तियों के लिए उनकी सामाजिक-आर्थिक दशा सुधारने के लिए अथक प्रयास किये। इन्होंने कर्लमार्क्स के मार्क्सवादी चिंतन एवं आंबेडकर के समाजवादी विचारों को सामाजिक विकास का आधार स्तंभ माना है। इन्होंने न केवल धर्मीयता अर्थव्यवस्था का निरोध किया है अपितु आधुनिक सभ्यता का भी निरोध किया। वे मर्यादीक उत्पादन कार्य के निरोधों से इसलिए इन्होंने चरखा को अग्रसर और छाती के बर्छों का स्वयं उत्पादन करने लगे। महात्मा गांधी स्वतंत्रता देने को चाहते थे, उनका मत था कि यदि शांति में लोग स्वयं के द्वारा अपनी जरूरतों को पूरा करने हेतु उत्पादन का कार्य करेंगे तो गहनीय बेरोजगारी दूर होगी तथा समाज का विकास होगा। गांधी जी सदैव समाजवादी एवं मानवतावादी विचारों पर चलने को आग्रह किया करते थे।

उत्प्रे-प्रस्तुत शोध पत्र में गांधी जी के समाजवादी एवं मानवतावादी विचारधाराओं की विवेचना की गयी है।

अध्ययन पद्धति- समाजवादी एवं मानवतावादी विचारधाराओं का विश्लेषण द्वितीयक स्रोतों पर आधारित है, इसके लिए उपलब्ध साहित्य, पुस्तकें एवं समाचार पत्रों से प्राप्त द्वितीयक सामग्री का विश्लेषण किया गया है।

समाजवादी व मानवतावादी विचारों का विश्लेषण - गांधीजी ने समाजवादी विचारों का सामाजिक परिप्रेक्ष्य में विश्लेषण किया उनके अनुसार समाजवादी विचार नए हैं जिसमें प्रत्येक व्यक्ति के लिए जीवन की अनिवार्य मूलभूत मान्यताओं को प्राप्त करने के तरीके सम्मिलित होते हैं। इन तरीकों के मदद से आम आदमी अपनी आवश्यकताओं की पूर्ति कर सकता एवं सहजता से कर लेता है। समाजवादी समाज की स्थापना होने से संपत्ति का समान वितरण हो सकेगा इससे कोई भी व्यक्ति न अधिक संपत्ति होगा और न ही अधिक गरीब सबको जीविकोपार्जन करने के लिए अनिवार्य बस्तुएं आसानी से उपलब्ध हो जाएगी इससे समाज में ऊंच-नीच का वर्गभेद मिटेगा तथा समाज में समता की स्थिति उपलब्ध होगी। गांधी जी ने समाज में नए वर्गों को समाजवाधिकार मिलने की बात कही है, उनका कहना है कि इस पृथ्वी में सभी व्यक्तियों में एक समान एंग का रक्त का प्रवाह होता है। सभी में किसी न किसी प्रकार की जीविक समता जरूर पायी जाये है तथा उसका उपयोग उनकी बुद्धि के अनुसार करना चाहिए। गांधी जी ने सभी वर्गों को समान अधिकार दिलाने के लिए अहिंसात्मक तरीकों का प्रयोग किया तथा वे इन प्रयोग में सफल भी हुए यही कारण है कि समाज में अब सभी व्यक्तियों को ऐसे अधिकार देने की बात कही गयी है।

जॉन स्टुअर्ट मिल्स की रचना अन टू दिस लास्ट के द्वारा गांधी जी ने सर्वोच्च आंदोलन की चर्चा की थी सर्वोच्च आंदोलन का मुख्य उद्देश्य समाज के प्रत्येक व्यक्ति के उन्नति एवं विकास से है। इन्होंने सत्य एवं अहिंसा के माध्यम से सर्वोच्च का सिद्धांत दिया। गांधी जी बुद्धिवादी शिक्षा के पक्ष पर थे। महिला सक्रियता को बढ़ाना देने के लिए इन्होंने महिला जोशाल जोड़ना को प्रोत्साहित किया इन्होंने मानवाधिकार संबंधी विचारों की नींव रखी। इनकी विचारधारा के प्रभावों में मार्टिन लूथर किंग, दलाईलामा, नेल्सन मंडेला आनसान सूजी एवं उपज मोबासा



A CURVILINEAR TYPE ESTIMATOR OF POPULATION MEAN ON TWO OCCASIONS

20-21

Vyas Dubey and Arun Kumar Shukla*

School of Studies in Statistics, Pt. Ravishankar Shukla University, Raipur - 492 010, India
 E-mail: arun_shukla@rediffmail.com

Abstract: This paper deals with an estimator of population mean on current occasion based on samples selected over current and previous occasions if a quadratic relationship between study and auxiliary variables exists. Properties of proposed estimator has been discussed and it is ascertained that it is more efficient than usual estimators for optimal choice of constants included in the estimator. An optimum replacement policy of proposed estimator has been studied. Numerical illustrations have been cited in support of the theoretical results.

Key words: Auxiliary Information, Curvilinear Relationship, Mean squared error (MSE), Variance.

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1. Introduction

The pursuit of estimation of population mean of a variable using auxiliary information has drawn wide attention in sampling from a finite population. The estimators based on utilization of population mean of auxiliary variable are known as ratio, product and linear regression estimators. Among these estimators, regression estimator has been proved to be more efficient theoretically. Let $U = \{1, 2, \dots, i, \dots, N\}$ be a finite population of size N , and x and y be study and auxiliary variables defined on U taking the value y_i and x_i on the unit i of U ($1 \leq i \leq N$) respectively. Let \bar{y} and \bar{x} be unbiased estimators of population means \bar{Y} and \bar{X} of variables y and x respectively, then ratio, product and regression estimators of \bar{Y} are defined as

$$\bar{y}_r = \bar{y} \left(\frac{\bar{X}}{\bar{x}} \right) \quad (1)$$

$$\bar{y}_p = \bar{y} \left(\frac{\bar{x}}{\bar{X}} \right) \quad (2)$$

$$\bar{y}_b = \bar{y} + b(\bar{X} - \bar{x}) \quad (3)$$

respectively, b is sample regression coefficient of y

on x .

For improving efficiency of above estimators, many attempts have been made in literature [Srivastava (1971), Das and Tripathi (1980), Singh *et al.* (2012)] which are almost equally efficient as linear regression estimator for optimum choice of constants involved in the estimators.

Note that regression estimator \bar{y}_b is used if a linear relationship between y and x exists, however, sometimes curvilinear relationship between study variables may also exist. Dubey and Sharma (2003) proposed the estimator of \bar{Y}

$$\bar{y}_c = \bar{y} + K_1(\bar{X} - \bar{x}) + K_2(\mu'_2(x) - m'_2(x)) \quad (4)$$

where,

$$m'_2(x) = \frac{1}{n} \sum_{j=1}^n x_j^2 \text{ is unbiased estimator of}$$

$$\mu'_2(x) = \frac{1}{N} \sum_{j=1}^N x_j^2$$

1301

ORIGINAL ARTICLE

A Quadratic Type Estimator of Population Mean on Multi Occasions Using General Sampling Scheme

Vyas Dubey¹ and Arun Kumar Shukla²

1. School of Studies in Statistics, Pt. Ravishankar Shukla University,
Raipur (C.G.) 492010 INDIA
dubey_vyas@rediffmail.com

2. School of Studies in Statistics, Pt. Ravishankar Shukla University,
Raipur (C.G.) 492010 INDIA
arun_shukla@rediffmail.com

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Abstract

This paper deals with a quadratic type estimator of population mean on multi occasions based on samples selected current and previous occasions using general sampling scheme provided quadratic relationship between study and auxiliary variables exists. Properties of proposed estimator have been discussed and it is established that the proposed estimator is more efficient than usual estimators for optimal choice of constants involved with the estimator. An optimum replacement policy for proposed estimator has been studied. Numerical illustrations have been cited to support the theoretical results.

Keywords: Auxiliary Information, Bias, Quadratic Relationship, Mean Squared Error (MSE), Probability Proportion Size (PPS) Sampling.

1. Introduction

Surveys are repeated many times over years or seasons in an attempt to estimate the same characteristic at different points of time. Here, the information collected on earlier occasions is used to study the change taken place over occasions or the total value for the character, in addition to studying the average value for the latest occasion. For example, in crop yield surveys, one may be interested in estimating the average crop yield for the current season, the change in average crop yield for two different seasons, and the total crop production for the year. The successive method of sampling consists of selecting sample units on different occasions in such a way that some units are common with samples selected on earlier occasions.

The theory of successive sampling seems to have started with the work of Jessen (1942). Yates (1949) extended the work of Jessen to develop the theory for more than two occasions. Kulldorff (1963) considered the problem of optimum allocation for simple random sampling on two occasions. Considering an unbiased estimator of population mean on the current occasion based on matched sample with first occasion, Sukhatme et al. (1984) proposed a weighted estimator of population mean on current occasion based on matched and unmatched portions of samples. Raj (1965) studied use of probability

proportional to size with replacement sampling, partial replacement of units for estimating population mean on second occasion. Tripathi and Srivastava (1979) and Tripathi et al. (1989) extended this further.

Singh and Kumar (2011) studied the problem of successive sampling on two occasions in cluster sampling whereas Singh and Pal (2015) utilized two auxiliary variables under the knowledge of Coefficient of Kurtosis and correlation coefficient.

Noting that due to passage of time and the nature of production of commodities as well as habits of people a quadratic relationship between the units of earlier and current occasions may exist, in section 2, we propose a quadratic type estimator of population mean on current occasion using general sampling design.

2. Generalized Estimator of \bar{Y}_2

Let $d = D(U, S, P)$ be a family of sampling designs and $S = \{s\}$ is the collection of all possible samples generated from the population U through a method of randomization leading to probability $P(s)$ of selecting a sample s .

Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

Buddhadev Layek¹, Bina Gidwani³, Sakshi Tiwari², Venu Joshi², Vishal Jain² and Amber Vyas^{2,*}

¹Department of Pharmaceutical Sciences, North Dakota State University, Fargo, North Dakota, 58105, USA; ²University Institute of Pharmacy, Pt Ravishankar Shukla University, Raipur (C.G.), 492001; ³Columbia Institute of Pharmacy, Raipur, 493111

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Abstract: Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different nanoformulations like liposomes, solid lipid nanoparticles and nanostructured lipid carriers which are commercially available for cancer therapy.

Keywords: Cancer, Chemotherapeutics, drug delivery, Liposomes, Nanostructure lipid carriers, Solid lipid nanoparticles, Targeted drug delivery.

1. INTRODUCTION

Cancer is the second leading cause of death globally, with one in every six deaths being attributable to cancer [1]. According to GLOBOCAN 2018, an estimated 18.1 million new cancer cases and 9.6 million cancer deaths occurred in 2018 [2]. By 2040, the estimated global burden is expected to rise to 27.5 million new cancer cases and 16.3 million cancer deaths. Current cancer therapies include surgical resection of tumors, radiation therapy, and chemotherapy. Among different strategies, chemotherapy has been extensively applied in clinics, particularly in the treatment of advanced cancer cases. However, most of the chemotherapeutic drugs suffer from poor solubility, low bioavailability, and unfavorable pharmacokinetic profile [3]. Furthermore, conventional chemotherapeutics lack sufficient cancer selectivity and inevitably kill both cancer cells and rapidly proliferating healthy cells, causing unwanted adverse effects. Hence, there is an urgent need to develop suitable drug delivery systems capable of achieving high accumulation in tumor tissues while sparing the surrounding healthy tissues [4].

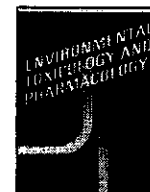
Nanotechnology can serve as a useful tool to circumvent the limitations stated above and enhance the outcome of cancer treatment. Nanocarriers are submicron colloidal drug carrier system with a size range of 10–1000 nm (typically <500 nm) [5, 6]. In general, the drug molecule is dissolved, adsorbed, entrapped, encapsulated, or attached to a nanomatrix. Nanocarriers, owing to their nanoscale sizes and high surface area to volume ratio, can alter the basic properties and bioactivity of its payload [7]. Over the past few decades, nanocarriers have been extensively used in cancer therapy because of their ability to improve the bioavailability and pharmacokinetics of chemotherapeutic drugs while facilitating preferential accumulation at the tumor tissue [8–10].

Tumor-selective accumulation of nanomedicines is primarily relying on the passive targeting of solid tumors through enhanced permeability and retention (EPR) effect. It is illustrated in Fig. 1. Unlike small-moleculod rugs, nanocarriers cannot pass through the tight endothelial cell junctions on normal blood vessels. However, solid tumors are often characterized by abnormal vascular networks and exhibit leaky blood vessels (endothelial pores of 40 to 1000 nm) compared to those of healthy tissue (<8 nm) [11]. Thus, nanoparticles can extravasate into tumor tissues through the leaky vasculature [12]. As the lymphatic system in tumors is mostly absent or dysfunctional, the inefficient drainage facilitates the retention of nanoparticles in the tumor tissues [13–15]. Furthermore, the physicochemical properties of nanocarriers can be fine-tuned by altering their sizes, shapes, compositions, and surface properties. For instance, rationally designed nanocarriers with specific dimensions and suitable surface properties (e.g., zwitterionic or neutral PEG) display longer residence time in systemic circulation without opsonization and preferentially accumulate in tumor tissues [16–18].

To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among the nanocarriers, lipid-based formulations such as liposomes, solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLC), and lipid-polymer hybrid nanoparticles have received considerable attention in cancer treatment due to their distinct advantages over other colloidal nanocarriers. Lipid-based nanocarriers made up of biocompatible and biodegradable lipids, such as phospholipids, cholesterol, and triglycerides, and hence these systems are less toxic as compared to other nanocarriers, such as polymeric nanoparticles [19, 20]. They can encapsulate both the hydrophilic and hydrophobic drugs with high loading capacity, display high temporal and thermal stability, and offer prolonged and controlled drug release profile [21, 22]. Further, surface modification with polyethylene glycol (PEG) enables lipid-based nanocarriers to evade mononuclear phagocyte system (MPS) and ameliorate circulation half-life for better thera-

*Address correspondence to this author at the University Institute of Pharmacy, Pt Ravishankar Shukla University, Raipur (C.G.);
E-mail: ambervyas@gmail.com

13509



Glycosylated-imidazole aldoximes as reactivators of pesticides inhibited AChE: Synthesis and *in-vitro* reactivation study

Rahul Sharma^{a,b}, Kapil Upadhyaya^c, Bhanushree Gupta^{d,*,**}, Kallol K. Ghosh^a, Rama P. Tripathi^e, Kamil Musilek^f, Kamil Kuca^{f,g,*}

^a School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, CG 492010, India

^b Department of Plant Physiology, Agril. Biochemistry, Medicinal & Aromatic Plants, Indira Gandhi Agricultural University, Raipur, CG 492005, India

^c Department of Pharmaceutical and Biomedical Sciences, University of Georgia, 250 West Green Street, Athens, GA 30602, USA

^d Centre for Basic Sciences, Pt. Ravishankar Shukla University, Raipur CG 492010, India

^e National Institute of Pharmaceutical Education and Research-Raebareilly, Sarojini Nagar, Lucknow, Uttar Pradesh 226301, India

^f University of Hradec Kralove, Faculty of Science, Department of Chemistry, Rokytanskeho 62, Hradec Kralove, Czech Republic

^g University Hospital, Biomedical Research Center, Sokolska 581, 50005, Hradec Kralove, Czech Republic

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ABSTRACT

The present armamentarium of commercially available antidotes provides limited protection against the neurological effects of organophosphate exposure. Hence, there is an urgent need to design and develop molecules that can protect and reactivate inhibited-AChE in the central nervous system. Some natural compounds like glucose and certain amino acids (glutamate, the anion of glutamic acid) can easily cross the blood brain barrier although they are highly polar. Glucose is mainly transported by systems like glucose transporter protein type 1 (GLUT1). For this reason, a series of non-quaternary and quaternary glycosylated imidazolium oximes with different alkane linkers have been designed and synthesized. These compounds were evaluated for their *in-vitro* reactivation ability against pesticide (paraoxon-ethyl and paraoxon-methyl) inhibited-AChE and compared with standards antidote AChE reactivators pralidoxime and obidoxime. Several physicochemical properties including acid dissociation constant (pK_a), $\log P$, $\log D$, HBD and HBA, have also been assessed for reported compounds. Out of the synthesized compounds, three have exhibited comparable potency with a standard antidote (pralidoxime).

1. Introduction

Organophosphorus compounds (OPCs) were initially developed as pesticides to improve crop production, although they were subsequently modified and misused as chemical warfare agents (Tucker, 2006). Pesticide (Fig. 1A) poisoning is a primary health issue in rural areas of developing countries and an estimated 3,000,000 acute intoxication events occur annually, with approximately 300,000 fatalities. (Antonijevic et al., 2016; Peter et al., 2014; Sharma et al., 2015; Gunnell and Eddleston, 2003). Even a small exposure can cause death due to the failure of respiratory organs. OP toxicity is primarily focused on inhibition of enzyme acetylcholinesterase (AChE). The inhibition process occurs mainly due to the formation of a P–O bond between the electrophilic centre of OPCs and the oxygen atom of the active serine residue, yielding a phosphorylated AChE adduct (Jokanovic, 2001). This inactivation results in the overstimulation of postsynaptic cholinergic

neurons (Sharma et al., 2015; Eddleston and Chowdhury, 2016). The reaction is usually reversible until de-alkylation occurs. This removal of alkyl group is known as the 'aging' process (Worek et al., 2004). The adduct formed after aging is no longer available for reactivation. Worldwide, efforts have focused for many years on finding ways to restore the function of aged AChE (Quinn et al., 2017). However, if a nucleophile such as oxime attacks the phosphorous atom before aging of OP-AChE adduct, it can detach the OP from serine group and thus the enzyme can be regenerated (Kitagawa et al., 2019).

Oxime based cholinesterase reactivators such pralidoxime (2-PAM), obidoxime (LiH-6), asoxime (HI-6), trimedoxime (TMB-4) (Fig. 1B) and other agents like anticonvulsants (e.g. benzodiazepine) and anticholinergics (e.g. atropine) have been used as antidotes against OP-intoxication (Chambers et al., 2016a; Worek et al., 2020; Antonijevic et al., 2018; daSilva et al., 2020; Worek et al., 1998; Jokanovic and Maksimovic, 1995). To date, none of the available oximes is considered

* Corresponding author at: University of Hradec Kralove, Faculty of Science, Department of Chemistry, Rokytanskeho 62, Hradec Kralove, Czech Republic.

** Corresponding author at: Centre for Basic Sciences, Pt. Ravishankar Shukla University, Raipur CG 492010, India.

E-mail addresses: bgupta1517@gmail.com (B. Gupta), kamil.kuca@uhk.cz (K. Kuca).

1307

Severe Acute Respiratory Syndrome Coronavirus -2 (SARS-CoV-2): A Review on Pathophysiology, Diagnosis, and Investigational Therapeutics

Rahul Sharma¹, Dharmendra Khokhar¹, Bhanushree Gupta^{2,*}, Purnendu Saxena³, Kallol Kumar Ghosh², Arvind Kumar Geda¹ and Kamil Kuca^{5,6,*}

¹Department of Plant Physiology, Agril. Biochemistry, Medicinal & Aromatic Plants, Indira Gandhi Agricultural University, Raipur, (C.G.)-492005, India; ²Department of Chemistry, Centre for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (C.G.)492010, India; ³Department of Orthopaedics, VY Hospital, Kamal Vihar, Raipur, Chhattisgarh, India-492001; ⁴School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur (C.G.)492010, India; ⁵University of Hradec Kralove, Faculty of Science, Department of Chemistry, Rokitanskeho 62, Hradec Kralove, Czech Republic; ⁶University Hospital, Biomedical Research Center, Sokolska 581, 50005 Hradec Kralove, Czech Republic

Abstract: There is a new public health crisis threatening the world with the emergence and spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was later named novel coronavirus disease or COVID-19. It was then declared a pandemic by the World Health Organization on March 11, 2020. The virus originated in bats and was transmitted to humans through unknown intermediary animals in Wuhan, Hubei province, China, in December 2019.

As of February 5, 2021, 10.7 million laboratory-confirmed cases and nearly 2.3 million deaths were reported globally. The number of death tolls continues to rise, and a large number of countries have been forced to distance socially and enforce lockdown. As per literature, coronavirus is transmitted human to human or human to animal via airborne droplets. Coronavirus enters the human cell through the membrane ACE-2 exopeptidase receptor. WHO, ECDC, and ICMR advised avoiding public places and close contact with infected persons and animals. To date, there is no evidence of any effective treatment for COVID-19. The main therapies being used to treat the disease are antiviral drugs, chloroquine/hydroxychloroquine, and respiratory therapy. Although several therapies have been proposed, quarantine is the only intervention that appears to be effective in decreasing the contagion rate. We conducted a literature review of publicly available information to summarize knowledge about the pathogen and the current epidemic. In the present literature review, the causative agent of the pandemic, epidemiology, pathogenesis, and diagnostic techniques are discussed. Further, currently used treatment and preventive strategies along with vaccine trials and computational tools are all described in detail.

Keywords: Coronavirus, SARS-CoV-2, Severe Acute Respiratory Syndrome, pandemic, antiviral, quarantine, diagnosis, treatment.

* Address correspondence to these authors at the Department of Chemistry, Centre for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (C.G.) 492010, India; Tel.: +91-771-2263146, 2262588; Fax: 91-771-2262583; E-mail: bgupta1517@gmail.com and University of Hradec Kralove, Faculty of Science, Department of Chemistry, Rokitanskeho 62, Hradec Kralove, Czech Republic; University Hospital, Biomedical Research Center, Sokolska 581, 50005 Hradec Kralove, Czech Republic; Tel.: +420 493 332 509; E-mail: kamil.kuca@uhk.cz

130⁰⁰

इक्ष्वा

(साहित्य-संस्कृति-शोध संवाही)

भारतीय भाषा साहित्य संगम,
भोजपुर, आरा (बिहार), भारत

अंक : १८ वर्ष : २०२०

संस्थापक परामर्शदाता
आचार्य विश्वनाथ सिंह

संपादक
डॉ. पद्मसुधासिंह

आइ एस एस एन २३४८-६७९१ ईक्षा

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(साहित्य-संस्कृति-शोध संवाही)

[अंक : १८, वर्ष : २०२०]

संस्थापक परामर्शदाता
आचार्य विश्वनाथ सिंह
संपादक

डॉ० परशुराम सिंह

सहायक संपादक

डॉ० विजय कुमार सिंह
११०, अशोक नगर
गया-८२३००१ (बिहार)
चलभाष : ९९७३४३५२७७

डॉ० उषा सिंह
ए-११, जगतभवानी अपार्टमेंट
एस.पी. सिन्हा पथ
पूर्वी खोरिंग कैनाल रोड
पटना-८००००१ (बिहार)
चलभाष : ९३३४१९८९३३

संपादकीय संपर्क :-

चौगाई भवन, तिलक नगर, कतिरा
आरा-८०२३०१ (बिहार) भारत
चलभाष : ९४३०८७९०६९

E-mail : iksha.ara@gmail.com

(भारतीय भाषा साहित्य संगम, भोजपुर
आरा (बिहार) भारत)

इस पत्रिका में व्यक्त विचार रचनाकारों के
अपने हैं। इनसे संपादक की नीतियों व
विचारों का सहमत होना आवश्यक नहीं है।

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अनुक्रम

क्रम	विषय	लेखक	पृष्ठ
	सम्पादकीय		
१.	परंपरागत योग और निर्गुणियों की योग-साधना	- परशुराम सिंह	१
२.	आचार्य नलिन विलोचन शर्मा और गोदान	- आचार्य विश्वनाथ सिंह	३
३.	कलम-शिल्पी पंडित जगन्नाथ प्रसाद मिश्र	- डॉ० तालकेश्वर सिंह	१६
४.	मीरा की प्रेमाराधना	- डॉ० ठषा सिंह	३०
५.	हर क्रौंच-बध का प्रतिपाद करता है साहित्य	- डॉ० विजय कुमार सिंह	३५
		- डॉ० वेद प्रकाश अमिताभ	
		- डॉ० मधुर नन्मी	४०
६.	संत कवि मगनीराम के काव्य में जीवन मूल्य-	डॉ० मनोज कुमार	४८
७.	दकनी उर्दू अदब का सफरनामा	- वाचस्पति त्रिपाठी	५६
८.	'सात आसमान' में चित्रित मुस्लिम समाज	- बलदेव महतो	६४
९.	परिंदे : नयी परंपरा का प्रस्थान विंदु	- जय प्रकाश विश्वासी	७१
१०.	'गिलिगडु' के शहरी परिवेश के वृद्धों का एकाकीपन-	गीता कुमारी	७७
११.	महाभोज : युगीन समाज का सामाजिक राजनीतिक विश्लेषण	- उर्मिला टोप्पो	९१
१२.	निराला के उपन्यास	- सुगन्धा कुमारी	९८
१३.	बज्जिका कला गीतों में आंचलिकता	- डॉ० कुमारी मीना सिंह	१०८
१४.	अज्ञेय के काव्य में छन्द-विधान	- डॉ० प्रभात कुमार 'प्रभाकर'	११२
१६.	महादेवी की लोकचेतना	- जया कुमारी	१२७
१७.	हिन्दी भाषा का विकास : कल और आज	- डॉ० धर्मेन्द्र कुमार	१३३
१८.	कवि-पाठक-सम्बन्ध	- प्रो०(डॉ०) छाया सिन्हा	१४०
१९.	नयी मनुष्यता के जनक : ओशो	- सुरभि एवं डॉ० उषारानी	१४५
२०.	साहित्य-हिमवान के शिखर पुरुष : आचार्य विश्वनाथ सिंह	- डॉ० रेखा कुमारी शर्मा	१४८
२१.	खड़ी बोली की प्रथम कविता है कविते : एक विहंगम दृष्टिगत	- दिवाकर पाण्डेय	१५१
२२.	जगजीवन राम का भारत के स्वतंत्रता आन्दोलन में योगदान-एक ऐतिहासिक विवेचना	- डॉ० विनय सिंह	१५८
२३.	एक मॉड सोशलाइट से मुलाकात	- अवध बिहारी ओझा	१६४

हिंदी सेवी विदेशी विद्वान और जार्ज अब्राहम ग्रियर्सन

डॉ० गिरिजा शंकर गीतम

भारत बोलियों का अजायब घर है, हमारे यहाँ कोस-कोस में पानी बदले, चार कोस में बानी' बदलती है। हम इस पर गौरव करते हैं। घाट-घाट का पानी पीना मुहावरा शायद इसी लोकप्रियता से प्रचलन में आया होगा। भाषावार प्रांत गठन के बाद अब हम आपस में कभी-कभार झगड़ते भी हैं। आज हिंदी की तमाम बोलियाँ अपना वर्चस्व स्थापित करना चाहती हैं। यदि समग्रता में बात हिंदी की की जाय तो विनम्रता के साथ स्वीकार करना पड़ता है कि हिंदी की जितनी सेवा हिंदीतर भाषी रचनाकारों ने की है उतनी सेवा हिंदी भाषी लोगों ने शायद ही की हो।

इसी प्रकार विदेशी, विदेशी मूल के लोगों ने यहाँ आकर न केवल प्राकृत-बोली सीखी वरन् इन पर शोध और अनुवाद कार्य भी किये। जान जेशुआ केट्लेर सत्रहवीं शताब्दी के उत्तरार्ध में भारत आये। गुजरात के सूरत शहर में व्यवसाय के दौरान इन्होंने हिंदी सीखी तथा व्यावसायिक दृष्टिकोण से उच्च भाषी थे। इन्होंने हिंदुस्तानी भाषा का व्याकरण लैटिन भाषा में लिखा। जार्ज हैडले ने १७४५ में व्याकरण ग्रंथ लिखा जिसे आधुनिक व्याकरण परंपरा में मील का पत्थर माना जाता है।

जॉन बार्थविक गिलक्राइस्ट (१८००) फोर्ट विलियम कॉलेज कोलकाता में हिंदुस्तानी विभाग के संस्थापक अध्यक्ष थे इन्होंने हिंदुस्तानी ग्रामर' लिखा। इंग्लिश-हिंदुस्तानी डिक्सनरी में इन्होंने शब्दों का संकलन किया। हिंदी में अध्ययन-अध्यापन के लिए सामग्री तैयार करने का सार्थक प्रयास, लल्लूलाल आदि ठन्नायकों की इन्होंने सहायता की।

गार्सा-द-तासी (१८३९) प्रथम विदेशी विद्वान हैं। जिन्होंने हिंदी-साहित्य का इतिहास लेखन किया। इनके द्वारा फ्रेंच भाषा में लिखा गया 'इस्त्वार द ला लित्येत्यूर ऐंडुई-ए-ऐंडुस्तानी' बहुचर्चित साहित्यिक इतिहास ग्रंथ है। इस ग्रंथ का प्रकाशन पेरिस से हुआ।

इतालवी भाषी डॉ. तेस्सीतेरी अग्रणी विदेशी शोधकर्ता हैं जिन्होंने हिंदी

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20-24



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Review article

Quantum dots: Prospectives, toxicity, advances and applications

Bina Gidwani^b, Varsha Sahu^a, Shiv Shankar Shukla^b, Ravindra Pandey^b, Veenu Joshi^c, Vikas Kumar Jain^d, Amber Vyas^{a,*}

^a University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, CG, India

^b Columbia Institute of Pharmacy, Tekari, Raipur, CG, India

^c Center for Basic science, Pt. Ravishankar Shukla University, Raipur, CG, India

^d Department of Chemistry, Government Engineering College, Raipur, C.G, India

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ABSTRACT

Quantum Dots are fluorescence type semiconductor nano sized particles. They are made up of either heavy metal or inorganic material with size range from 2 to 10 nm. The word quantum dots itself indicates its quantum confinement and optical properties. They contain same number of electrons and atoms, hence are called as artificial atom. Quantum dots consist of two free functional groups for binding with drug molecule. Surface modification of quantum dots through covalent and/or non-covalent binding affects and alters the properties of drug molecule. Their cellular delivery is mediated by passive transport, facilitated delivery and active transport. The outer shell of quantum dots is made of semiconductor material which provides the surface for bio-conjugation leading to improvement in aqueous solubility. This provides effective surface area for binding of drug with the targeting molecule. The unique feature being that the material of shell reduces the toxicity of core of quantum dots. Various functionalization and surface modification makes them suitable for application in pharmaceutical field such as biomedical imaging, drug delivery, drug release study and diagnosis. Toxicity of quantum dots depends upon the size, material used, dose, route of administration and capping material. The regulatory status of quantum dots is not yet clear; still they are regarded as safe to use. The first clinical trial of quantum-dot technology in humans was approved by USFDA in 2011. With the advances in technology; most of the chemotherapeutics and cytotoxic drugs are delivered as quantum dots for improved/enhanced pharmacological action.

1. Introduction

One of the invention in nanotechnology; comprises nano-sized particles called as Quantum dots (QDs), which have gained lot of popularity among researchers' over past two decades because of their interesting physical and chemical properties. Quantum dots are fluorescent type of semiconductor nanoparticles, which are composed of core material enclosed within a shell of another semiconductor material with a diameter of 2–10 nm. The size of QDs reflects the properties like optical property, absorbance and photoluminescence in dependent manner [1]. The name quantum dots itself indicates its quantum confinement and optical properties. This specific property makes them suitable candidate for biological function and imaging. They have great potential towards imaging, sensing, tracking and real time monitoring. QDs are also known as artificial atom because of the presence of same number of electrons and atoms, demonstrating their movement in three dimensions

with narrow electronic energy level [2,3]. The selection of quantum dots depends on their application in various fields. The semiconductor outer shell of QDs are made of heavy or inorganic material like cadmium (Cd), selenium (Se), Zinc oxide (ZnO), silica etc. which are coated with shell material and provides a specific site for the conjugation and reduces their toxicity.

In drug delivery system; biocompatible quantum dots like carbon quantum dots, graphene quantum dots and zinc oxide quantum dots are used which contribute towards the aqueous solubility. For example - carbon quantum dots are preferred for the delivery of mitomycin (anti-cancer agent) [3,4]. For imaging and sensing purpose semiconductor quantum dots are mostly used such as ZnCuInS/ZnS quantum dots and CdTe quantum dots. QDs coated with organic acid are used for *in-vivo* cellular imaging of tumor and *in-vitro* cell staining [5]. Quantum dots possess a rigid structure which provides a large surface area for the drug conjugation, where the drug is not encapsulated in quantum dots but is

* Corresponding author.

E-mail addresses: beenagidwani@gmail.com (B. Gidwani), ambervyas@gmail.com (A. Vyas).

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1341