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समकालीन कविता का स्वरूप व दृष्टि

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सारांश: साठोत्तरी कविता में आधुनिक काल में जो कविता लिखी गयी उसे हम समकालीन कविता की दृष्टि से देखते हैं। उसमें यंत्रयुगीन मानव के भीतर का अकेलापन, आत्मीयता से दूर होती हुई भावना दिखाई देती है। आज समाज पाश्चात्य संस्कृति से प्रभावित होकर भारतीय आदर्श संस्कृति से दूर हो रहा है। इसके परिणामस्वरूप सांस्कृतिक न्हास की प्रक्रिया का आरंभ हो चुका है। पाश्चात्य भाषा का रंग हमारी भाषा पर भी चढ़ गया है जिसके कारण भाषा के नष्ट होने का भय भी व्यक्त हो रहा है। प्रस्तुत शोध निबंध में समकालीन हिन्दी कविता में जो नयी करवट ली है उसे व्यक्त किया गया है। यह कविता समाज को नयी चेतावनी देने की क्षमता रखती है। कवि हमें आज की समस्याओं का सामना करने के लिए चेतावनी देते हैं। समकालीन कविता में आत्मीयता की तलाश करनेवाली कविताओं के द्वारा कवि हमें किस तरह जागृत करने का प्रयास कर रहा है उसका वर्णन किया है। वर्तमान समाज में मुल्यों के इस भारी संकट को कविद्वारा किस तरह चित्रित किया है उसके सामने लाकर मनुष्य के भीतर हलचल पैदा करके समस्याओं से सजग किया गया है। आज अंग्रेजी भाषा भारतीय सभ्यता की पहचान बनती जा रही है। समकालीन कवि इस यथार्थ को निर्भिकता से व्यक्त करके पाठकों को जागृत कर रहा है। समकालीन कवि की कांतीकारी भावना का उजागर करने का प्रयास इस शोध निबंध द्वारा किया गया है।

1. प्रासंगिकता

समकालीन कवी उदय प्रकाश, अरुण कमल, कुमार कृष्ण, राजेश जोशी, कुमार अम्बुज, ज्ञानेन्द्रपति, मंगलेश डनराल, बोधीसत्व, विश्वनाथ प्रसाद तिवारी, अशोक वाजपेयी, निर्मला पुतुल, किरण अग्रवाल, प्रभा मजुमदार आदी कवियों की प्रकाशित कविताओं का अध्ययन करने पर एक बात स्पष्ट हा जाती है कि समकालीन कविता का स्वरूप और दृष्टि परिवर्तित हो रही है। कवि ने अपने समय के प्रश्नों को जागृत करने का प्रयास किया है। हमे इन कविताओं का न करके यथार्थ के प्रति सजग होकर चेतना प्राप्त करनी है।

2. विषय क्षेत्र

अ) समकालीन कविता के द्वारा कवि हमे बता रहे हैं कि आज आत्मीयता किस तरह खत्म हो रही है। आज मनुष्य घर की आत्मीयता को तलाश कर रहा है लेकिन उसे वह प्राप्त नहीं हो रही है। कवियों कि चुनी हुई पंक्तियों द्वारा व्यक्त करने का प्रयास किया गया है।

ब) आज समाज पाश्चात्य संस्कृति से प्रभावित हो रही है और अपनी संस्कृति से किस तरह दुर जा रही है उसका वर्णन इस समकालीन कवि ने किस तरह किया है और परिणाम स्वरूप सांस्कृतिक न्हास की प्रक्रिया आरंभ हो चुकी जो हमारे जीवन पर दृष्टभाव डाल रही है उसे यहा स्पष्ट किया गया है। भाषा के नष्ट होने का भय भी व्यक्त किया गया है।

3. विषय उपलब्धि

समकालीन कविता ने आज नयी करवट ली है। उसका तेवर और प्रवृत्ति बदल गयी है। इस काल के कवि ने अपने समय को अत्यंत निकटता से देखा, परखा और व्यक्त किया है। यह कविता पाठकों को चेतावनी देने की क्षमता रखती है। वह हमे आज के समाज की आराजक और दिशाहीन स्थिती से अवगत कराती है जिससे मनुष्य प्रभावित हो रहा है। कवि हमे किस तरह आज की समस्याओं का सामना करने के लिए तत्पर कर रहे है उसका वर्णन करके समाज मे जागृती लाने का प्रयास इस शोध अध्ययन से किया गया है।

समकालीन हिन्दी कविता मे आत्मीयता की तलाश

कुमार कृष्ण की 'पहाड पर नदियों के घर' इस कविता द्वारा कहते है -

हम नही पुछते उस आदमी से
उन छोटे-छोटे रिश्तों के बारे मे
जिनको उठाकर बिना दिये उसने
पहाड जैसे साठ बरसा।

आज रिश्तोंका महत्व नष्ट हो रहा है। सब लोग धन के पिछे पागल होते जा रहे है। बुढे लोग आज भी उन रिश्तों को याद करके समय अच्छी तरह बिता रहे है। आज मनुष्यों को किसी से दो बाते करने और किसी की दो बाते सुनने का वक्त नही है वहा किसी के बारे मे सोचने की बात करना मुश्कील है। हमारी भारतीय संस्कृती

'अतिथी देवो भव' के रूप में मानी जाती थी। संयुक्त परिवार का मेलजोल हमारी संस्कृति सभ्यता मानी जाती थी। लेकिन आज मनुष्य अकेलापन महसूस कर रहा है। उन दिनों की याद करते हुए कवि कहते हैं—

वहा बाबा थे, दादी थी, माँ और पिता थे

लडते-झगडते भी साथ साथ रहते थे सारे भाई बहन

कोई न कोई हर वक्त बना ही रहता था घर में

पल-दो-पल को बिठा ही लिया जाता हर आने वाले को

ताना देकर शायद ही कभी कोई लौटा होगा घर से।

यहाँ कवि पुराने जमाने की याद को ताजा करके पाठकों का ध्यान आकृष्ट करके उन्हें चेतावनी दे रहे हैं। आज एकल परिवार की यह स्थिति है की अगर सभी को काम के कारण बाहर जाना पड रहा है तो घर अकेला छोड़ना पडता है। बूढ़े लोग शहर में रहने लायक नहीं है ऐसा बच्चों का कहना है। ऐसी स्थिति में आनेवाला मेहमान फोन करके ही आपके घर आ सकता है या ताला देखकर वापस जा सकता है। गेहगान के प्रति आदरभाव, स्नेहभाव कम होता दिखाई दे रहा है। आज मनुष्य धन के पीछे इस तरह भाग रहा है कि उसे अपने लोगों के लिए समय नहीं मिल रहा है आज सुख में शरीफ होने के लिए भी किसी के पास समय नहीं है इसी को व्यक्त करते हुए कवि कहते हैं—

कम हो रहा है मिलना-जुलना

कम हो रही है लोगों की जान-पहचान

सुख दुःख में भी पहले की तरह इकठ्ठे नहीं होते लोग

तार(हॉट्सअप) से आ जाती है बधाई और शोक संदेश।

आज लोग सुख दुःख में उपस्थित लोगों द्वारा भावनाओं का जिस तरह से संचार होता है उस तरह का संचार, संचार माध्यमों द्वारा प्रेषित बधाई और शोक संदेश नहीं कर सकते। सुख दुःख के मौके पर उपस्थित लोगों के बधाई और शोक संदेश जितने प्रभावी और संवेदनशील होते हैं उतने संचार माध्यमों द्वारा हो ही नहीं सकते। आज मनुष्य स्वार्थी बनता जा रहा है वह धनलालुपता के कारण प्रेम, सहानुभुती, आत्मीयता इन चीजों को भुलकर भौतिक सुविधाओं के पीछे पडा हुआ है। पुराने जमाने में गाँव के लोग एक दुसरे के साथ अपनत्व का रिश्ता जोड़कर रखते थे। सब एक दुसरे को अच्छी तरह पहचानते थे लेकिन आज शहरों में और गाँव में भी 'फ्लैट' संस्कृति के कारण कोई एक दुसरे को पहचानता नहीं है। इसी कारण जो स्थिति पैदा हो गयी है उसका वर्णन करते हुए कवि कहते हैं—

बाबा को जानता था सारा शहर

पिता को भी चार मोहल्ले के लोग जानते थे

मुझे नहीं जानता मेरा पडोसी मेरे नाम से

अब सिर्फ एलमन में रहते हैं

परिवार के सारे लोग एकसाथ।

आज संयुक्त परिवार बिखर रहा है लेकिन मनुष्य भी आत्मकेंद्रित होकर समाज से भी कट रहा है जिसे समाज के लिए अच्छी स्थिति नहीं कह सकते। आज अहंकार के बढ़ने तथा रिश्तों के परायेपन के कारण अकेलेपन, अजनबीपन की स्थिति पैदा हो रही है। आज युवा पिढी भौतिक सुख-सुविधाएँ जुटाने तथा अपने सामाजिक स्तर को बढ़ाने का प्रयास कर रहे हैं। उसके लिए किसी भी अनैतिक मार्ग से धन प्राप्त करने की लालसा बढ़ रही है। 'फ्लैट' संस्कृति की चकाचौंध में बुढ़लोगों के लिए घर में जगह नहीं है। उन्हें आश्रम में पहुँचाकर बच्चे चैन की साँस लेते हैं। लेकिन अपने बच्चों के सामने वह कौनसा आदर्श रखते हैं इसकी चिंता उन्हें नहीं है। खुद मूल्यहीन जिंदगी जितते हुए दुसरो को और अपन बच्चों को भी झूठ, बेपर्वाही, अनैतिकता सीखा रहे हैं। आज आप जो आचरण करते हैं उसका अनुकरण कल आपके लिए बच्चे कर सकते हैं इसकी चेतावनी कवि पाठकों को देना चाहते हैं।

राजेश जोशी की कविता पुस्तक 'दो पंचितियों के बीच' की कविता 'तीन शोकगीत' में कवि यह कहना सही है—

हमें कितना अकेला किया है हमारे समय ने, समाज ने
स्वजन भी इसके अपवाद नहीं है।

आज मनुष्य ने अपनी जवानी में धन के पीछे सबकुछ लुटा दिया है। सबकुछ प्राप्त करने के बाद ज बवंह पीछे देखता है तब उसे पता चलता है कि रिश्ते बचे ही नहीं हैं। मानवीय संदना नष्ट होती जा रही है। इस मूल्यहीन परिवेश से उत्पन्न विसंगतियों को देखकर ही समकालीन कवि आज उस घर की तलाश के लिए बाध्य हुआ है जहाँ ये मूल्य मौजूद हो और विसंगतिमापन न सके। उदय प्रकाश की 'रात में हारमोनियम' पुस्तक की कविता 'हम वही हैं' में कवि को बडी अम्मा से बचपन में जो स्नेह मिला उसे आज याद कर वापस उसे पाने की चाह में कह उठता है—

लौट कर फिर आते हैं हम तुम्हारे पास

लेकर अपनी वही पुरानी निर्भरता

किसी यत्नपूर्वक मुलाई गयी चीज को बेशर्मी से फिर-फिर
फिर से माँगने अन्न।

मतलब यह है की आज मनुष्य भौतिक सुविधाओं के पीछे मूल्यहीन होते जा रहे हैं। जीवन में किसे महत्व देना है इसकी समझदारी सही समय पर आना बहुत जरूरी है। समकालीन कवि इसी बात की चेतावनी देने के लिए समाज के यथार्थ का दस्तावेज कविता के माध्यम से स्पष्ट कर रहे हैं।

समकालीन हिन्दी कविता द्वारा पाश्चात्य संस्कृति का प्रभाव और भाषा का संकट का वर्णन—

समकालीन हिन्दी कविता भाषा गायब होने की चिंता तथा उसे बचाने की कवायद को व्यक्त करती है। निर्मला पुतुल की कविता पुस्तक 'नगाडे की तरह बजते शब्द' की कविता 'मेरा सबकुछ अप्रिय है' उनकी नजर में भाषा के गायब होने के भय को साफ देखा जा

सकत है। आज लोगों के जीवन में बदलाव आ रहा है। अपने को सम्य बनने की हड में अनेक चीजे-भाषा, चाल-चलन, रीती रिवाज, पहनावा, ओदावा में भी यह बदलाव स्पष्ट झलकता है। इस बदलाव को देखकर कवि कहते हैं-

मजाक उडाते हैं हमारी भाषा का

हमारे चाल-चलन, रीती रिवाज

कुछ भी पसंद नहीं उन्हें

पसंद नहीं है हमारा पहनावा, ओदावा।

पाश्चात्य लोग हमारे बीच में रहते हुए भी हमारी भाषा नहीं सीखना चाहते। हमारे लोग उनकी भाषा को अपनाकर खुद को सम्य कहलाते हैं। ये लोग पूरी तरह से पश्चिमी सभ्यता का अन्धानुकरण करना चाहते हैं और हमसे भी ऐसी अपेक्षा रखते हैं क्योंकि उनका तर्क है-सम्य होने के लिए जरूरी है उनकी भाषा सीखना, उनकी तरह बोलना, बतियाना, उठना, बैठना।

जरूरी है सम्य होने के लिए उनकी तरह पहनना-ओढ़ना। आधुनिक काल के सम्य लोगों की चाहत को देखकर यह डर लगने लगा है कि कहीं हमारी भाषा और संस्कृतिलुप्त न हो जाय। वह भाषा जिसमें हमारे जीवन की धडकने व्यक्त होती है। हमारी भाषा, चाल-चलन, रीती-रिवाज, पहराव में बदलाव आने पर जाहीर है कि उनसे संबंधित शब्दावली में भी बदलाव आयेगा और एक दिन हमारी भाषा ही नष्ट हो जायेगी। कवयित्री ने इस बात को बखूबी पहचाना है और इस स्थिती से पाठकों को परिचित कराके इस बात पर सोचने के लिए मजबूर किया है। अंग्रेजी भाषा बच्चों के पढ़ने का माध्यम बनता जा रहा है।

आज मनुष्य अपनी जरूरतों को पूरा करने के लिए और अपना जीवन स्तर उँचा उठाने के लिए इतना व्यस्त है कि उसके पास किसी के लिए समय नहीं है। पुराने जमाने में लम्बे लम्बे पत्रों की मीयता से भरी भाषा जो भावनात्मकता और मैत्री के रिश्तों को शक्ति देती थी जो आज गायब हो रही है। इस स्थिती को व्यक्त करते हैं कवि कहते हैं-

चार पन्नों के पत्र

ई-मेल की

दो लाइनों में

सिमटने लगे

या साल दो साल के

अन्तराल में

एकाध फोन कॉल में।

समय की इस रफतार में इंसान आत्मकेंद्रित हो रहा है और मर्थापन का शिकार हो रहा है। उसे इन चिजों से कोई लेना-देना ही है। उसे कोई फर्क नहीं पडता। इसी तरह के विचार विश्वनाथ साद तिवारी 'कविता पुस्तक' 'शब्द और शताब्दी' की कविता 'शब्द' देखने को मिलते हैं।

कवि इस भाव को स्पष्ट करते हुए कहते हैं-

शब्द सृष्टी की पुंजी है

बेलना होठों की कसरत नहीं

लिखना उँगलियों का खेल नहीं

शब्द 'होने' का सबूत है

वह एक विराट मौन को तोडता है

एक निबिड अन्धकार से उबारता है।

इस तरह भाषा के गायब होने पर एक तरफ बात की जा रही है। भाषा के गायब होने के भय को समकालीन कवियों ने अपनी कविताओं द्वारा स्पष्ट करके उनके दुष्परिणामों को भी व्यक्त किया है। इसके साथ-साथ इस स्थिती से निपटने का रास्ता भी दिखाया है। सिमे देश का बडा हिस्सा मानसिक गुलामी का शिकार होने से बच सके। कवि आज के यथार्थ को उद्घाटित करते हुए आनेवाले कल को चेतावनी देना चाहता है। क्योंकि व्यापक जिवन अनुभव ही भाषा को जिवन और प्राणवान बनाते हैं।

Achievement from the Research Pepar

समकालीन कवि ने अपने परिवेश से प्रभावित होकर वर्तमान के सच की यथार्थ अभिव्यक्ति की है। आज का भारतीय परिवेश निश्चित ही मुल्यहिनता की स्थिती से गुजर रहा है। मुल्य की अवहेलना करके इमारा जिवन कभी सुखी नहीं हो सकता। सांस्कृतिक तथा बुनियादी मानव मुल्यों को छोडने का आग्रह सभ्यता की नहीं बल्की असभ्यता की निशानी है। जिस रफतार से आज हम अपने मुल्यों में आस्था खोते जा रहे हैं तथा तत्कालीन जिवन को सुखी बनाने हेतु यंत्र की मरह काम कर रहे हैं, वह एक असुरक्षित भविष्य का द्योतक है। वर्तमान समाज में मुल्यों के इस भारी संकट को समकालीन कवितार द्वारा किस मरह चित्रित किया है उस तथ्यों को प्रतिपादीत किया है।

Summary of the Findings

समकालीन कविता ने आज नयी करवट ली है। कवि ने अपने समय को अत्यंत निकटता से बारीकी से देखा है और अनुभूत करके उसे वाणी दी है। तभी तो अपने समय के प्रश्नों को व्यक्त करके सार्थक तथा कालजयी तथा पाठकों को चेतावनी देने की क्षमता रखते हैं। कवि ने आज के संदर्भ में ऐसे महत्वपूर्ण सवालों को उठाया है जो कभी पहले उठाये नहीं गये। आज समकालीन कविता का स्वरूप और दृष्टी बदली हुई है। वह हमें आज के समाज की अराजक और दिशाहीन स्थिती से अवगत कराती है जिससे मनुष्य प्रभावित हो रहा है। वह हमें अपने समय की चुनौतियों को व्यक्त करके दनका सामना करने के लिए तैयार करती है ताकि हमारा सबका जिवन जीने लायक बने और सुंदर दुनिका का निर्माण हो सके। असंगतियों से भरे इस समाज में समकालीन कविता जिवन को

बेहतर और जीने लायक बनाकर उसकी सार्थकता को चरितार्थ करती है। सच में, समय से गहरे स्तर पर कविता यह जुड़ाव श्रेष्ठ कवि कर्म की बसौटी कही जा सकती है। समकालीन कविता में सामाजिक, सांस्कृतिक मूल्य किस तरह बिखर रहे हैं और भाषा का गायब होने का भय जो व्यक्त किया है वह चिंता को स्पष्ट करनेवाला है। आज हमारे सांस्कृतिक तथा बुनियादी मानव मूल्य खत्म हो रहे हैं, जिसके कारण घर, घर नहीं रह गये हैं। घर ईंट, पत्थर से नहीं बनता बल्कि इन मूल्यवान चीजों की मौजूदगी से बनता है। आज इन्सान इनसे दूर होता जा रहा है। सांस्कृतिक तथा बुनियादी मानव मूल्य के न्हास के कारण आज अहं तथा अकेलापन बढ़ रहा है, मानवीय संवेदना तथा संयुक्त परिवार खत्म हो रहा है। हमें दन मूल्यों की ओर वापस लौटना बहुत जरूरी है। अन्यथा हमारे जिवन में दुःख सिवाय कुछ नहीं रह जायेगा। समकालीन कवि आपनी कविता द्वारा दस हार की तलाश कर रहा है जिसमें कही मूल्य बचे हुए हो। कवि हमें उस ओर आकर्षित कर रहे हैं जहाँ मूल्य बचे हुए हैं और मूल्यहीनता को प्रकटीत कर सके। रिश्तों के विघटन के कारण आपसी आत्मीयता खत्म होती नजर आ रही है उसे स्पष्ट करके कवि पाठकों को चेतावनी देते हुए कहते हैं कि हमें अपने अंदर झाँककर पूछना चाहिए की सचमुच हम गलत राह पर चल ता नहीं रहे हैं? अगर इसका जवाब सही है तो हमें अपने अंदर परिवर्तन लाना पड़ेगा। आज स्थिती चह है की जिसके साथ जिवन के कई वर्ष बिताए हैं उसके इस

संसार से जाने पर भी कोई खास दुःखी नहीं दिखता। सच तो यह है की दुःख तो वहा होता है जहाँ आत्मीयता होती है, लगाव होता है। हमें इन्सान होने के नाते इन बातों में परिवर्तन लाना है यह संकेत समकालीन कवि अपनी कविताओं की माध्यम से दे रहे हैं।

समकालीन कविता जिन बदलते सरोकारों से साक्षात्कार करवाती है उससे पाठक उद्बलित होता है, जागृत होता है और दन ज्वलन्त प्रश्नों को समझने-सुलझाने की समझ अपने अंदर विकसित करता है। समकालीन कवि जिवन को बेहतर बनाने के दायित्व को बखूबी निभाते हुए नजर आ रहा है। पाश्चात्य संस्कृती के प्रति बढ़ने से व्यक्ति अपनी संस्कृती से दूर होते जा रहे हैं। इससे सांस्कृतिक विरासत की धिजें तो लुप्त हो रही हैं और साथ ही मानविय अभिव्यक्ती के सबसे सबलतम माध्यम भाषा के गायब होने भय भी पैदा हो चुका है। जो भाषा एक समय अंग्रेजों की भाषा मानी थी आज भारतीय सम्यता की पहचान बन गयी है। समकालीन कवि इस यथार्थ को निर्मिकता से अपनी कविता द्वारा व्यक्त करके समाज को चेतना देने का प्रयास कर रहा है। ताकी आज का मनुष्य जागृत होकर इन चीजों की तरफ गंभीरता से देखकर अपने अंदर परिवर्तन ला सके। समकालीन कवि इस दृष्टी से आज के युग के सच्चे क्रांतीकारक माने जाने चाहिए। युग परिवर्तन तभी होता है जब उसे कोई बखूबी निभा रहे हैं। प्रस्तुत शोध निबंध द्वारा इन्ही बातों को उजागर करने का प्रयास किया गया है।

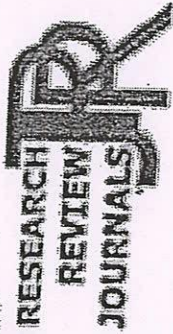
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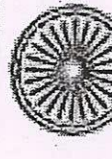
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डॉ. विद्या शशीशेखर शिंदे

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ABSTRACT

प्रेमचंदजी ने विकासात्मक स्तर पर नारी को ही श्रेष्ठता प्रदान करते हुए लिखा है- "में प्राणियों के विकास में स्त्री के पद को पुरुषों के पद से श्रेष्ठ समझता हूँ, उसी तरह जैसे प्रेम, त्याग और श्रद्धा को हिंसा और संग्राम और कलह से श्रेष्ठ समझता हूँ। स्त्री पुरुष से उतनी ही श्रेष्ठ है, जितना प्रकाश अँधेरे से।" साठोत्तरी महिला उपन्यासकारों में श्रीमती ममता कालिया का स्थान श्रेष्ठ रहा है। उनके उपन्यासों में परंपरा एवं रुढ़ियों को तोड़ती, अपने स्वतंत्रता के लिए जूझती, कभी सफल तो कभी असफल होती, नवीन मूल्यों को ग्रहण करने में सशक्त नारी का जो रूप उभर आया है, वह वास्तव में अभिनव ही है। बीसवीं शताब्दी के उत्तरार्ध में भारत में ही नहीं बल्कि विश्व के प्रायः प्रत्येक कोने में नारी के सामने अपनी हीन अवस्था से उभरने की समस्या सबसे प्रमुख थी। यद्यपि उस समस्या का समाधान अब भी नहीं हो पाया है, किंतु नारी उसके लिए पूर्ण तत्परता से सचेष्ट है। आर्थिक स्वतंत्रता, राजनीतिक तथा सामाजिक अधिकार, शिक्षा तथा प्रगति आदि कुछ समस्याएँ जिनके लिए नारी ने संघर्ष आरंभ किया है। ममताजी ने इस कार्य में विशेष रुचि लेकर स्वयं नारी के साथ-साथ समाज के ठेकेदारों को उसकी दयनीय दशा के प्रति सजग करने की चेष्टा की। अस्तित्व प्राप्ति के लिए निरंतर क्रियाशील रहनेवाले उनके नारी पात्रों की विभिन्न चेतनाओं को प्रमाण के रूप में पाठकों के सामने रखना है।

Objectives

1. सन साठ के बाद समय के अंतराल में उसे अपनी स्वतंत्र सत्ता का बोध होता रहा। उसे सबके सामने लाने का प्रयास करना है।
2. सन साठ के बाद स्त्री ने अपने अंदर की निहित शक्ति को पहचाना और वह निरंतर चलते आ रहे नारी शोषण और दमन के वर्क से मुक्त होने के लिए छटपटाने लगी। उसे उपन्यासों के नारी पात्र के माध्यम से दिखाना है।
3. सन साठ के बाद की परिस्थितियों ने नारी को उन बंधनों के प्रति विद्रोहिणी रूप में प्रस्तुत किया। जिसके कारण परिवर्तन की चाहत स्त्री में किस तरह बढ़ गयी यह दिखाना है।
4. ममता कालिया जी ने अस्तित्व प्राप्ति के लिए निरंतर सचेष्ट रहनेवाले उनके नारी पात्रों की विभिन्न चेतनाओं को प्रमाण के रूप में किस तरह प्रस्तुत किया है उसे पाठकों को दर्शाना है।

करने का युग है। यद्यपि यह हर समय संभव नहीं होता। फिर भी आज के उपन्यासकार का प्रधान प्रयोजन जीवन के विविध समस्याओं का उद्घाटन और उसका हल खोजने का प्रयास करना है। ममता कालिया जी ने यह हल खोजने की चेतावनी दी है। स्त्री को सशक्त करने का प्रयास किया है उसे पाठकों के सामने लाना यह मेरे संशोधन का मुख्य प्रयास रहा है।

विवाहपूर्व विवाह बंधन की चेतना -

वस्तुतः नारी के समक्ष विवाह के पूर्व कई ऐसे निर्णायक मोड़ उपस्थित हो जाते हैं, जिसके कारण परिवार बसाने के पहले ही वह जीवन प्रति हताश हो जाती है। जिसके कारण वह विवाह बंधन में मन के विरोध में बँध जाती है। प्रेम, शिक्षा, दहेज, अधिकार, सेक्स तथा विवाह को लेकर कई ऐसे निर्णयात्मक बिंदू हैं, जिसके कारण नारी को अपनी चेतना के स्तर पर दोहरा संघर्ष करना पड़ता है। ममता जी के उपन्यासों में नारी की विवाह पूर्व विभिन्न संवेदनाओं को बहुत मात्रा में स्थान दिया है। प्रेम की जटिलता का अनुमान करके ही शायद 'नरक दर नरक' की नायिका उषा अपने जीवन में काफी चौकन्नी हैं। फिर भी पता नहीं कैसे बड़ी जल्दी जगन और उषा के बीच प्रेम घुसपैठ कर गया। उषा को प्रेम के नशे में होश खोना अच्छा लगा।

प्रेम की तरलता का अहसास ही भिन्न होता है। 'एक पत्नी के नोट्स' की 'कविता' का साहित्य की छात्रा होना एक बात थी। संदीप के परिचय के बाद उसका जीवन वही होते हुए भी वही नहीं रहा था। उसमें रूप, रंग और रस आ मिला था। उसकी समस्त चेतना संदीप के आसपास मेंडराने लगी।

प्रस्तावना -

वस्तुतः हर युग तथा हर स्थिति में मानव जीवन समस्याओं से घिरा होता है। वैसे भी जीवन को समस्याओं से जूझते हुए ही मनुष्य अपने लक्ष्य तक पहुँचता है। वर्तमान युग विषमता और समस्याओं का युग है। पहलू जीवन की विभिन्न परिस्थितियों के साथ नित नवीन समस्याओं का सामना करने का युग है। उपन्यासकार जीवन की विविध समस्याओं से प्रभावित रहता है। जीवन की विविध समस्याओं का सामना

उसे वस्तु में लगता कि वह राधा है और संदीप मदनानुर कृष्ण. प्रेम का नशा बड़ा होता है. प्रेम की इसी चेतना में 'प्रेम कहानी' की यशा अपने प्रेमी को मिलने के लिए सदैव प्रयत्नशील रहती हैं. यशा जया के साथ प्रेम करती हैं. पर इस समय उसे लगा कि " निजी भविष्य कितना रहस्यमय, कितना मोहक बनता जा रहा है. अपने भाग्य, अपने भविष्य को लेकर असह्य जिज्ञासा होने लगी. मुझे लगा, शायद पढाई में मैं भी नहीं लगा पाऊंगी"2

अक्सर देखा जाय तो प्रेम के इस गहरे अहसास में सफलता हाथ आती है तो ठिक है, प्रेम की असफलता में नारी अपना घर बसाने के पहले ही लगभग आधी मर चुकी होती है. पुरुष तो इस संबंधों को अपना पौरुषत्व समझ भूल जाता होगा. कमलता का प्रतिक्रमांनी जानेवाली संवेदनशील नारियों अपने जीवन में हताश हो जाती हैं. 'बेघर' की संजीवनी को क्या पता था, प्रेम के नाम पर उसका सर्वस्व लुटा जा रहा है. पर जैसे ही परमजीत के बंद कार्यालय में आकर दरवाजा बंद करता है, संजीवनी जैसे जागकर बौखला जाती है और बोलती है— "हम यहाँ नहीं जायेंगे."3

प्रेम और विवाह के प्रति तटस्थ रहनेवाली 'लडकियों' की लल्ली ओर अफ़शों अविवाहित जीवन के विविध आयाम उपस्थित करती हैं. महानगरिय जीवन की त्रासदी में उन दोनों की चेतना सदैव अपने अस्तित्व को रक्षा के इर्द गिर्द दिखती है. बंबई जैसे महानगर में अकेली रहनेवाली सुशिक्षित नौकरीपेशा नायिका निरंतर अपने आसपास की असुरक्षितता का अनुभव करती हैं.

इस प्रकार ममता जी ने उपन्यासों में विवाहपूर्व जीवन में अपनी विविध समस्याओं से संघर्ष करनेवाले नारी पात्रों की विभिन्न संवेदनाओं का व्यापक विस्तृत धरातल प्राप्त होता है. विवाहपूर्ण प्रेम संबंधों में विश्वास रखकर किसी सुरक्षित प्रेम संबंधों में विश्वास रखकर किसी सुरक्षित प्रेम प्रसंग का अनुभव प्राप्त करके प्रेम में मर मिटनेवाली यह नारियों अपने आधुनिक रूप को प्रस्तुत करती हैं.

पारिवारिक चेतना -

मानव और परिवार का अटूट संबंध है. नारी और पुरुष दोनों के संयोग द्वारा ही परिवार का निर्माण हो सकता है. हमारा समाज पुरुष प्रधान होने के कारण उसे ही श्रेष्ठ मानता है. जबकि परिवार को बनाने में नारी का ही सहयोग अधिक होता है. उसके बिना परिवार की कल्पना नहीं की जा सकती.

वैसे ही परिवार में थोड़ी बहुत नाराजगी बनी रहती है. लेकिन छोटे छोटे झगड़े कई बार बहुत भयानक रूप धारण करते हैं. ममता जी के उपन्यासों में नारी पात्रों के पारिवारिक तथा दाम्पत्य जीवन में मूल्य विघटन अत्याधिक रूप में परिलक्षित होता है. ममता जी ने अपने उपन्यासों में बिखरे हुए मधुर संबंधों के परिवेश में वर्तमान नारी के संघर्षों का आलेख प्रस्तुत करना चाहा है. संभवतः इसी कारण गिडगिडाकर क्षमा

याचना करनेवाली नारी के स्थान पर पति को चुनौती देनेवाली नारियों का निर्माण उन्होंने किया है. अपने अहं की रक्षा करते हुए पति के अन्याय अत्याचारों के खिलाफ आवाज उठाने का साहस करनेवाली नारियों अपने भाव को यथार्थ रूप में प्रस्तुत करती हैं. 'बेघर' का परमजीत संजीवनी के प्रेम को दैहिक संबंधों का जामा पहनाकर 'रमा' से शादी करता है. संजीवनी के सपनों की दुनिया उजड़ जाती है और विवाहित रमा की त्रासदीयों शुरु हो जाती हैं. रमा को ऐसा गुस्सा तब भी आता जब वह दफ़तर से शराब पीकर आता है. शराब के बारे में रमा ने फिल्मों में देखा था. कितनी बार संबंधों को लेकर उनकी झड़प होती पर रमा मुँह बिचकाकर यह कहती, 'कैसी घटिया बात पर लड रहे हो। तुम्हें शर्म नहीं आती, एक बच्चे के बाप हो गये.'4

मानसिक झुंझलाहट के क्षणों में दाम्पत्य जीवन की अर्थवत्ता का चिंतन करनेवाली 'नाक दर नरक' की नायिका उषा अपने अस्तित्व की रक्षा के लिए निरंतर सचेत रहती हैं. विवाह से पैदा हुई जानलेवा दिनचर्या के बीच अब जगन की ओर से संपर्क संकेत उषा को असह्य थकान से भर देते हैं. जहाँ संप्रेषण ही समाप्त हो जाय वहाँ संवाद का कोई मतलब नहीं रहता. ऐसी अवस्थामें उषा का शरीर हिंसक हो उठता था. जगन बाहर की परेशानियों का गुस्सा घर में उषा पर निकालता है. ऐसे ही एक दिन भकभकाया हुआ घर में घुसा, उषा ने विजेता मुद्रा में कहा, "लो खाना भी तैयार है. तुम बिल्कुल ठिक वक्त पर आए हो." वह बरस गया, "ऐसी की तैसी तुम्हारे खाने की. मेरे सामने यों बाल बिखरकर, चुडेल की तरह मत आया करो." तब वह म नही मन में भीषण गालीयों देती हुई उषा गुसलखाने में चली जाती है. वहाँ पानी नहीं था. दाम्पत्य जीवन की निरसता का यह अनुभव 'उषा' के लिए जितना जानलेवा सिद्ध हुआ, उतना ही 'एक पत्नी के नोट्स' की कविता के लिए भी.

इस प्रकार ममताजी के उपन्यासों में नारी पात्र अपने दाम्पत्य, पारिवारिक जीवन की सुख-दुःखात्मक अनुभूतियों को यथातथ्य प्रस्तुत करती हैं. कविता तथा उषा के दाम्पत्य जीवन की वह पीडादायी अनुभूतियों न केवल संदीप और जगन के अहं का पर्दापाश करती हैं वरन आम पुरुष के अहं को चुनौती देने का पर्याय सिद्ध होती हैं.

सामाजिक चेतना-

वर्तमान समाज में नारी पार्श्वगत्य सम्यता की अंधी दौड़ में भागती हुई नजर आती है. साथ ही उसका सामाजिक परिवेश बदल रहा है. वह एक 'नयापन' प्राप्त करना चाहती है. आधुनिक यंग में 'युद्ध' मनुष्य की नियती बन गया है. जीवन के हर क्षेत्र में छल प्रपंच, आपाधापी का बोलबोला है. इस दृष्टि से ममता कालिया ने अपने उपन्यासों में सामाजिक चेतना के परिवेश में स्त्री पुरुष संबंधों के अन्तर्विरोधों को विशेष स्थान दिया है. 'बेघर' की संजीवनी अपने प्रेम वैयक्तिक

पीडाओं को व्यक्त करती हैं। वैयक्तिक धरातल पर परमजीत के प्रति उसका प्रेम गहरा क्यों न हो, परमजीत और विपीन द्वारा भोगी यातनाओं का सामाजिक महत्व उतना ही है। आग्रह, गुस्सा, और कभी न बोलने का डर या छोड़ देने की धमकी के सामने स्त्री स्वयं नर्वस या निढाल हो जाती है। कौमार्य के मिथक और उसकी भयावह मानसिक प्रतिक्रियाओं के बारे में 'संकड सेक्स' में काफी विस्तार के साथ विश्लेषण किया है। वस्तुतः स्त्री के कुँआरेपन को लेकर पुरुष समाज में जो रुढ़ धारणाएँ हैं, वे न सिर्फ अवैज्ञानिक और अमानवीय हैं। समाज की नैतिक अनैतिक मान्यताओं के संदर्भ में भी अक्सर देखा जा सकता है कि उस पर पुरुष प्रधान संस्कृति का अधिकार बना रहा है।

एक पत्नी के नोट्स की कविता सामाजिक संबंधों को तर्क की कसौटी पर परखते हुए उसका निरंतर चिंतन करती दिखाई देती है। अपने परिवार के सामाजिक अस्तित्व की चेतना उसमें तीव्र है। संभवतः इसी कारण सामाजिक संबंधों के प्रति संदीप की अव्यावहारिकता को अस्वीकार करते हुए उसका विरोध करती है। संदीप ने एक दिन घर आते दास्तों को देखकर स्वयं घर न होने का बहाना बनाया था। सामाजिक संबंधों के प्रति सचेत रहनेवाली कविता उसका विरोध करती हुई कहती है— "मैं तो इस चीज के विल्कुल खिलाफ हूँ कि तूम घर पर रहकर लोगों से कहलवाओ कि तूम नहीं हो, आइन्दा मुझे यह गंदा काम न देना।" 5 सामाजिक सम्पर्कों के इन्हीं दौर से गुजरते हुए लडकियों की लल्ली और अफशाँ दोनो गिरते सामाजिक मूल्यों की यथार्थ तस्वीर प्रस्तुत करती है। ऐसा नहीं है कि लल्ली को दास्तों की कमी थी। वह कहती है कि— "खासी सामाजिक जिंदगी थी। लेकिन मैंने सामाजिकता को अपनी सुविधा के अनुसार ही ग्रहण किया था। मुझे यह पसंद नहीं था कि दोस्त कभी भी धडधडाते हुए मेरे घर में घुस आएँ।" 6 इस तरह लल्ली समाज में अपना अलग अस्तित्व बनाए रखने की कोशिश करती है।

अतः कहा जा सकता है कि ममता जी के उपन्यासों में नारी की सामाजिक स्वतंत्रता का वास्तविक स्वरूप उजागर हुआ है। समाज की दकियानुसी विचारधारा में तबाह होनेवाली संजीवनी, समाज की कृपता का अन्वेषण करनेवाली अफशाँ और लल्ली निश्चित रूप से इन दास्तानों का ठोस साहित्यिक प्रमाण है। एक औसत नारी के रूप में उषा और कविता के धधकते हृदय की आवाज है कि सामाजिक स्वतंत्रता के बिना अन्य सभी स्वतंत्रताएँ अधूरी, खोखली एवं ढोंग हैं।

आर्थिक चेतना —

वर्तमान जीवन संदर्भ में स्त्री-पुरुष की मुख्य प्रवृत्ति है कि धन के लिए वे कुछ भी करने को तैयार हैं। वैसे भी पैसा है तो प्रतिष्ठा है, प्रतिष्ठा है तो उनके सारे दोष क्षम्य हैं। सन

साठ के बाद के उपन्यासों में भी आधुनिक युगबोध को अर्थ से संपृक्त करते हुए यह बतलाने का प्रयास किया है कि स्त्री पुरुष की चेतना की मूल दिशा अर्थ की उपलब्धी है। दोनों की दृष्टी से रुपया शक्ति है, रुपया देवता है, रुपया सबकुछ है।

ममताजी के उपन्यासों में अधिकांश नारी पात्र आर्थिक स्वावलंबन की चेतना के द्वारा संघर्षरत दिखाई देते हैं। आत्मनिर्भरता की भावना से प्रेरित रहते हुए वे घर के बाहर दोनों उत्तरदायित्वों का सफलतापूर्वक निर्वाह करते हैं तथा अपने कर्मक्षेत्र में दृढ़ निश्चय के साथ डटे रहते हैं। शायद यही कारण है कि 'बेघर' का परमजीत संजीवनी भरुचा के संदर्भ में पहली ही मुलाकात में एक साथ बहुत कुछ जान लेना चाहता पर उसने अपने को रोका। परमजीत ने फिल्म का प्रस्ताव उसके समक्ष रखा तो वह बहुत खुश हो जाती है।

एक पत्नी नोट्स की कविता का मानसिक ढोंचा अकादमिक जिंदगी के लिए बना था। वह अपने काम में तन्मय हो जाती थी। कविता की यह आत्मनिर्भरता घर के तनावों का कारण बन जाता है। धीरे धीरे संदीप उसके उपर शक करने लगा। बेबुनियाद आरोप पर फिजूल की बहस से कविता को सख्त नफरत थी। दोनों के अपने अपने अहं थे, अपने अपने वहम थे। वे अपने अपने क्षेत्र में संपूर्ण थे। शायद इसीलिए किसी के आगे झुकना उन्हें बर्दाश्त नहीं था। कविता अपनी नौकरी को महत्व देती है। इस तरह आर्थिक महत्व हर कोई अपने जीवन में दे रहा है।

निष्कर्ष—

इस विवेचना के आधार पर निष्कर्ष के रूप में कहा जा सकता है कि, ममताजी ने युगों से पीड़ित तथा त्रस्त नारी जीवन के विविध पहलुओं को अपने उपन्यासों का विषय बनाया। उन्होंने नारी जीवन को विषमतापूर्ण और दुःखमय बनानेवाली, काम तथा विवाहसंबंधी पारिवारिक, सामाजिक तथा आर्थिक समस्याओं को उभारकर उनकी सूक्ष्म अनुभूतियों को प्रस्तुत किया है। प्रेम, काम और विवाह संबंधी रुढ़िग्रस्त मान्यताओं को अस्वीकार करनेवाली संजीवनी तथा लल्ली, स्वतंत्रता की चेतना में नवीन आयाम प्रस्तुत करती हैं। पारिवारिक और सामाजिक बांधियों का अतिक्रमण करनेवाली उषा और अफशाँ तथा आर्थिक क्षेत्र में अपने स्वतंत्र अस्तित्व की स्थापना के लिए संघर्षरत रहनेवाली कविता आदि नारियाँ अपनी प्रगतिशील चेतना के बूते पर संघर्ष के लिए प्रस्तुत होती हुई दिखाई देती हैं।

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संपादक

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आय.सी.एस.कॉलेज, खेड ता. खेड,

०१. प्रासंगिकता -

चित्रा मुद्गल के पोस्ट बॉक्स नं.२०१३ नाला सोपारा उपन्यास को २०१७-१८ का साहित्य अकादमी द्वारा पुरस्कृत किया गया। वह पढ़कर इस उपन्यास को पढ़ने की मन में रुची पैदा हुई। जब मैंने यह उपन्यास पढ़ा तब मुझे पता चला की इस उपन्यास में जन्म से प्राप्त शारीरिक कमी की वजह से इस उपन्यास का नायक बिन्नी उर्फ बिजली के बहाने हमारे समाज में लम्बे समय से चली आ रही उस मानसिकता का विरोध किया गया है जो मनुष्य को मनुष्य समझने से बचती रही है। यह जातिभेद, वंशभेद, धर्मभेद की पुरानी परंपरा का प्रचलन नहीं है, महज शारीरिक कमी के चलते किसी इंसान को असामाजिक बना देने की क्रूर विडंबना को व्यक्त करके आज के समाज को चेतावनी देकर मनुष्य ने मनुष्य को मानवतावादी दृष्टीकोन से देखने के लिए प्रेरित किया है।

विषय क्षेत्र -

चित्रा मुद्गल के इस उपन्यास में समाज में रहनेवाले ऐसे मनुष्य का चित्रण किया गया है जो परिवार द्वारा ठुकराया जाता है। उसमें उसका कोई दोष न होते हुए भी उसे समाज से वंचित किया जाता है। जो छुपकर पत्र द्वारा अपनी मन की वेदना को माँ के सामने व्यक्त करता है। नायक और उसकी माँ की मानसिकता का चित्रण यही इसका विषय क्षेत्र है।

विषय उपलब्धि -

इस उपन्यास द्वारा अपने ही घर से निकाल दिए गए विनोद की मर्मांतक पीड़ा उसके अपनी बा को लिखे पत्रों में इतनी गहराई से उजागर हुई है की हम खुद यह सोचने पर विवश हो जाते है की क्या शब्द बदल देन भर से अपमान समाप्त किया जा सकता है ? गलियों की गाली हिजडा को किन्नर कह देने भर से बया देह के नासूर छिटक सकते है ? परिवार के बीच पलनेवाले इस बालक को शारीरिक कमी की वजह से परिवार से अलग करके उसे नारकीय जीवन बिताने के लिए मजबूर क्यूँ किया जाता है ? क्या यह उम्मीद नहीं की जानी चाहिए की परिवार तथा समाज अपनी संकुचित सोच से बाहर आकर अपने बेटे को परिवार में रखकर उसका सम्मान बढ़ाए।

उपन्यास में चित्रित मानवतावाद -

हिन्दी साहित्य जगत में अपनी अप्रतिम जगह बना चुकी तथा साहित्य अकादमी पुरस्कृत वरिष्ठ कथाकार चित्रा मुद्गल का यह उपन्यास एक ऐसी वास्तविक कहानी हमारे सामने रखती है। जिससे पाठकों के भीतर मानवीय संवेदना जागृत होती है। बिन्नी उर्फ बिमली की तरफ देखने का अंदाज हमारा परिवर्तित हो जाता है। आज तक इस प्रकार के लोगों ने जो समाजद्वारा प्राप्त उपेक्षा को झेला है उनकी पीड़ा हमारे अंदर कसक पैदा करती है। उस मनुष्य को जिस तरह की जिंदगी जीने पडती है उसमें उसका क्या दोष है ? इस प्रश्न ने पाठकों को अंदर से हिलाकर उसके प्रति मानवतावादी दृष्टीकोन को अपनाने का प्रयास अत्यंत उच्च है।

इस उपन्यास का प्रमुख पात्र बिन्नी उर्फ बिमली उसकी शारीरिक कमी की वजह से उसे घर से उस जगह पर भेजा जाता है जहाँ इस प्रकार के लोग रहते है। तब वह पत्रद्वारा अपनी माँ को पूछवता है- क्या सामान्य लोगों की तरह जीवन जीने का अधिकार न होता मेरा ? जिस नरक में तूने और पापा ने धकेला है मुझे वह एक अन्धा कुआँ है जिसमें सिर्फ सांप-बिच्छू रहते है। बस इस कुएं ने उन्हें आदमी नहीं रहने दिया।

उसकी माँ कोयह विश्वास है कि, हमेशा ऐसी स्थिती नहीं रहनेवाली है। वक्त बदलेगा। वक्त के साथ नजरिया बदलेगा। इस वाक्य से पता चलता है की लेखिका की दृष्टी सकारात्मक बातें सोचती है। वह जताती है की भविष्य में इस अधूरेपन का भी कोई इलाज निकल आए। माँ आपने लाडले बेटे को पत्र लिखती है मगर पोस्ट ऑफिस के नाम से तब उसके मन में सवाल उठता है -क्या मेरा कोई घर नहीं है।

नचमुच मनुष्य दूसरे मनुष्य के बारे में क्यों साचता नहीं है ? जिस माता ने उसे छिपाती है | ट्रेन में पैसे मांगते हुए स्त्रियाँ इनकी तरफ तिरस्कार की दृष्टी से देखती है तब वह चिढ़कर बोलता है - माँ ... भूल जाती है | पैदा हमें उन्हें सालियो ने किया है | उस वक्त इनकी ममता कहाँ खो जाती है ? पढ़कर मन में कसक पैदा होती है | उन्हें सामान्य मनुष्य की तरह जीने ज़ाहज़ होज़र भी उन्हें समाज द्वारा तिरस्कृत किया जाता है | उनका दोष न होते हुए भी जीवन में उन्हें नरक यातनाएँ भुगतनी पडती है यह कौनसा मानवतावाद है ?

मोटा भाई की पत्नी सेजल को पाँचवा महिना चल रहा है मगर वह बच्चे के विषय में सदा उद्वग्न और आशंकित रहता है | उसके दिमाग में जाने कैसी उटपटांग शंकाएँ रहती है | जब सोनोग्राफी होने के बाद डाक्टर ने पुछा आपको लडका-लडकी दोनो स्वीकार है तो फिर आपने सोनोग्राफी क्यूँ की ? तब मोटा भाई कहता है, वह लडका-लडकी न होकर रह कोई अन्य हो तो ? हम उसे रखना नहीं चाहते थे | मतलब है की ऐसे बच्चे कोई पसंत नही करता | उनके प्रति कोई भावना या संवेदना नही है | उपर से व्यंग्य दर्शानेवाली बात यह है कि मोटे भाई का नाम सिध्दार्थ रखा गया है | जो नाम विश्व को मानवतादी संदेश देनेवाले महात्मा गौतम बुध्दजी का था | इतने संकुचित क्यूँ होते है लोग ? जब वह छोटा था तब जोत्सना से ब्याह करने का सपना देखता था | वह बच्चा एक आम जिंदगी जीना चाहता था मगर उसके जीवन में नरक आ गया है जिसे वह चाहकर भी बदल नहीं सकता | घरवालों ने लोगों को बताने के लिए एक झूठ का निर्माण किया | विनोद जीप एक्सीडेंट में मर गया बॉडी नहीं मिली | खोज जारी है | इस नाटक का पता विनोद को उसके दोस्त ईशानद्वारा पता चल जाता है | समाज के आँखों में धूल फेंकना आसान होता है मगर खुद की आँखों की धूल निकालना मुश्किल हो जाता है |

उपन्यास का नायक सोचता है कि, - इन्सान बदल क्यों नहीं सकता ? मैं तो चाहता हूँ बा, वो बदले | वो ही क्यों सभी | पूरी बिरादरी जहाँ कहीं भी हो | समूचे हाथ-पैर, दिल-दिमाजवाले लम्बा-तडंग रुलंक क्यों है ? किसी की कलाई धर लें तो वह उनसे छूट पाने से रहा | ऐसी दुर्दम्य शक्ति, वीर्य वमन से वंचितों के भीतर ही संभव है | उन्हें ज्ञात ही नहीं |

जगणगणना में किन्नरों को शामिल कर लिया है | ऐसा पूनम जोशी कहती है | लेकिन लोगो की सोच को कौन बदलेगा ? उन्हें संवेदनाशील जैन बनाएगा ? तभी माँ-पिता अपने लिंग दोषी बच्चे को कलंक मान किन्नरों के हवाले नहीं करेंगे | हमें अन्य-0 श्रेजी में संवेदना को जगाना क्या नैतिकता मानी जाती है ? उसे मानवीय मुद्दा बनाकर उठाया जा रहा है | आगे उपन्यास में विधायक उर्फ बाऊनी नामक पात्र को लाकर विनोद उनके यहाँ नौकरी करने लगता है | विधायकजी नामक पात्र संवेदना तथा आत्मीयता से भरा हुआ है | विनोद एक तरु पढता है | और दूसरी तरफ काम में जुड जाता है | विनोद के पहले काम करनेवाला हरिश विधायकजी की संवेदनाओं के साथ किस तरह खेलता है वह बताकर आज की युवापिढी का जीवन के प्रति असंवेदनशील और स्वार्थी दृष्टीकोन व्यक्त किया गया है | जिसके जीवन में अभाव रहता है वह जीवन की तरु-गंभीर चिंतनात्मक भाव से देखता है | जिन युवकों को सबकुछ मिलता है वह उसकी कद्र नहीं करते | हरिश माँ और विधायकजी दोनों के प्यार के साथ खिलवाड करता है तो अच्छे मनुष्यों के मन में निराशा छा जाती है | लेकिन विनोद के प्रति आत्यंतिक प्रेम और आत्मीयता विधायकजी दिखाने लगते है तो उसके मन कुछ देर जे लिए मन में संदेह पैदा हो जाता है | बचपन से विनोद ने सबका उपहास सहा है इसलिए वह मुँह खोलकर कभी हँसा नहीं था | बचपन में उसका दोस्त ईशान उसे चढाते हुए कहता था - तू मुँ खोलकर क्यों नहीं हँसता | मुँह में हापुस की गुठली फंसी हुई है क्या ? प्रोफेसर वर्मा सभ्यता की आड में राजनीती को वोट मिलाने के लिए प्रयत्नशील है | विनोद अपनी बिरादरी के लिए लडकर हमारी पार्टी में आ जाय इसलिए रबी जी जैसा यकती उसे उपहार देकर अपने कब्जे में करना चाहता है मगर स्वाभिमानी विनोद उसे स्वीकार नहीं करता | मानवयिता का भाव रखाकर स्वार्थ विनोद किन्नर बिरादरी का संघर्ष इसलिए करता है क्योंकि यह संघर्ष मनुष्य माने जाने का संघर्ष है | विधायकजी के तीजे का पुनम के साथ अन्यायकारी बतीव मानवता को केलंक लगाता लिंग दोषी बच्चों को परिवार ने अपना ही मानना चाहिए उन्हें माज में अकेला छोडना कहाँ का मानवतावाद है ?

उपन्यास में चित्रित समकालीनता -

उपन्यास के विकास क बारे में डॉ. गणपतीचंद्र गुप्तजी ने कहा है कि विभिन्न प्रयोगो की लंबी श्रृंखला के बाद हमारे उपन्यास हित्य का पाठ चौडा अवश्य हुआ है, पर उपन्यासकार की दृष्टि तलस्पर्शी नहीं हो पायी, अतः वह मानव का जो उसके पूर्ण आयायों में तुत नहीं कर पाया है | अभी वह समय आना है जब भिन्न भिन्न प्रसंगो घटनाओं और पात्रों की सृष्टि इतनी यथार्थ और नैसर्गिक होगी वह पाठक को सच्ची और विश्वसनीय लगेगी |

चित्रा मृदंगल के इस उपन्यास को पढ़ने के बाद गुप्तजी ने कही हुई बात यथार्थ साबित होती है। आधुनिक काल में समाज में सभ्यता को बनाये रखने के लिए परिवार अपने बच्चे को सबके लिए मरा हुआ साबित करता है और उसे घर से बेदखल करता है। इतना ही नहीं वह ज भी जि सी परिवारवाले से न मिले इसलिए मकान भी परिवर्तित किया जाता है। वह बच्चा जिसका कोई अपराध न होते हुए अपनी उम्र में सजा भुगतता है। अपनी माया, ममता को वह दिल में दबाकर रखने के लिए विवश किया जाता है। जिसे आम इन्सान की तरह जिंदगी ना मिली हो उसे आत्मीय संवेदना जब मिलती है तो वह इन्सान जीने की तमन्ना को उभारता है। जो इस उपन्यास पत्र के माध्यम से पूरा करने की कोशिश की गयी है। आधुनिक काल के लोग सभ्यता को बनाए रखने के लिए इच्छा के विरोध में काम कर रहे हैं। लेकिन इस उपन्यास का प्रमुख पात्र अपनी इच्छा के अनुसार जीना चाहता है। वह कहता है की, इच्छा न हो तो दिखावा करना जरूरी नहीं। असामाजिक तत्वों के हाथ की कठपुतली बनने में जितनी भूमिका किन्नरों के संदर्भ में सामाजिक बहिष्कार तिरस्कार की रही है, उसमें कम उनके पथभ्रष्ट निरंकुश सरदारों और गुरुओं की की नहीं। उपर से विकल्पहीनता की कुठ ने उन्हें आंधी का तिनका बना दिया। आधुनिक लोग पिछड़ी परंपराएं और मान्यताओं में विश्वास नहीं रखते। गुंडागर्दी करनेवालों के हाथों में वह अपने शिशु को आशीर्षन का अधिकार कैसे सौंप सकते हैं? बुजुर्गों की बेसिर-पैर की बातें एस और आशिर्षन का सम्मान तो दुसरी ओर उन्हें कलंक मान घर-परीवार से उनका निष्कासन।

मतलब है की जब मनष्य दुसरों के मुताबि न चलने की जिद्द पकडता है तभी वह अपनी तरह से जी सकता है। अपने आपको जि सजे सामने झुकता है यह भी खुद तय करें तो वह जीवन स्वाभिमान लगता है। आधुनिक काल की व्यवस्था के लिए जो वाक्य अपनाया गया है वह आत्मा की गहराई तक पहुँच जाता है। विनोद कहता है, फैली चीजे आमंत्रित करती हैं व्यवस्थित होने के लिए। व्यवस्थित चीजें निष्क्रिय।

आदमी और औरत का रिश्ता खूबसुरत होता है इसक कल्पना विनोद करता है मगर आधुनिक काल में पती-पत्नी के भीतरी संघर्ष, कडवाहट, खीझ, उपेक्षा, तिरस्कार को उसने कभी महसूस नहीं किया। जिसके पास जिस बात की कमी है वह उसे कल्पना से माध्यम से महसूस करने का प्रयास करता है। जो जिसके पास है उसे उसका मोल नहीं है।

उपन्यास में चित्रित राजनीतिकता -

किन्नरों को वोट देने का हक मिलने के राजनितिक पक्ष उत्साह के साथ सहभागी हो रहे हैं। उन्हें किन्नरों के बारे में सहानुभुती नहीं है, उन्हें सिर्फ वोट कमाने का लालच है। विनोद उनके इस कार्य में साथ दें और किन्नरों का संगठन बनाये यह चर्चा हो रही है। राजनीति में मतलब साध्य करने के लिए कौन किसे महान बनाए कहा नहीं जा सकता। हजडा बिरादरी का संमेलन भरवाया जा रहा है इस वाक्य आज की राजनीति पर तीखा व्यंग्य कैसा गया है। जो सहृदय व्यक्ती को चुमता है। अब विनोद संमेलन के सभापती, मुज्य अतिथि और बीज-वक्ता बनेंगे। वह अपना ओजरवी मर्मस्पर्शी भाषण देकर मोटी चमडीवालों के हृदय को हिला देगा। किन्नरों के आरक्षण का मामला उठेगा, लपटे आसमान छुएंगी। उनके प्रति करुणा जगाने का मुद्दा उठाया जा रहा है। विनोद समाज पर व्यंग्य कसते हुए कहता है की, इक्कीसवीं सदी में जीते हुए जो समाज सदियों पुराने अंधविश्वास को गले से लगाए हुए है, आज भी उसे झटकने को राजी नहीं। सचमुच आज पढा लिखा समाज भी उसी गर्त में फँसा हुआ दिखाई दे रहा है। ज्ञान से मनुष्य में परिवर्तन होना चाहिए मगर असलियत में पढा लिखा इन्सान ज्ञान पाकर भी उसी तरह आचरण कर रहा है यह देखकर ज्ञान पर संदेह निर्माण होने लगता है। राजनीतिवाले लोग इसी अज्ञानी जनता का लाभ उठाने के लिए तत्पर हैं। धोखाधडी, अंधविश्वास, भ्रष्टाचार परंपरागत मान्यताओं को बनाए रखने का साहस यह नेता लोग आज्ञानी से इसलिए कर रहे हैं, क्योंकि जनता में संगठन नहीं है। हर कोई अपनी-अपनी बात सोच रहा है। समाज के होत में अपना हित होता है यह समझ में नहीं आ रही है।

उपन्यास में वर्णित सामाजिकता -

विनोद का कहना है की हमें तिसरे खाते में आरक्षण नहीं चाहिए। आरक्षण देना ही है, तो सरकार उन्हें उन्हीं दो खातों के भीतर दे जिन खातों के भीतर जन्म लेनेवाले सभी मनुष्यों को मिलता है। उन्हें चुनने की सुविधा दे। जिस खाने को वे स्वयं के लिए चुनना चाहें जो हानो चाहें। अगर कन्या भ्रूण हत्या पाप है, अपराध है तो जननांग दोषी बच्चों को लागनेवालों को भी कानूनन दंड देना चाहिए।

विनोद जैसे जननांग दोषी बच्चा घर में पैदा होने का मतलब है की सात पुस्तों तक भी दागन धुले, ऐसे कलंक से अपने प्रतिष्ठित समाज की नजरों से बचाने के लिए पापा ने उस बच्चे की मृत्यु का नाटक रचाया। लेकिन कल अगर मीडिया के सामने सच्चाई प्रकट हो गयी तो पापा को हृदयाघात न हो पाए। कितनी यथार्थता है इसके कहने में। मनुष्य अपने बच्चों की भावनाओं को न समझकर

वह समाज का विचार क्यों करता है | हर मनुष्य के जीवन में जिस तरह दो रास्ते आते हैं वैसे विनोद की जिंदगी में भी दो रास्ते आ गये हैं | एक है स्वार्थ और दुसरा है परमार्थ | किस चुनना है ? यह आत्मिक संस्कृति बतायेगी | बचपन से जिन किन्नरों को अलग प्रकार की ताली बजाने के लिए सिखाया गया हो तो वह सामान्य ताली कैसे बजा सकते हैं | वह उन्हें सीखाना पड़ेगा | परिवर्तन अचानक होनेवाली चीज नहीं है वह धीरे-धीरे होता है | पहली बार इस उपन्यास में किन्नरों की पीड, वंचना, यातना और संवेदनाओं को व्यक्त किया गया है | जिन्हें दोषी मानकर घर से निकाला गया है उन्हें ससम्मान वापस घर जाना है यह इस संगठन का मतलब माना जा रहा है | परिवर्तन सबसे पहले नलि माँगता है | जो व्यवसाय किन्नरों द्वारा किया जा रहा है वह उनकी आत्मवंचना है | उसका धिक्कार हर किन्नरों द्वारा होना चाहिए | समाज द्वारा प्राप्त अपमान, अवहेलना, खीज, कुंठा को वह सहेंगे नहीं | उन्हें भी सम्मान से जीने का हक कानूनन मिलना चाहिए | बिना लिंग या अविक्सित लिंग के प्राणी मनुष्य नहीं है ऐसी सोच को अस्वीकार करना होगा | किन्नर बिरादरी का संघर्ष सिर्फ वोट पाने का अधिकार या आरक्षण न होकर उन्हें मनुष्य माने जाने का संघर्ष था | राजनीतिवाले यही नहीं चाहते हैं | इसलिए विनोद पर इन लोगों को दबाव बढ़ता हुआ दिखाया जा रहा है |

मानव के भीतर की दरिन्दगी -

पूनम जोशी जो किन्नर जाति होकर सदा विनोद का साथ देती है | वह उसे बीजी कहकर पुकारता है | चंदिगड से अपने कमरे में वापस लौटे विनोद को पता चलता है की पूनम जोशी आई.सी.यू. में दाखिल है | रात देह के करीब नाजुक हालत में पुनम को विधायकजी ने यहा इमरजेंसी में दाखिल करवाया | चंद्रा ने विनो को पूनम के साथ हुए भयानक हादसे का सच सुनाया तब विनोद का दिल कॉप उठा | विधायकजी भतीजा और उसके दोस्तों ने उसके साथ जो मजाक किया उसे मनुष्ये अंदर की दरिन्दगी से सीखा क्या कह सकते हैं ? आज की युवा पीढ़ी धन के बल पर मानवता को भूल गयी है | उनके मन में सदा शैतान जागता है | यह मानव जाति के सबसे बड़े कलंक है लेकिन यह कल बाइज्जत बरी हो जायेंगे क्योंकि किन्नर जाति की कोई इज्जत नहीं होती | कानून उन्हें सजा नहीं दे सकता क्योंकि यह अपराध नहीं है | जवान खून आजकल धन के बलपर बहक रहा है | उसे बहकानेवाले उनके माता-पिता के संस्कार है या समाज के संस्कार कुछ न समझनेवाली घटना है | एक तरफ सम्मान पाने के लिए तरसनेवाले किन्नर और दुसरी तरफ असंस्कृत और धन के बलपर दुनिया को मुठ्ठी में करनेवाली दरिन्दगी देखकर मन बेचैन हो जाता है | मानवता के प्राण खींचकर ले जानेवाली यह बर्बरता हमें सुखी बना देती है |

निष्कर्ष :-

इस उपन्यास में मानवतावादी भावनाओं को झुंझोरा गया है | किन्नरों की बिरादरी को परिवार समाज और पूरे विश्व में उनके अधिकार प्राप्त होने चाहिए | उनके लिए अलग कानून बनाने होंगे | जिन लोगों बचपन से अपनों से भी तिरस्कार मिलता है वह मानवता को कैसे स्वीकार सकते हैं ? अच्छे परिवारवालों के युवक धिनौनाकृत्य इसलिए करते हैं कि उनके उपर उचित संस्कार हुअे नहीं है | हमें अपने अंदर परिवर्तन करना होगा | मनुष्य और मनुष्य के बीच प्रेम की दार्शनिकता को न लाकर आत्मीयता और संवेदना को जगाना होजा |

संदर्भ ग्रंथ-

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| ०१. | हिंदी साहित्य युग और प्रवृत्तियाँ | - | शिवकुमार शर्मा |
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| ०४. | पोस्ट बॉक्स नं. २०३ | - | गालासोपारा- चित्रा मुद्गल |

18. Dielectric Relaxation Study in a Binary Mixture of Multi-Functional Compounds using Bruggeman Model

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Abstract

The complex permittivity spectra for ethanolamine-diethanolamine binary mixture have been determined over the frequency range of 10 MHz to 20 GHz, at 5, 10, 15, 20, 25, 28, 30, 35, 40 and 45°C using time domain reflectometry (TDR) method for 11 concentrations of the system. The present work reveals molecular interaction between same multi-functional groups [–OH and –NH₂] of the alkanolamines [ethanolamine–diethanolamine] with different molecular size (carbon chain), on the basis of evaluation the static dielectric constants for the mixture have been fitted with the modified Bruggeman model.

1. Introduction

The aim of the dielectric relaxation study is to understand intermolecular interaction in a molecular system and the structural changes in liquid due to change in amount of hydrogen bonding by using dielectric spectroscopy. The relative changes in dielectric parameters are more important to predict structural changes in liquid. An extensive study of dielectric behavior of the polar-polar mixture at different concentrations and temperatures has led to valuable information regarding hydrogen bonding and solute-solvent interaction^[1-4]. Considerable dielectric relaxation study has been done in ethanolamine with diethanolamine^[5,6]. Earlier to this work, no work was reported on structural properties of binary polar mixtures at melting points using Bruggeman model. The objective of the present work is to report the dielectric relaxation study on ETA-DEA mixture at different temperatures and their melting points.

2. Experimental and Data Analysis

2.1 Chemicals

ETA (Qualigens fine chemicals Pvt. Ltd., Mumbai, India) and DEA (Merck Specialties, Pvt. Ltd., Mumbai, India) were used without further purification. The solutions were prepared at 11 different volume percentage of DEA from 0 % to 100 %. Using these volume percent the mole fraction is calculated as

$$x = (v_1\rho_1/m_1) / [(v_1\rho_1/m_1) + (v_2\rho_2/m_2)]$$

where m_i , v_i , and ρ_i represent the molecular weight, volume percent, and density of the i^{th} ($i=1, 2$) liquids, respectively.

2.2 Apparatus

The complex permittivity spectra were studied using the time domain reflectometry^[7-10] method. The Hewlett Packard HP 54750 sampling oscilloscope with HP 54754A TDR plug in module has been used. A fast rising step voltage pulse of 200 mv about 39 ps rise time generated by a pulse generator was propagated through a coaxial line system of impedance 50 Ω . Transmission line system under test was placed at the end of coaxial line in the standard military applications (SMA) coaxial connector with 3.5 mm outer diameter and 1.35 mm effective pin length. All measurement was done under open load conditions. The change in the pulse after reflection from the sample placed in the cell was monitored by the sampling oscilloscope. In the experiment, time window of 5 ns was used. The reflected pulse without sample $R_1(t)$ and with sample $R_x(t)$ were digitized in 1024 points in the memory of the oscilloscope and transferred to a PC through 1.44 MB floppy diskette drive.

The temperature controller system with water bath and a thermostat has been used to maintain the constant temperature within the accuracy limit of ± 0.5 $^{\circ}\text{C}$. The sample cell is surrounded by a heat insulating container through which the water of constant temperature using a temperature controller system is circulated. The temperature at the cell is checked using the electronic thermometer.

2.3 Data Analysis

The time dependent data were processed to obtain complex reflection coefficient spectra $\Gamma(\omega)$ over the frequency range from 10 MHz to 20 GHz using Fourier transformation^[11, 12] as

$$\Gamma(\omega) = (c/j\omega d)[p(\omega)/q(\omega)] \quad (1)$$

where $p(\omega)$ and $q(\omega)$ are Fourier transforms of $[R_1(t) - R_x(t)]$ and $[R_1(t) + R_x(t)]$ respectively, c is the velocity of light, ω is angular frequency, d is the effective pin length and $j = \sqrt{-1}$.

The general form of the relaxation model is given by the Havriliak-Negami expression^[13]

$$\epsilon^*(\omega) = \epsilon_\infty + \frac{(\epsilon_0 - \epsilon_\infty)}{[1 + (j\omega\tau)^{1-\alpha}]^\beta} \quad (4.1)$$

where $\epsilon^*(\omega)$ is the complex permittivity at an angular frequency ω , ϵ_0 is the static permittivity, ϵ_∞ is the permittivity at high frequency, τ is the relaxation time of the system, α is the shape parameter representing symmetrical distribution of relaxation time and β is the shape parameter of an asymmetric relaxation curve.

Equation (4.2) includes Cole-Cole ($\alpha=1$)^[14], Davidson-Cole ($\alpha=0$)^[15], and Debye ($\alpha=0, \beta=1$)^[16] relaxation model. The relaxation behavior of ETA-DEA system agrees with the Debye model. Therefore the experimental values of $\epsilon''(\omega)$ were fitted with the Debye equation.

$$\epsilon''(\omega) = \frac{\epsilon_0 - \epsilon_\infty}{1 + j\omega\tau} \quad (4.2)$$

with ϵ_0 , ϵ_∞ and τ are the adjustable parameters. A nonlinear Least-Squares fit method^[17] was used to determine the values of dielectric parameters.

3. Results and Discussion

The density and ϵ' values of pure liquid used are given in table (1). The static dielectric constant (ϵ') and relaxation time (τ) obtained by fitting experimental data with the Debye equation.

The values of static dielectric constant randomly increase with increasing the temperatures up to the melting points of ETA and DEA in the system, and then it becomes smoothly decreases with increase in temperatures.

The melting point of ETA is 10.5°C and DEA is 28°C. The values of relaxation time decreases with increase of temperature, but these values suddenly decreases at the melting points of ETA and DEA in the system.

Table 1: Comparison of data for the liquids used with literature values at 25°C.

Liquids	ϵ_0		$\rho/(g.cm^{-3})$	
	This work	Lit.	This work	Lit.
Ethanolamine	31.60 (30°C)	31.46 ^b	1.0180	1.0181 ^a
Diethanolamine	22.54	22.60 ^a	1.0966	1.0975 ^c

where a, b and c data taken from references^[18-20] respectively.

The modified Bruggeman equation^[21] is another parameter which may be used an indicator of liquid 1 and 2 interaction. The Bruggeman factor f_B is given by

$$f_B = \left(\frac{\epsilon_{0m} - \epsilon_{02}}{\epsilon_{01} - \epsilon_{02}} \right) \left(\frac{\epsilon_{01}}{\epsilon_{0m}} \right)^{1/3} = (1 - \phi_2) \tag{4}$$

According to equation (4), a linear relationship is expected which will give a straight line when plotted f_B against ϕ_2 . However, here the experimental values of f_B were found to deviate from the linear relationship. The Bruggeman dielectric factor f_B versus volume fraction ϕ_2 of DEA at various temperatures is given in figure (1).

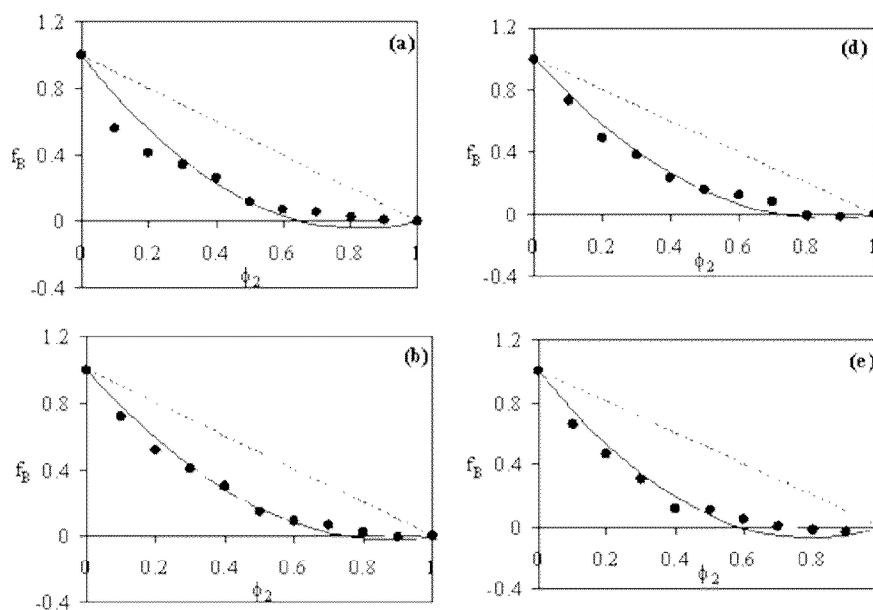
To fit the experimental data, the above equation has been modified^[22, 23]

$$f_B = 1 - [a - (a-1)\phi_2]\phi_2 \tag{5}$$

where 'a' is numerical fitting parameter.

The parameters 'a' were determined for all systems. The value of 'a' = 1 corresponds to the ideal Bruggeman mixture formula. The deviation from 1 relates to corresponding liquids 1 and 2 interactions.

The values of 'a' are listed in table (2). The values of 'a' indicates the strong intermolecular interaction for ETA-DEA system.



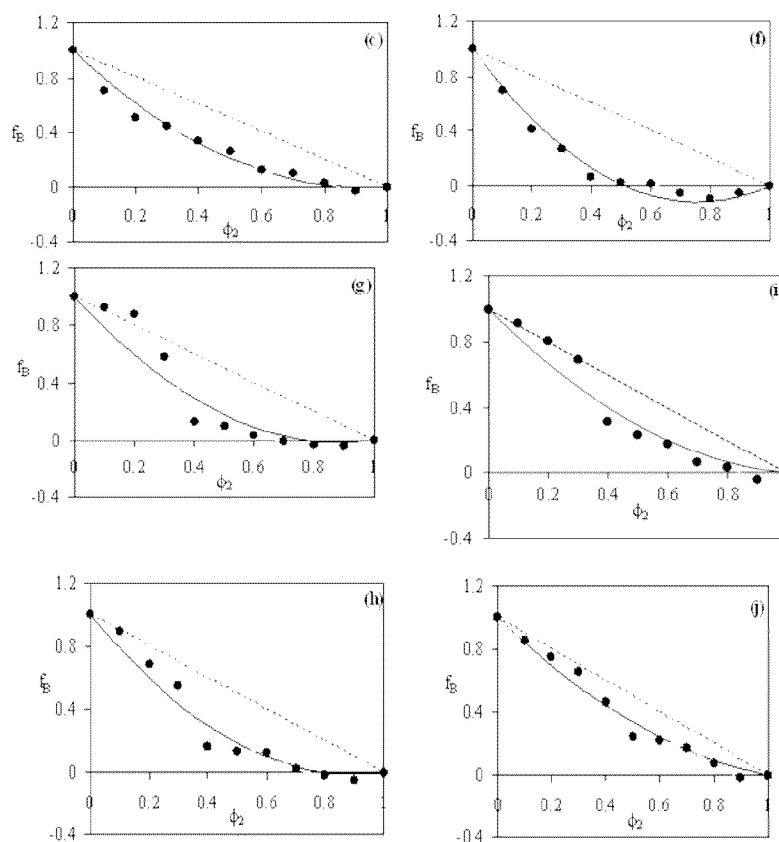


Figure 1 Bruggeman factor (f_B) versus volume fraction (ϕ_2) of DEA at (a) 5°C (b) 10°C (c) 15°C (d) 20°C (e) 25°C (f) 28°C (g) 30°C (h) 35°C (i) 40°C (j) 45°C. Dashed line represents theoretical Bruggeman model. Solid line represents Bruggeman model obtained from equation (5). Marker \bullet denotes experimental results.

Table 2: Values of ‘a’ for ETA-DEA at different temperatures

T/°C	Values of ‘a’
5	2.523
10	2.339
15	2.170
20	2.372
25	2.702
28	2.951
30	2.275
35	2.267
40	1.817
45	1.669

The values of 'a' decrease with increase temperatures in the system. The large deviation of 'a' suggest the strong interaction between ETA and DEA and small deviation of 'a' suggests the weaker interaction between ETA and DEA. At the melting points of ETA and DEA takes the strong interactions between them in the system.

Conclusion

Dielectric relaxation parameters are reported in this work for ETA-DEA mixture at various temperatures and concentrations. This data provide information regarding solute-solvent interaction in liquids. The value of static dielectric constants increases up to their melting points then it becomes decreases with increase in temperatures. This indicates that the change of phase from semi solid to liquid state in the system. The static dielectric constant decreases and relaxation time increases with increase the concentration of DEA in ETA for all temperatures. The dielectric behaviour of this binary mixture is found to agree with the modified Bruggeman equation.

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STRUCTURAL PROPERTIES INA BINARY MIXTURE OF DIETHANOLAMINE WITH TRIETHANOLAMINE USING BRUGGEMAN MODEL

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ABSTRACT

The structural properties for diethanolamine with triethanolamine binary mixture have been determined over the frequency range of 10 MHz to 20 GHz, at various temperatures using time domain reflectometry (TDR) method for 11 concentrations of the system. The present work reveals molecular interaction between same multi-functional groups [-OH and -NH₂] of the alkanolamines [diethanolamine and triethanolamine] with different molecular size (carbon chain), on the basis of evaluation the static dielectric constants for the mixture have been fitted with the modified Bruggeman model.

KEY WORDS – Static dielectric constant, Bruggeman model, Time domain reflectometry technique.

INTRODUCTION

This dielectric study of binary polar liquids provides information regarding solute-solvent interaction. Considerable dielectric relaxation study has been done in aqueous solutions[1]-[6]. The diethanolamine (DEA) and triethanolamine (TEA) are multifunctional substances that are capable of hydrogen bonding by both donation and acceptance of hydrogen bonds. Their properties, in this respect, have not so far been determined, and it should be of interest to see how one functional group (the two hydroxy and primary secondary functional groups) affects to the behavior of the other (the two hydroxy and tertiary amine functional groups). Diethanolamine (DEA) and triethanolamine (TEA) both are highly polar liquids. Dielectric relaxation of liquid mixture gives information about molecular interactions. The objective of the present work is to report the dielectric relaxation study for DEA-TEA system at various concentrations and temperatures.

EXPERIMENTAL AND DATA ANALYSIS

A. Chemicals

DEA (AR grade, Merck Specialties, Pvt. Ltd., Mumbai, India) and TEA (AR grade, Qualigens fine chemicals Pvt. Ltd., Mumbai, India) were used without further purification. The solutions were prepared at 11 different volume percentage of DEA from 0 % to 100 %. Using these volume percent the mole fraction is calculated as

$$x = (v_1\rho_1/m_1) / [(v_1\rho_1/m_1) + (v_2\rho_2/m_2)]$$

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where m_i , v_i , and ρ_i represent the molecular weight, volume percent, and density of the i^{th} ($i=1, 2$) liquids, respectively.

B. Experimental and Data Analysis

The complex permittivity spectra were studied using the time domain reflectometry[7]-[10] method. The Hewlett Packard HP 54750 sampling oscilloscope with HP 54754A TDR plug in module has been used. A fast rising step voltage pulse of 200 mv about 39 ps rise time generated by a pulse generator was propagated through a coaxial line system of impedance 50 Ω. Transmission line system under test was placed at the end of coaxial line in the standard military applications (SMA) coaxial connector with 3.5 mm outer diameter and 1.35 mm effective pin length. All measurement was done under open load conditions. The change in the pulse after reflection from the sample placed in the cell was monitored by the sampling oscilloscope. In the experiment, time window of 5 ns was used. The reflected pulse without sample $R_i(t)$ and with sample $R_x(t)$ were digitized in 1024 points in the memory of the oscilloscope and transferred to a PC through 1.44 MB floppy diskette drive.

The temperature controller system with water bath and a thermostat has been used to maintain the constant temperature within the accuracy limit of ± 0.5 °C. The sample cell is surrounded by a heat insulating container through which the water of constant temperature using a temperature controller system is circulated. The temperature at the cell is checked using the electronic thermometer.

The time dependent data were processed to obtain complex reflection coefficient spectra over the frequency range from 10 MHz to 20 GHz using Fourier transformation[11],[12] as

$$\rho^*(\omega) = (c/j\omega d)[p(\omega)/q(\omega)] \tag{1}$$

where $p(\omega)$ and $q(\omega)$ are Fourier transforms of $[R_1(t) - R_x(t)]$ and $[R_1(t) + R_x(t)]$ respectively, c is the velocity of light, ω is angular frequency, d is the effective pin length and $j = \sqrt{-1}$.

The general form of the relaxation model is given by the Havriliak-Negami expression[13]

$$\epsilon^*(\omega) = \epsilon_\infty + \frac{(\epsilon_0 - \epsilon_\infty)}{[1 + (j\omega\tau)^{(1-\alpha)}]^\beta} \tag{2}$$

where $\epsilon^*(\omega)$ is the complex permittivity at an angular frequency ω , ϵ_0 is the static permittivity, ϵ_∞ is the permittivity at high frequency, τ is the relaxation time of the system, α is the shape parameter representing symmetrical distribution of relaxation time and β is the shape parameter of an asymmetric relaxation curve.

Equation (2) includes Cole-Cole ($\beta=1$)[14], Davidson-Cole ($\alpha=0$)[15], and Debye ($\alpha=0, \beta=1$)[16] relaxation model. The relaxation behavior of ETA-DEA system agrees with the Debye model. Therefore the experimental values of $\epsilon^*(\omega)$ were fitted with the Debye equation.

$$\epsilon^*(\omega) = \epsilon_\infty + \frac{\epsilon_0 - \epsilon_\infty}{1 + j\omega\tau} \tag{3}$$

with ϵ_0 , ϵ_∞ and τ are the adjustable parameters. A nonlinear Least-Squares fit method[17] was used to determine the values of dielectric parameters.

RESULT AND DISCUSSION

The density and ϵ_0 values of pure liquid used are given in table (1). The static dielectric constant (ϵ_0) and relaxation time (τ) obtained by fitting experimental data with the Debye equation for DEA-TEA system.

TABLE I
COMPARISON OF DATA FOR THE LIQUIDS USED WITH LITERATURE VALUES AT 25°C

Liquids	ϵ_0		$\rho/(\text{g.cm}^{-3})$	
	This work	Lit.	This work	Lit.
Diethanolamine	22.54	22.60 ^a	1.0966	1.0975 ^c
Triethanolamine	28.09	28.11 ^b (30°C)	1.1242	1.1253 ^d

Where a, b, c and d data taken from references[18]-[21] respectively.

The values of static dielectric constant randomly increase with increasing the temperatures up to the melting points of DEA and TEA in the system, and then it becomes smoothly decreases with increase in temperatures. This behavior of static dielectric constants of DEA and TEA indicates that the change of phase from semi solid state to liquid state and increase in static dielectric constant may be correlated to disturbance in antiparallel arrangement of dipoles which leads to increase effective dipole moment. The melting point of DEA is 28°C and TEA is 20.5°C. The values of relaxation time decreases with increase of temperature, but these values suddenly decreases at the melting points of DEA and TEA in the system. This rapid decrease in relaxation time indicates the change in phase from semi solid to liquid state in the TEA-DEA system. The sharp decrease in relaxation time indicates the fast rotation of the molecules in the system.

The modified Bruggeman equation[22] is another parameter which may be used an indicator of liquid 1 and 2 interaction. The Bruggeman factor f_B is given by

$$f_B = \left(\frac{\epsilon_{0m} - \epsilon_{02}}{\epsilon_{01} - \epsilon_{02}} \right) \left(\frac{\epsilon_{01}}{\epsilon_{0m}} \right)^{1/3} = (1 - \phi_2) \quad (4)$$

According to equation (4), a linear relationship is expected which will give a straight line when plotted f_B against ϕ_2 . However, here the experimental values of f_B were found to deviate from the linear relationship.

The Bruggeman dielectric factor f_B versus volume fraction ϕ_2 of DEA at various temperatures is given in figure (1).

To fit the experimental data, the above equation has been modified[23],[24]

$$f_B = 1 - [a - (a-1)\phi_2]\phi_2 \quad (5)$$

where 'a' is numerical fitting parameter.

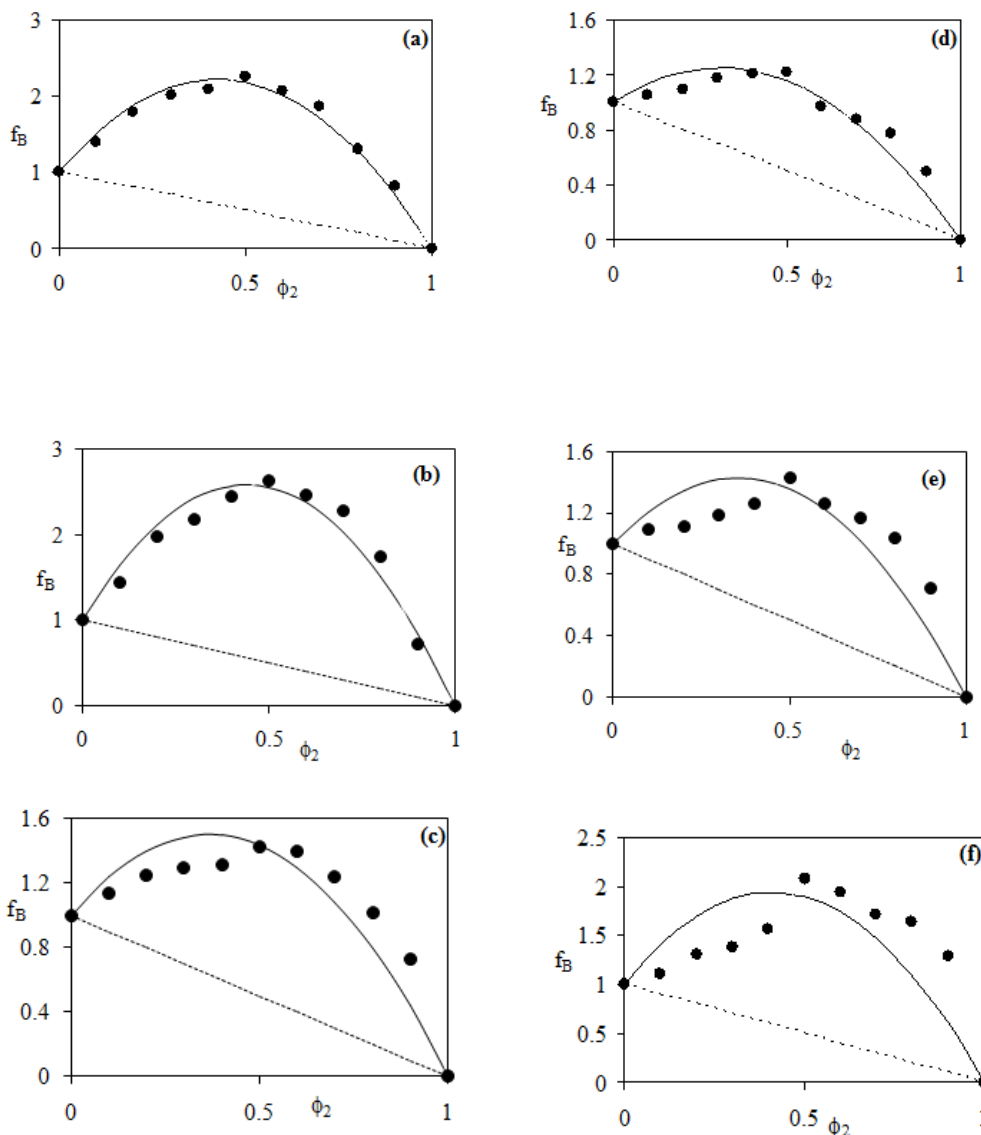
The parameters 'a' were determined for all systems. The value of 'a' = 1 corresponds to the ideal Bruggeman mixture formula. The deviation from 1 relates to corresponding liquids 1 and 2 interactions.

The values of 'a' are listed in table (2). The values of 'a' indicates the strong intermolecular interaction for DEA-TEA system.

The static dielectric constant of two liquid mixture must lie somewhere between two extremes corresponding to static dielectric constant of two pure liquids. In order to understand molecular interaction on the mixtures of two liquids, mixture formula proposed by Bruggeman. The Bruggeman dielectric factors of few binary mixtures of polar molecules are studied.

It is observed that the experimental values of Bruggeman factor f_B were found to deviate from the linear relationship. The Bruggeman dielectric factor f_B versus volume fraction of TEA at various temperatures

is given in figure (1). The value of 'a' for the system is negative for all the temperatures in the system. The values of 'a' < 1 indicates that the effective volume fraction of TEA in DEA has increased by a factor $[a - (a-1)\phi_2]$. The values of 'a' < 1 suggests weaker intermolecular interaction for the system DEA-TEA.



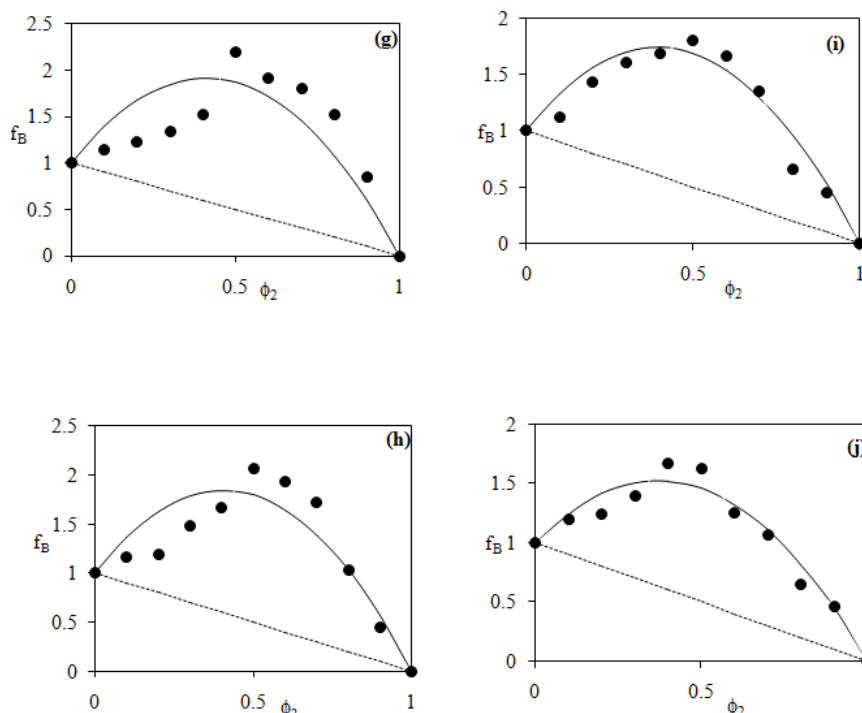


Figure 1. Bruggeman factor (f_B) versus volume fraction (ϕ_2) of TEA at (a) 5°C (b) 10°C (c) 15°C (d) 20°C (e) 25°C (f) 28°C (g) 30°C (h) 35°C (i) 40°C (j) 45°C. Dashed line represents theoretical Bruggeman model. Solid line represents Bruggeman model obtained from equation (5). Marker • denotes experimental results.

TABLE III
VALUES OF 'A' FOR DEA-TEA AT DIFFERENT TEMPERATURES

T/°C	Values of 'a'
5	-5.74
10	-7.207
15	-2.734
20	-1.616
25	-2.416
28	-4.605
30	-4.464
35	-4.176
40	-3.741
45	-2.829

CONCLUSIONS

Dielectric relaxation parameters are reported in this work for diethanolamine with triethanolamine mixture at various concentrations and temperatures. This data provide information regarding solute-solvent interaction in liquids. The value of static dielectric constants increases upto their melting points then it becomes decreases with temperatures. This indicates that the change of phase from semi-solid to liquid state in the system. The static dielectric constant increases up to 50% of ETA in DEA and then it becomes decreases with increase in concentrations of TEA in DEA for all temperatures in DEA and TEA rich region

respectively. The relaxation time values drops down at their melting points in the system. These values also increase with increasing the concentration of DEA in ETA for all temperatures.

The dielectric behavior of this binary mixture is found to agree with the modified Bruggeman equation.

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BIOLOGICAL ACTIVITY OF SCHIFF BASES AND METAL COMPLEXES-A REVIEW

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Introduction:

The science of assembling the primary amines and aldehydes and ketones has been made enormous strides in recent few decades. Schiff bases are important class of organic compounds. Metal complexes of Schiff bases play an important role in biological activity and in pharmaceutical industry. Schiff bases and their metal complexes show a broad range of biological activities including antifungal, antibacterial, antimalarial, anti-inflammatory, antiviral properties. This review encapsulates the biological activity of Schiff bases and metal complexes.

Keywords: Schiff bases ligands, metal complexes, biological activity, antimicrobial, antifungal activity.

Gajendrakumar et al.⁽¹⁾ synthesized new Schiff base ligand from thiocarbohydrazide with 2-amino-4-ethyl-5-hydroxy benzaldehyde and reported antimicrobial activity. Ligand shows moderate activity while its complexes with metals Co(III) and Fe(III) exhibit excellent antimicrobial activity.

A. P. Mishra⁽²⁾ et al. reported comparative study of Schiff bases and their metal complexes and found that majority of metal complexes are more active than their respective Schiff bases. Also suggested therapeutic value increase or decrease by chelation.

Dragoslav R. Ilić⁽³⁾ et al. reported synthesis of Pd(II) complexes with different bidentate ligands and tested for their in vitro antimicrobial activity against different species of bacteria and fungi. Palladium complexes exhibited significantly higher activity than corresponding ligands. All complexes show moderate antimicrobial activity.

K. Subin Kumar⁽⁴⁾ reported synthesis of new Schiff base complexes of first transition series elements Schiff base ligand Vaniline-(1,2-ethylenediamine)ethylacetanilide and its different metal complexes were synthesized. Different spectral techniques have been used for their characterization such as conductivity measurements, infrared and electronic spectra. Spectral data suggested that complexes of Co(II), Ni(II) and Cu(II) are tetrahedral while Zn(II) shows octahedral geometry. In vitro cytotoxicity studies show that the copper complex showed highest cytotoxicity and may be used as a potential anticancer agent. The metal complexes show greater bactericidal and fungicidal activities as compared to their corresponding Schiff base.

Aurora REISS et al.⁽⁵⁾ synthesized novel Schiff base N-(2-furanylmethylene)-3-aminodibenzofuran and its complexes with different metal ions. In vitro antimicrobial tests were recorded by using Streptomycin as a standard and found that chelation significantly affects the growth of bacteria to varying degrees.

Anil Kumar et al.⁽⁶⁾ reported synthesis of different metal complexes and characterized by usual spectral techniques. In vitro antifungal and antimicrobial tests were recorded and found that both ligand and complexes are more active as antifungal than antimicrobial.

Shambuling Karabasannavar⁽⁷⁾ et al. reported synthesis of new Schiff base and its metal complexes. In vitro cytotoxicity study shows that newly synthesized complexes exhibit potent activity than free ligand, same results found for in vitro antimicrobial activity. DNA cleavage activity also carried out and found that complete cleavage of supercoiled DNA by Cu(II), Co(II) and Zn(II) complexes and incomplete cleavage by Ni(II) and Cd(II) complexes.

Baliram Y Waghmare⁽⁸⁾ et al. reported green approach for preparation of Schiff bases in water as solvent, new route suggested by author that combined effect of structural variations, coordination pattern, enantioselectivity on biological activity of coordination compounds. Out of palladium and nickel complexes, Pd(II) complexes show better antimicrobial and antifungal agents.

Karima F. Ali et al. reported synthesis of new Schiff bases from nalixidic acid and substituted aromatic aldehyde in ethanol. Different spectral techniques have been used for their assignment. The newly synthesized complexes subjected to antimicrobial study and found that complexes of Au(II) and Pt(II) show prominent activity against gram positive and gram negative bacteria.

Karima F. Ali⁽¹⁰⁾ reported novel mercaptotriazol Schiff bases and their mixed ligands complexes with Cu(II), Co(II), Ni(II), and Cd(II) metal ions. The biological activity between ligands and complexes were compared and found that zone of inhibitions are greater for the metal complexes than free ligands which can be explained on the basis of chelation theory and overtone concept. They also found that the antibacterial and antifungal activity of the complexes increased in the order: Cd(II) > Cu(II) > Ni(II) > Co(II).

Akalpita S. Bodkhe⁽¹¹⁾ reported the synthesis of mixed ligand complexes of Cu(II) with 8-hydroxyquinoline as primary ligand and various amino acids. Complexes are characterized by various spectral techniques. Antimicrobial study screened by taking tetracycline as standard compound and found that complexes show minor antibacterial activity due to bulky structure of the complex.

Sanja o et al⁽¹²⁾ reported synthesis of Co(II) complexes using substituted 2-aminobenzimidazole as ligand. The synthesized complexes were screened for their in vitro study against gram positive and gram negative bacteria and found that Co(II) complex was more active than starting ligand. They also found that complexes are more active against gram positive than gram negative bacteria.

Khalifa Mesbah Khalifa⁽¹³⁾ et al. synthesized the new macrocyclic ligand from 4-(1-(naphthalene-3-yl)ethyleneamino(3-hydroxynaphthalene-1-sulfonic acid and its metal complexes with Cr(II), Mn(II), Co(II), and Cu(II) and structural assignment has been made on the basis of various spectral techniques. Various bacteria were screened for their antibacterial activity and found that ligands and complexes show moderate to good antibacterial activity.

Shri Vaishnav⁽¹⁴⁾ et al. synthesize novel Schiff bases from N-amino rhodamine and salicylaldehyde and its complexes. Different spectral techniques were used for their analysis. The free ligands and their metal complexes were screened for antimicrobial activity and reported that complexes show more antimicrobial activity while ligands do not show any activity against same organisms under similar environmental conditions.

Saadiyah A. Dhahir⁽¹⁵⁾ reported the synthesis of complexes using azo compound and various metals in ethanol. Complexes were screened for their antimicrobial activities and found that complexes show more toxicity than ligands.

Dayang Norafizan⁽¹⁶⁾ reported new organotin (IV) complexes by direct reaction between RSnCl₃ or RSnCl₂ and benzoylacetone benzhydone ligand. Different spectroscopic methods were used for their characterization. Good efforts have been made by author to explain organotin(IV) complexes as antimicrobial agents. Antimicrobial activity of ligands increases by co-ordination of tin(IV) metal which may be due to the synergic effect of tin metal and ligand and also reported that chloride present in structure inhibit growth of microbes by blocking their active sites.

Demlet Gurbez⁽¹⁷⁾ et al. reported the synthesis of novel Schiff base from 4-chloro-2-aminophenol and 3-methoxy salicylaldehyde and its metal complexes. Ligand behaves as tridentate ligand and all the complexes are paramagnetic except Zn(II). Antimicrobial activity performed by using Ciprofloxacin as standard and reveal that the complexes of Ni(II) and Co(II) show considerable activity while ligands are inactive.

Walaa H Mahmoud⁽¹⁸⁾ et al. reported the synthesis of transition metal ternary complexes from Schiff base derived from drug lornoxian and 1,10-phenanthroline. Various spectral analysis carried out to confirm the structure of new complexes. Antibacterial activity shows that ligands are inactive while all complexes show considerable activity against tested organisms. Antifungal activity performed by using Ketokonazole as standard and found that Mn(II) complex shows two times active than standard. The antitumor cancer tests also performed and reveals that complex shows significant inhibition efficiency against MCF7 cell line.

Grace E Iniaya⁽¹⁹⁾ et al. reported the synthesis of Zn(II) complex derived from L-arginine-2-hydroxy-1-naphthaldehyde and glycine-2-hydroxy-1-naphthaldehyde in ethanol by addition of three drops of acetic acid. The new Zn(II) complex screened for antimicrobial analysis and found that complex shows better activity than free ligands.

Waziri et al⁽²⁰⁾ reported the synthesis of new complexes from mixed antibiotics such as cephalexin monohydrate and Amoxicillin tetrahydrate. Different spectral analysis were used to confirm the structure. Complexes were screened for antimicrobial activity and found that complexes of Co(II) and Ni(II) show increase in activity while Fe(II) and Zn(II) show decrease in activity when compared with the parent drugs.

Conclusion:

The Schiff bases are nothing but the condensation products of primary amines and aldehydes..Both Schiff bases and metal complexes are biologically active compounds in medical pharmaceutical Field. In the present study, Antimicrobial activities of the ligand and metal complexes were compared and found that the complexes are more active than free ligands.

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Research Article

SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL SCREENING STUDIES OF SOME METAL COMPLEXES OF NOVEL SCHIFF BASE OF 3-FORMYL-6-METHYLCHROMONE AND 3-AMINOQUINOLINE

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ABSTRACT

Synthesis of Ni(II) and Fe(III) complexes with Schiff base 6-methyl-3-((quinolin-3-ylimino) methyl)-4H-chromen-4-one obtained from 3-formyl-6-methylchromone and 3-aminoquinoline. Schiff base and its complexes were characterized by analytical data, elemental analysis, molar conductance, thermogravimetric analysis. The structural investigation performed by UV-Vis, IR and ¹HNMR spectral techniques. Interpretation of elemental analysis shown 2:1 molar ratio of Schiff base with metal complexes. Molar conductance values indicate neutral nature of metal complexes. Antimicrobial activity studied at different concentration (MIC method) by disc diffusion technique. Schiff base and the metal complexes found to be significant antibacterial and antifungal agents.

Keywords: Schiff base, antimicrobial activity, 3-aminoquinoline, 3-formyl-6-methylchromone.

INTRODUCTION

Schiff bases obtained by the condensation of amino and carbonyl compounds are intrinsic class of ligand that coordinate to metal ions via azomethine nitrogen and have been extensively for its wide range of medicinal applications. Chromone derivatives attract chemist due to various medicinal applications such as antimicrobial, antifungal, antimycobacterial, antiallergenic, antihypertensive, anticonvulsant, anticancer, antioxidant, anti-inflammatory, protein kinase C inhibitors and mushroom tyrosinase inhibition activities ¹⁻⁵. Omnipresent occurrence of chromone particularly in plants and their less toxicity towards mammals, also human diet contains huge chromone derivatives ⁶⁻⁷.

Fluorescence spectra play vital role for further complexation of ligand with metal ion ⁸⁻⁹. Chemists pay more attention on Schiff base obtained from 3-formylchromone and its derivatives. In the present work, we have synthesized novel ligand from 3-formyl-6-methylchromone and 3-aminoquinoline and its complexes with Ni(II) and Fe(III). Ligand and its complexes are characterized by IR, NMR, UV, elemental analysis. Emphasis has been put on biological evaluation of the complexes.

MATERIALS AND METHODS

Materials: 3-aminoquinoline, 3-formyl-6-methylchromone, Nickel chloride hexahydrate, ferric chloride hexahydrate and solvent used were AR grade.

Physical Measurement: Molar conductance of the complexes was measured in DMF at 1×10^{-3} M using Elico CM-180

conductometer. Elemental analysis (CHN) was carried out using Thermo finnigan, Italy CHN analyzer. Thermal analysis carried out on a Perkin Elmer USAA TGA instrument at heating rate 10 °C/min and temperature range 30°C to 1150°C. The IR spectra ($4000-400 \text{ cm}^{-1}$) in KBr disc were recorded on Bruker, Germany spectrophotometer. The NMR spectra were carried out by mercury plus 300 MHz NMR spectrometer, using TMS as internal standard. The solvent used were chloroform-*d*₆ for Schiff base and DMSO-*d*₆ for metal complexes. Electronic spectra were measured by using Shimadzu UV-160A spectrophotometer. The magnetic moment data obtained by Gouy-type magnetic balance at room temperature using Hg[Co(NCS)₄] as calibrant.

In Vitro Antimicrobial Studies: The antibacterial and antifungal activity of Schiff base ligand and its Ni(II) and Fe(III) complexes towards the bacteria *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Proteus vulgaris* and fungi *Candida albicans* and *Aspergillus niger* was carried out at different concentration by using minimum inhibitory concentration (MIC) method and disc diffusion method. The assay was performed in flat bottom 96 well plate. 1st column was used as negative control while second column onward the test drug was added. Initially in second column 2× Muller Hinton broth (100µl) was added while 3rd column onwards 1× Muller Hinton broth (100µl) was added. Now 4000 ppm (100µl) concentration of drug was added in second column the drug was mixed properly in order to achieve final concentration of 2000 ppm and now 100µl of solution from second column was taken out and added into 3rd column in order to achieve the 2-fold dilution. Finally, 100µl of culture was added to achieve 1.5×10^6 cell/ml in each well. Similarly, in the 1st row the culture along with diluent and 1× Muller Hinton broth was added. The plates were for incubation and after 24 hours, 5 µl

resazurin (6.75 mg ml⁻¹) was added to all wells and incubated at 37°C for another 24 hours. Change of colour was observed and recorded. The lowest concentration prior to colour change was considered as Minimum Inhibitory Concentration (MIC). The culture equivalent to 10⁶ cells was added to molten agar and was poured in sterile petri dish and kept for solidification. Wells were made, and samples were added in each well. DMSO and tetracycline was used as negative and positive control respectively. Plates were incubated at 37°C for 24 hours. The zone of clearance was considered for antibacterial activity and was measured in mm.

Synthesis of Ligand: The Synthesis of Schiff base (L) was carried out by refluxing hot ethanolic solution of 3-formyl-6-methylchromone (10 mmol, 1.88 gm) in 40 ml of alcohol and 3-aminoquinoline (10 mmol, 1.44 gm) in 15 ml of alcohol. The reaction mixture was refluxed for 5 hours. The progress of reaction was monitored by TLC. The resulting yellow coloured product precipitated, filtered off and washed with ether. The product thus obtained was recrystallized from ethanol.

Synthesis of the Complexes: A hot ethanolic solution of ligand (10 mmol, 3.14 gm) was added to ethanolic solution NiCl₂·6H₂O (5 mmol, 1.18 gm) and FeCl₂·6H₂O (5 mmol 1.35 gm). The resulting reaction mixture was refluxed for 4-5 hours. After cooling, the coloured precipitate obtained was collected, filtered, washed with ether, recrystallized from ethanol and dried in vacuum.

RESULT AND DISCUSSION

The analytical, physical, molar conductance data and magnetic moment values are shown in table 1. Ligand is chloroform soluble and solubility of metal complexes is in DMSO and DMF. The elemental analysis elucidate that metal to ligand ratio is 1:2 in both Ni(II) and Fe(III) complexes. Neutral nature of metal complexes was proved by the lower value of molar conductivity data.

IR Spectral data: IR spectral data are mentioned in table 2. IR spectra revealed, $\nu(\text{C}=\text{N})$ of band at 1598 cm⁻¹ is most characteristic band of azomethine, which shifted to 15-20 cm⁻¹ to lower wave number side in both Ni(II) and Fe(III) complexes¹⁰. The Schiff base shown a band at 1650 cm⁻¹, is assignable to the $\nu(\text{C}=\text{O})$ group of chromone system. After complex formation the $\nu(\text{C}=\text{O})$ group is shifted to 6-40 cm⁻¹ to a lower wave number in its complexes indicate carbonyl oxygen involved in coordination to the metal ion¹¹⁻¹². The broad band observed at 3500-3400 cm⁻¹ and other band at 810-870 cm⁻¹ that suggest the presence of water molecules in the metal complexes¹³⁻¹⁴. The spectral band observed in the spectral range of 600-400 cm⁻¹ corresponds to $\nu(\text{M}-\text{O})$ and $\nu(\text{M}-\text{N})$ vibrations respectively¹⁵. Thus the interpretation of IR data suggest that Schiff base ligand (Fig. 1) in reported complexes is bidentate and the coordination of metal ion (Ni(II) and Fe(III)) with Schiff base through azomethine nitrogen and carbonyl oxygen of chromone moiety. The position in the coordination sphere would be completed by water molecule.

¹HNMR Spectra: The ¹HNMR spectrum of ligand recorded in chloroform and its Ni(II) and Fe(III) metal complexes recorded in DMSO. The ¹HNMR data have summarized in table 3. The spectrum of ligand shows following signals: 8.07 ppm (H, S, -HC=N- azomethine proton); 2.35 ppm (3H, S, -CH₃ protons); 6.9-7.9 ppm (m, aromatic protons of chromone nucleus); 7.6-8.9 ppm (m, aromatic protons of quinolone nucleus). However, in metal

complexes the NMR signal of azomethine proton shifted to downfield as compared to NMR signal of azomethine proton in Schiff base¹⁶. In Ni(II) and Fe(III) complexes resonance signal for azomethine proton at 8.24 ppm and 8.26 ppm respectively. Thus, there is confirming the metal complex formation.

Electronic Spectra and Magnetic Moment: The absorption spectra of Schiff base and its Ni(II) and Fe(III) complexes were measured in DMSO solution in wavelength range of 200-1100 nm. The electronic spectra of ligand show two bands, one band at 23310 cm⁻¹ is attributed to the $n \rightarrow \pi^*$ transition. Another band at 32258 cm⁻¹ is due to the $\pi \rightarrow \pi^*$ transition⁸. The Ni(II) complex showing three bands at 9107 cm⁻¹, 15497 cm⁻¹ and 23696 cm⁻¹ assignable to the ${}^3\text{A}_{2g}(\text{F}) \rightarrow {}^3\text{T}_{2g}(\text{F})$ (ν_1), ${}^3\text{A}_{2g}(\text{F}) \rightarrow {}^3\text{T}_{1g}(\text{F})$ (ν_2), ${}^3\text{A}_{2g}(\text{F}) \rightarrow {}^3\text{T}_{2g}(\text{P})$ (ν_3) transition respectively characteristic of octahedral geometry⁸. The electronic transition of Fe(III) complex are generally spin forbidden and hence weak, and are often masked by charge transfer spectra¹⁷⁻¹⁸. The Fe(III) complex showing band at 23148 cm⁻¹ which can be assigned to the ${}^6\text{A}_{1g} \rightarrow {}^4\text{T}_{1g}$ transition characteristic of octahedral structure¹⁷⁻¹⁹. The magnetic moment value of both the complexes as shown in table no. 1 which also confirm their octahedral geometry^{8, 18}.

Antimicrobial Activity: The antibacterial and antifungal activity of Schiff base and its complexes are shown in the table no 4 and results were compared standard tetracycline. Comparative antibacterial and antifungal studies of Schiff base and its complexes are shown in figure 2. The antimicrobial activity of ligand and its complexes were studied by MIC method²⁰. Several gram positive and gram negative bacteria pernicious for human health. The bacteria were mostly found in digestive tract, respiratory tract and skin. The bacterium causes several types of vital organ infections. Due to plasmid bacteria develop resistance in short period of duration. The Schiff base was revealed significant antimicrobial activity against all tested pathogens. The Ligand and Fe(III) complex were shown nearly equal antibacterial activity against all tested organisms when compared with standard antibiotic tetracycline at 2000 ppm. All synthesized compounds were demonstrated better antifungal activity than standard tetracycline at 2000 ppm. There are also other factors which increase the activity are solubility, conductivity, and bond length between metal and ligand²¹⁻²³.

Thermogravimetric analysis: Thermogravimetric analysis carried out for [Ni(L)₂(H₂O)₂] and [Fe(L)₂(H₂O)₂] complexes, the range of heating was 30°C to 1150°C and heating rate was 10°C/min. TG curves are shown in figure 3 and 4. Interpretation of thermal data is given in table 5. Nickel complexes, [Ni(L)₂(H₂O)₂] decomposed in two step, in first step complex undergo decomposition with weight loss of 4.63 corresponds to two water molecules in the temperature range between 30°C and 270°C. In the second step, quinolone nucleus with azomethine group undergoes decomposition with weight loss 41.25 in the temperature range of 271°C and 631°C. In the third step complex decomposes gradually with remaining ligand moiety i.e. chromone nucleus and NiO with weight loss 53.37 in the temperature range greater than 631°C²⁴. TG studies of Fe(III) complex shown three decomposition step. In the first step decomposition at 30°C to 140°C corresponds to the loss of two water molecules, which are in accordance with the calculated values. The second step of decomposition start from 141°C to 730°C corresponds to chromone nucleus with weight loss 41.72 and in third step temperature greater than 731°C shown decomposition of remaining ligand moiety and FeO residue with final weight loss 52.78²⁴.

Table 1: Physical, analytical, molar conductivity data and magnetic moment of Schiff base and Ni(II) and Fe(III) complexes

Compounds	Colour (%Yield)	M.P. (°C)	% Found (calcd)				Molar Cond. (ohm ⁻¹ cm ² mol ⁻¹)	μ_{eff} (BM)
			C	H	N	M		
L	Yellow (78)	215	76.91 (76.41)	4.06 (4.45)	7.47 (8.90)	—	7	—
[Ni(L) ₂ (H ₂ O) ₂]	Green (82)	303	65.80 (66.40)	3.37 (4.42)	7.17 (7.74)	8.20 (8.11)	9	3.12
[Fe(L) ₂ (H ₂ O) ₂]	Brown (85)	282	66.43 (66.69)	3.85 (4.44)	6.06 (7.77)	7.53 (7.75)	12	3.41

Table 2: IR spectral data of ligand and its metal complexes

Compound	$\nu(\text{C}=\text{N})$	$\nu(\text{C}=\text{O})$	$\nu(\text{M}-\text{O})$	$\nu(\text{M}-\text{N})$
L	1598 cm ⁻¹	1650 cm ⁻¹	-	-
[Ni(L) ₂ (H ₂ O) ₂]	1573 cm ⁻¹	1641 cm ⁻¹	490 cm ⁻¹	552 cm ⁻¹
[Fe(L) ₂ (H ₂ O) ₂]	1572 cm ⁻¹	1642 cm ⁻¹	463 cm ⁻¹	564 cm ⁻¹

Table 3: ¹HNMR spectral data of ligand and its metal complexes

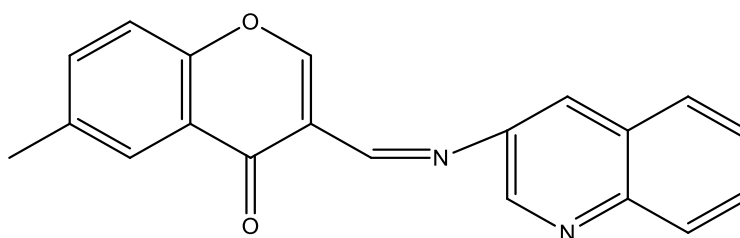
Compounds	Chemical shift (ppm)	Assignment
L	8.07	(H, S, -HC=N- azomethine proton)
	2.35	(3H, S, -CH ₃ protons)
	6.9-7.9	(m, aromatic protons of chromone nucleus)
	7.6-8.9	(m, aromatic protons of quinolone nucleus)
[Ni(L) ₂ (H ₂ O) ₂]	8.24	(H, S, -HC=N- azomethine proton)
	2.33	(3H, S, -CH ₃ protons)
	6.1-7.65	(m, aromatic protons of chromone nucleus)
	7.85-8.85	(m, aromatic protons of quinolone nucleus)
[Fe(L) ₂ (H ₂ O) ₂]	8.26	(H, S, -HC=N- azomethine proton)
	2.3	(3H, S, -CH ₃ protons)
	6.1-7.8	(m, aromatic protons of chromone nucleus)
	7.9-8.9	(m, aromatic protons of quinolone nucleus)

Table 4: MIC (ppm) and zone of inhibition values for antimicrobial activity of the ligand and its Ni(II) and Fe(III) complexes

Microorganism	L diameter of zone of inhibition (mm)				[Ni(L) ₂ (H ₂ O) ₂] diameter of zone of inhibition (mm)				[Fe(L) ₂ (H ₂ O) ₂] diameter of zone of inhibition (mm)				Standard
	250 ppm	500 ppm	1000 ppm	2000 ppm	250 ppm	500 ppm	1000 ppm	2000 ppm	250 ppm	500 ppm	1000 ppm	2000 ppm	
<i>K. pneumonia</i>	9	12	13	15	3	5	8	11	4	7	10	14	18
<i>S. aureus</i>	8	10	12	16	6	7	10	12	5	8	11	15	16
<i>P. vulgaris</i>	12	14	16	18	4	7	9	13	7	12	15	17	19
<i>C. albicans</i>	10	16	18	20	5	8	11	13	5	8	11	16	14
<i>A. niger</i>	8	10	15	17	9	11	14	16	4	8	12	15	12

Table 5: Thermal data of complexes

Complex	Temperature (°C)	Weight loss found (calcd%)	Assignment
[Ni(L) ₂ (H ₂ O) ₂]	25-270	4.73(4.97)	2H ₂ O
	271-630	41.50(42.87)	C ₂₀ H ₁₄ N ₄
	>631	53.77(52.16)	C ₂₀ H ₁₄ O ₃ and NiO
[Fe(L) ₂ (H ₂ O) ₂]	30-140	5.50(4.99)	2H ₂ O
	141-728	41.72(41.93)	C ₂₀ H ₁₄ O ₃
	>729	52.78(53.08)	C ₂₀ H ₁₄ N ₄ and FeO

**Figure 1: Structure of ligand (L)**

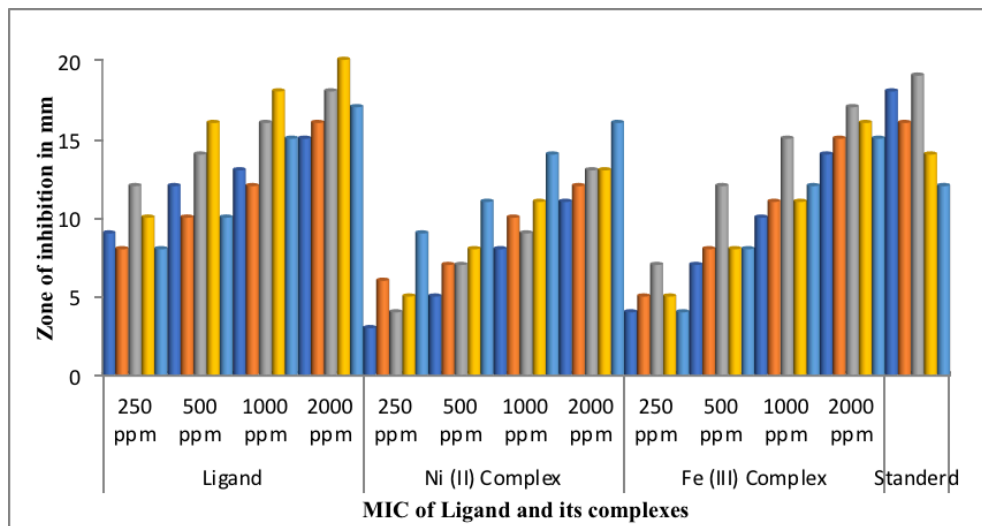


Figure 2: Antimicrobial activity of the ligand and its Ni(II) and Fe(III) complexes

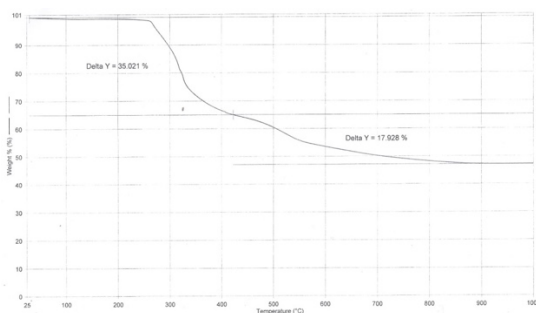


Figure 3: TG graph of (Ni) complex

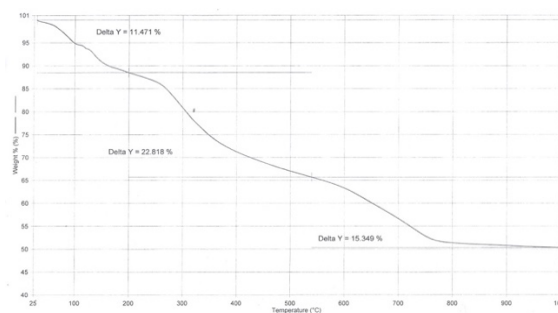


Figure 4: TG graph of Fe(III) complex

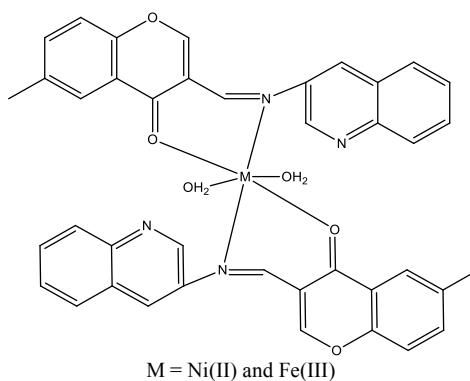


Figure 5: Proposed structure of complexes

CONCLUSION

Ni(II) and Fe(III) complexes were synthesized from novel Schiff base 3-formyl-6-methylchromone and 3-aminoquinoline and are characterized by using UV-Vis, IR and ¹HNMR spectral techniques. IR interpretation shown that the ligand act as bidentate and metals get coordinated through azomethine nitrogen and carbonyl oxygen of chromone moiety. Octahedral geometry of complexes has been predicted by electronic and magnetic moment data. TGA analysis studies demonstrated the stability of complexes as well as provided the number of

coordinated water molecules. Antimicrobial activity was studied by MIC and disc diffusion method. All prepared compounds were shown good to moderate antimicrobial activity against tested pathogens.

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STUDY OF COMPLEX FORMATION BETWEEN COPPER (II) METAL ION AND DRUG TAMSULOSIN WITH BIOLOGICAL IMPORTANT AMINO ACID LIKE PHENYLALANINE AND GLUTAMIC ACID IN 80% ETHANOL –WATER MIXTURE P^H METRICALLY.

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Abstract : The stability constant of complexes of Copper (II) ion with new Drug Tamsulosin (FLOMAX) as Primary ligand and biological molecules such as Phenyl alanine and glutamic acid as a secondary ligands have been determined P^H metrically in 80 % (v/v) ethanol-water medium at 27°C and fixed ionic strength 0.1M NaClO₄ by computational program SCOG

Key Words - Tamsulosin, ΔlogK, Copper metal ion, Ternary Complexes.

I. INTRODUCTION:

The metal ligand complexes are very important as per as the biological phenomenon's are concerned, every biological system involves the complex mechanism consisting of different components like metal ions and biological important amino acids etc. and hence any drug delivered in the biological system is expected to form the complexes with already present moieties to form the chelates thus study of complexation of the drug with metal ion is purposeful. The present study aims understanding the nature of drug complex by studying the equilibriums leading to determination of stability constant values of ternary complexes formed between the transition metal ion Cu²⁺, Drug Tamsulosin and the Amino acids Phenyl alanine and the glutamic acid.

The Drug Tamsulosin is available in market by name Flomax used for the treatment of symptomatic Benign Prostatic Hyperplasia, helps with Passage of Kidney stone ^{[1], [2]} and for the Urinary retentions also used for the treatment of acute urinary retention. Though the drug preliminarily used to treat BHP however appears to be useful for the kidney stone of the order 4 mm to 10 mm size ^[3]. The structure of the Drug Tamsulosin is illustrated in fig.1

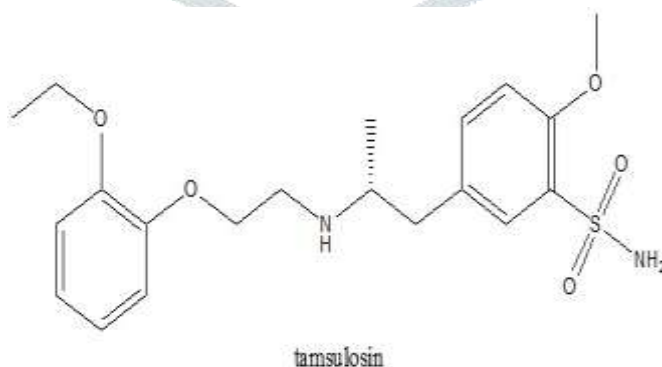


Fig. 1 Chemical Structure of Ligand Tamsulosin

This drug is alpha blocker and bladder neck muscle fibers are relaxed by its use and make prostate easier to urinate. Tamsulosin is used to treat men who have symptoms of an enlarged prostate gland, which is also known as benign enlargement of the prostate

(Benign Prostatic Hyperplasia or BPH). Benign enlargement of the prostate is a problem that can occur in men as they get older. The prostate gland is located below the bladder. As the prostate gland becomes bigger some muscles in that gland may become hard and get in the way of the tube that take urine from the bladder, which can cause problems in urinating, such as a need to urinate often, a weak stream when urinating, or a feeling of not being able to empty the bladder completely. as It is an Alpha adrenergic receptor antagonist. Therefore it is clear that this drug excretes to level good and thus it may become possible along with that it may take out certain excess amount of the metals from the body^[4].

The metal ions are integral parts of enzymes and play an important role in the biological system, such as to trigger a reaction, control reaction mechanism, stabilize protein structure, maintain structure of cell walls etc. Latest information indicates regulation of metabolism and growth of animal cell is dependent upon the mobilization of divalent and trivalent metal ions.

Copper is a transition metal ion are integral parts of enzymes and play an important role in the biological system, such as to trigger a reaction, control reaction mechanism, stabilize protein structure, maintain structure of cell walls etc. Latest information indicates regulation of metabolism and growth of animal cell is dependent upon the mobilization of divalent and trivalent metal ions. It is widely distributed throughout the body.^[5] The identification of mammalian homologues of these proteins reveals a remarkable structural and functional conservation of copper metabolism between bacteria, yeast and humans. Furthermore, studies on the function and localization of the products of the Menkes and Wilson's disease genes, which are defective in patients afflicted with these diseases, have provided valuable insight into the mechanisms of copper balance and their role in maintaining appropriate copper distribution in mammals^[6]

Copper (Cu) is an essential trace element required for survival by all organisms from bacterial cells to humans. All amino acids are polymer and regarded as building block of protein. Some amino acids are studied in this research.^[7]

II. MATERIALS AND METHODS:

Present investigation deals with the P^H metric studies on copper (II) metal complexes with Benign Prostatic Hyperplasia Tamsulosin and amino acids Phenyl alanine and Glutamic acid in 80% (v/v) ethanol-water medium at 27°C and fixed ionic strength of 0.1 M NaClO₄.

The nitrates of copper, of A.R. grade were obtained from Doodle (India). Metal ion was used in the form of their perchlorates to avoid the possibility of complex formation with anions. The perchlorates were prepared from the corresponding nitrates.^[8] The concentration of metal ions was estimated by the standard procedures.^[9-11] Sodium perchlorate (Merck) was dissolved in carbon dioxide free distilled water.

The solution of sodium hydroxide was also prepared in carbonate free distilled water by allowing the solution to stand for a long time till any carbonate if present precipitated. The solution was used as titrant for the potentiometric titration. As a routine, the solution was standardized at least once every day by titrating with standard oxalic acid solution. Per chloric acid of Reidal (Germany) was used for the preparation of the stock solution. Its exact normality was obtained by titrating it conductometrically using standard sodium hydroxide solution. Amino acids from Merck (Germany) and Fluka (Germany) were prepared by dissolving A.R. grade sample in 80% (v/v) ethanol – water medium.

Solution of the Drug Tamsulosin was prepared by dissolving sample as received in 80% (v/v) ethanol-water medium. Drugs samples in pure form were obtained from pharmacy industries.

The Methodology were used in the study of ternary metal complexes by the potentiometric titration technique, involves the titrations of carbonate free solution of against standard sodium hydroxide, where drug Tamsulosin (D) and amino acids (R) are the ligands.

The ionic strength of the solutions was maintained constant i.e. 0.1 M by adding appropriate amount of 1M sodium perchlorate solution. The titrations were carried out at 27°C in an inert atmosphere by bubbling oxygen free nitrogen gas through an assembly containing the electrode to expel out CO₂. The experimental procedure, in the study of ternary metal complexes by the potentiometric titration technique, involves the titration of carbonate free solution of in 80% (v/v) ethanol-water, were corrected by method of Vansittart and Hass. The formation constant of ternary complexes were determined by computational programmed SCOGS to minimize the standard derivation.

The systems taken for the titration are set as follows:

I	Free HClO ₄ (A)
II	Free HClO ₄ (A) + Tamsulosin (D)
III	Free HClO ₄ (A) + Tamsulosin (D) + Copper ion (M)
IV	Free HClO ₄ (A) + Amino acids (R)
V	Free HClO ₄ (A) + Amino acids (R) + Copper ion (M)
VI	Free HClO ₄ (A) + Tamsulosin (D) + Amino acids (R) + Copper ion (M)

III. RESULT AND DISCUSSIONS:

3.1 Binary metal complexes

The P^K and the $\log K$ values of the amino acids are important for the determination of the Stability constant of the studied ternary complexes and hence are taken as it is investigated [12-18]

Table No. 1. The proton ligand constant and metal ligand stability constant of drug Tamsulosin and amino acids with Copper (II) determined in 80 % (v/v) ethanol-water mixture at 27°C and ionic strength $\mu = 0.1$ M NaClO_4 are shown in the

Ligands	pK_1	pK_2	Copper	
			$\text{Log}K_1$	$\text{Log}K_2$
Tamsulosin	2.5444	5.9636	6.6043	-
Phenyl alanine	13.14	9.300	8.990	7.670
Glutamic acid	3.136	5.899	1098	8.640

The pK and $\log K$ value of drug here is important for the explanation of stability constant of Metal ligand ternary complexes. The figure 2 and the figure3 illustrates the scheme of complex formation between the Metal ion and the Primary Ligand

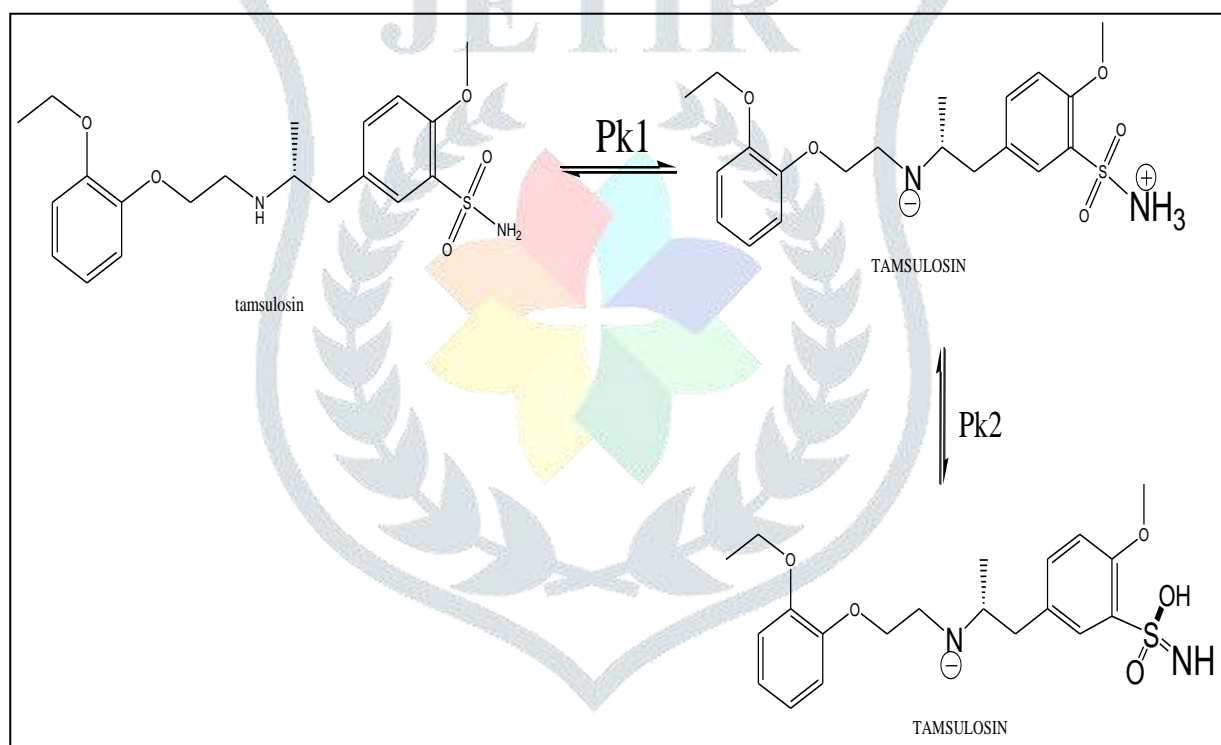


Fig. 2. Proton Dissociation Scheme for free Ligand Tamsulosin

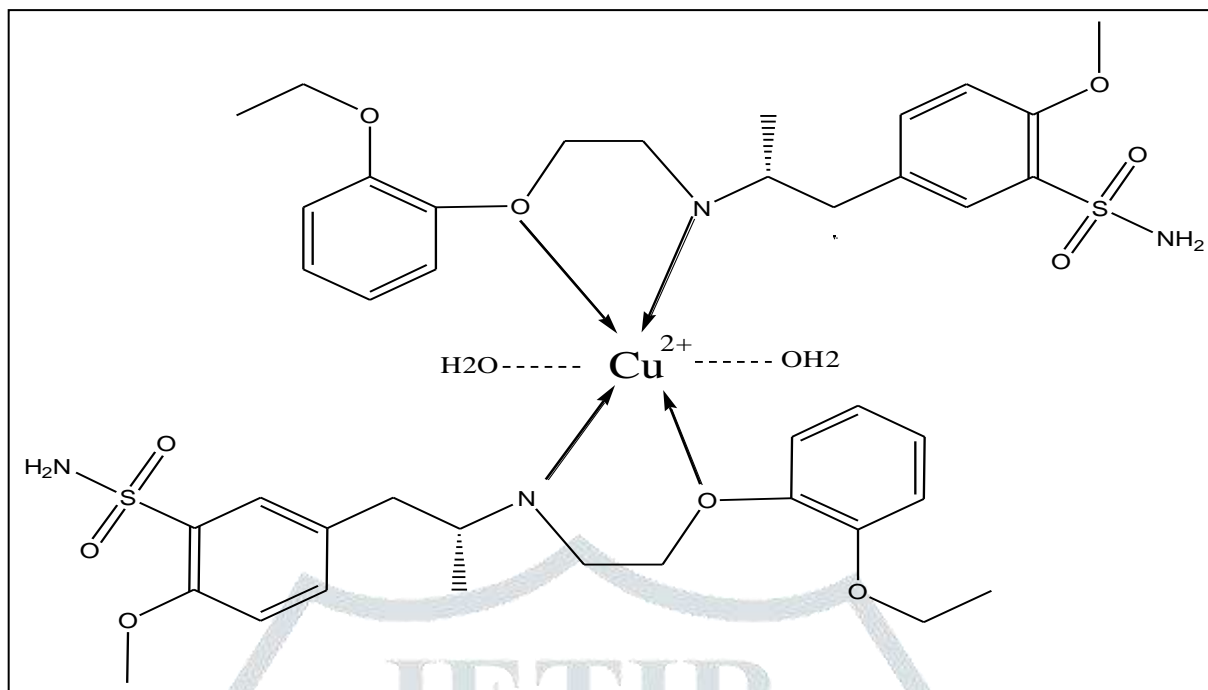


Fig.3. Proposed Structure of Cu (II) Tamsulosin Complex:

3.2 Ternary Metal Complexes:

The potentiometric titration, ternary systems shows that the mixed ligand curve coincide with A+D complex curve up to the pH ~ 2.8 and after this pH, it deviates. Theoretical composite curve remains toward left of the mixed ligand complex curve. After pH ~ 2.9, the mixed ligand curve drifts towards X-axis, indicating the formation of hydroxide species. Since the mixed ligand curve coincide with individual metal complex titration curves, the formation of 1:1:1 complex by involving stepwise equilibrium.

The primary ligand Tamsulosin (D) form 1:1 and secondary ligand (R) form 1:1 and 1:2 complexes with Cu (II). It is evident from the figure of percentage concentration species of Cu (II) - Tamsulosin - Phenyl alanine and glutamic acid systems that the percentage distribution curves of free metal decreases sharply with increasing pH, indicates involvement of metal ion in the complex formation process. Percentage concentration of free ligands Tamsulosin and glycine increases and this increase may be due to the dissociation of ligand present in the system, as a function of pH.

3.3 Species distribution studies:

To explain the equilibrium and evaluate the calculated stability constant of ternary complexes Cu (II) - Tamsulosin - phenyl alanine and Cu (II) - Tamsulosin - glutamic acid, species distribution curves have been plotted as a function of pH at temperature 27°C and $\mu = 0.1$ M NaClO₄ by using SCOG programmed.

It can be seen that, the concentration of Cu (II) - Tamsulosin-glycine increases from pH~2.6 whereas the concentration for the formation of D (Tamsulosin) and HR (Phenyl alanine) show continuous decrease with increasing pH which indicates the formation of Cu(II)-Tamsulosin - Phenyl alanine . The concentration of DRH species continuously increases; confirm the formation of ternary complexes.

From the SCOG distribution curve it is concluded that the formation of ternary complex started only after the metal primary ligand complex has attained its maximum concentration. This indicate that metal primary ligand complex Cu (II)- Tamsulosin is formed first then the secondary ligands such as Phenyl alanine and glutamic acid coordinated to it, resulting the formation of ternary complex

3.4 The Stability Constants of Ternary Complexes.

The relative stabilities of the binary and ternary complexes are quantitatively expressed in term of β_{11} , β_{20} , β_{02} , K_D , K_R , K_T and $\Delta \log K$ value which are represented in table II.

For the system ligand which form both 1: 1 and 1:2 binary complexes. The magnitude of the constant is the measure of stability of mixed ligand complexes. Water and K_a calculated statistically expected value 0.6 log units by considering with probabilities for a variety of reason discussed by Sigel. $\Delta \log K$ value can be calculated by using first or second approach. The calculated $\Delta \log K$ values for all systems are given in table II.

The Comparison of β_{11} with β_{20} and β_{02} of this system show that preferential formation of ternary complexes over binary complex of primary as well as secondary ligand. The considerably positive value of K_D & K_R indicates high stability of ternary

complexes with respect to that of primary as well as secondary ligands. The K_f value of this complex is positive but the magnitude is smaller which indicates lower stability of ternary complexes.

Results of the present investigations show that the stability constant of ternary complexes formed are less stable. The negative $\Delta \log K$ value of this system in case of ternary system of glutamic acid indicates that the ternary complex is less stable than the binary 1:1 copper -Tamsulosin & metal-amino acids complex. This is in accordance with statistical considerations. The negative value of $\Delta \log K$ does not mean that the complex is not formed. The negative value may be due to the higher stability of its binary complexes, reduced number of coordination sites, steric hindrance. ^[19-22] Electronic consideration ^[23-24] difference in bond type, geometrical structure etc.

Table No. II.

Parameters based on some relationship between the formation of ternary complexes of Copper (II) metal ion with Tamsulosin in the presence of amino acids (1:1:1) system at temp = 27°C I = 0.1 M NaClO₄ Medium = 80% (V/V) Ethanol-Water.

Amino acids	β_{11}	B ₂₀	B ₀₂	K _D	K _R	K _F	$\Delta \log K$
Phenyl alanine	16.4443	6.6043	16.660	9.8400	7.4543	2.4577	0.8500
Glutamic acid	17.5800	6.6043	19.6200	10.975	6.600	2.3851	-0.0043

IV CONCLUSION:

The $\Delta \log K$ value of this system is higher than the statistically expected value showing the stabilized nature of the ternary complex. The primary ligand Tamsulosin having smaller size.

Therefore its $\Delta \log K$ value is less negative. Negative $\log K$ value of ternary complexes is due to the electrostatic repulsion between the negative charges on Tamsulosin & amino acids. Steric hindrance consideration is the most important factor because in the present studies of ternary complex, primary ligand Tamsulosin coordinates with the metal ion in the lower pH range and form 1:1 complex. In solution, ternary complex forms as the titration curve run below the Cu (II)-Tamsulosin titration curve. So, it is evident that the entry of the secondary ligand amino acids faces steric hindrance due to bigger size of the Cu (II)-Tamsulosin complex as compared to aqua ion, which tries to restrict the entry of the secondary ligand in the coordination sphere of the Cu (II) metal ion & thus reduces the stability of ternary complexes. The order of stability of ternary complexes of Cu (II) with respect of secondary ligand for respective primary ligands is Tamsulosin = phenyl alanine > glutamic acid

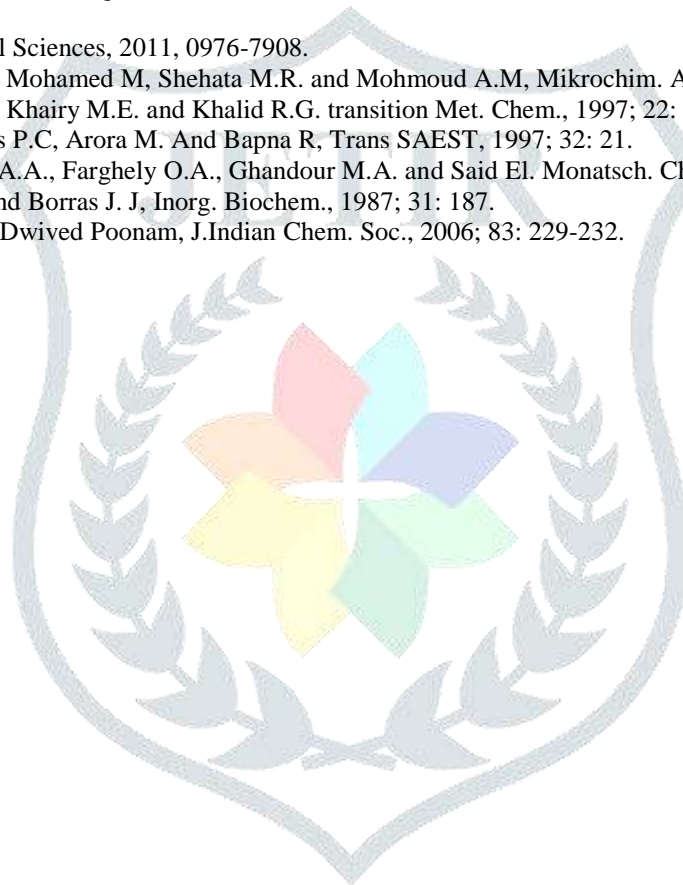
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SYNTHESIS AND CHARACTERIZATION AND BIOLOGICAL ACTIVITY OF SOME NEW COMPLEXES OF NI(II), CU(II), CO(II) AND FE(III) WITH THE SCHIFF BASE DERIVED FROM 6-BROMO-3-FORMYLCHROMONE AND 8-AMINOQUINOLINE

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ABSTRACT

Coordination compounds of Ni(II), Cu(II), Co(II) and Fe(III) with Schiff base obtained through the condensation of 6-bromo-3-formylchromone and 8-aminoquinoline were synthesized. The characterization of the newly formed compounds was done by ¹H NMR, UV-Visible, IR, elemental analysis and molar conductivity. The analytical data was studied which indicate that the metal to ligand molar ratio is 1:2 in all the complexes. Molar conductivity data have been shown that entire complexes are neutral in nature. The in vitro antibacterial activity have demonstrated by MIC (minimum inhibitory concentration) method. The antibacterial activity were studied against *Klebsiellapneumoniae*, *Staphylococcus aureus* and *Proteus vulgaris* and antifungal activity against *Candida albicans* and *Aspergillusniger* and compared to the activity of the free ligand.

KEY WORDS – 6-bromo-3-formylchromone, 8-aminoquinoline, MIC method, Antibacterial activity, Antifungal activity.

INTRODUCTION

Many metabolic processes in the human body run by the vital role of coordination compounds and it is proved that many organic compounds in pharmaceutical field do not have a purely organic mode of action, some are activated or bio transformed by metal ions metabolism. The ample of drugs show antimicrobial activity and pharmacological properties in the form of metal complex and the role of Schiff bases through azomethine (C=N) moiety showing broad spectrum of biological activity and incorporation of metals in the form of complexes showed some degree of antibacterial, antifungal and anti-inflammatory activity [1].

Schiff base are the organic molecules containing azomethine (-C=N-) chromophre. Schiff base were firstly reported by Hugo Schiff in 1864 and these are the condensation product of aldehydes and ketones with primary amines [2].

Chemist pay their more attention on synthesis of chromone derivatives due to pharmaceutical activities including antimycobacterial, anticonvulsant, antimicrobial, anticancer, antioxidant and mushroom tyrosinase inhibition activities [3]-[6]. Schiff bases derived from 3-formylchromone and its complexes have significant role in biological, clinical and pharmaceutical areas [7]-[9].

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In the present work we have synthesized the Schiff base 3-((quinolin-8-ylimino) methyl) -4H-chromen-4-one and their Ni(II), Cu(II), Co(II) and Fe(III) complexes. The prepared compounds were characterized by various analytical tools and their biological significance done by MIC and disc diffusion method.

EXPERIMENTAL

A. Materials

8- aminoquinoline, 6-bromo-3-formyl chromone, Nickel chloride hexahydrate, Copper chloride dihydrate, Cobalt hexahydrate, ferric chloride hexehydrate and solvent used were AR grade.

B. Physical measurement

Molar conductance of the complexes was measured in DMF at 1×10^{-3} M using Elico CM-180 conductometer. Elemental analysis (CHN) was carried out using Thermo finnigan, Italy CHN analyzer. Thermal analysis carried out on a Perkin Elmer USAA TGA instrument at heating rate $10^{\circ}\text{C}/\text{min}$ and temperature range 30°C to 1150°C . The IR spectra ($4000\text{-}400\text{ cm}^{-1}$) in KBr disc were recorded on Bruker, Germany spectrophotometer. The NMR spectra were carried out by mercury plus 300 MHz NMR spectrometer, using TMS as internal standard. The solvent used were chloroform- d_6 for Schiff base and DMSO- d_6 for metal complexes. Electronic spectra were measured by using Shimadzu UVmini-1240 spectrophotometer. The magnetic moment data obtained by Gouy-type magnetic balance at room temperature using $\text{Hg}[\text{Co}(\text{NCS})_4]$ as calibrant.

C. In vitro antimicrobial studies

The antibacterial and antifungal activity of Schiff base ligand and its Ni(II), Cu(II), Co(II) and Fe(III) complexes towards the bacteria *Klebsiellapneumoniae*, *Staphylococcus aureus* and *Proteus vulgaris* and fungi *Candida albicans* and *Aspergillusniger* were carried out by using minimum inhibitory concentration (MIC) method. The detailed description of MIC method were determined using literature method [10].

D. Synthesis of ligand

The Synthesis of Schiff base (L) was carried out by refluxing hot ethanolic solution of 8-bromo-3-formyl chromone (10 mmol, 2.53 gm) in 40 ml of alcohol and 8- aminoquinoline (10 mmol, 1.44 gm) in 15 ml of alcohol. The reaction mixture was refluxed for 2 hours. The progress of reaction was monitored by TLC. The resulting yellow coloured product precipitated, filtered off and washed with ether. The product thus obtained was recrystallized form ethanol.

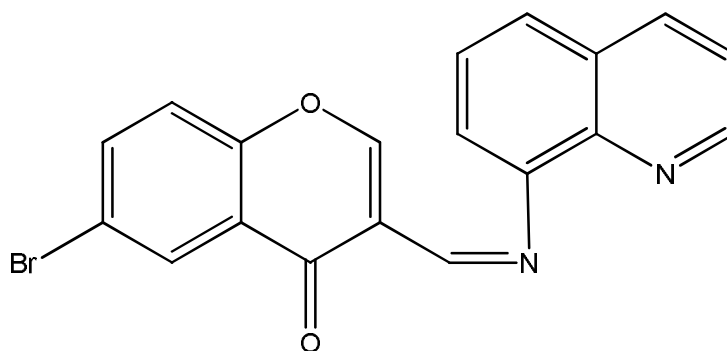


Fig. 1 Proposed structure of Ligand (L).

E. Synthesis of the complexes

A hot ethanolic solution of ligand (10 mmol, 3.79 gm) was added to ethanolic solution NiCl₂·6H₂O (5 mmol, 1.18 gm), CuCl₂·2H₂O (5 mmol, 0.85 gm), CoCl₂·6H₂O (5 mmol 1.18 gm) and FeCl₃·6H₂O (5 mmol 1.35 gm). The resulting reaction mixture was refluxed for 3-4 hours. After cooling, the coloured precipitate obtained was collected, filtered, washed with ether, recrystallized from ethanol and dried in vacuum.

RESULT AND DISCUSSION

All the complexes are coloured, non-hygroscopic and stable in air. The solubility of ligand is in chloroform solvent. The solubility of complexes are in DMF and DMSO but are insoluble in many common organic solvent. The analytical, physical, molar conductance data and magnetic moment values are given in table I. The analytical data predicted that the metal to ligand ratio is 1:2 in all the complexes. The molar conductance value of complexes in DMF at 1×10⁻³ M are mentioned in table 1 indicating their non-electrolytic nature[11].

TABLE I
PHYSICAL, ANALYTICAL, MOLAR CONDUCTIVITY AND MAGNETIC MOMENT DATA OF LIGAND AND THEIR COMPLEXES

Compounds	Mol. Wt.	Colour (%Yield)	M.P. (°C)	% Found (calcd)				Molar Cond. (ohm ⁻¹ cm ² mol ⁻¹)	μ _{eff} (BM)
				C	H	N	M		
L	378.9	Yellow (72)	256	60.33 60.17	3.31 2.9	6.47 7.38	—	7	—
[Ni(L) ₂ (Cl) ₂]	888.05	Green (83)	330	50.02 51.34	2.7 2.47	6.92 6.3	6.74 (6.60)	10	3.22
[Cu(L) ₂ (Cl) ₂]	892.9	Turmeric (84)	308	51 51.06	2.73 2.46	6.33 6.27	7.25 (7.11)	13	1.8
[Co(L) ₂ (Cl) ₂]	888.89	Brown (79)	298	51.03 51.33	2.55 2.47	6.28 6.3	6.81 (6.63)	12	3.72
[Fe(L) ₂ (Cl) ₂]	885.2	Brown (77)	340	51.52 51.51	2.37 2.48	6.01 6.32	6.43 (6.30)	11	3.47

F. IR spectral data

IR spectral data are given in table II. The ligand and complexes have been characterized in detail by studying their IR spectra. The IR spectral graph of ligand and Ni(II), Cu(II) and Co(II) complexes are given in Fig. 2. The IR spectrum of ligand displayed strong band at 1610 cm⁻¹ is assignable to ν(C=N). In the spectra of respective complexes this is shifted lower frequency wavenumber by 15-20 cm⁻¹[10]-[11], representing the coordination of azomethine nitrogen to the metal center. The ν(C=O) vibrations in the free ligand is at 1654 cm⁻¹, in the complexation, the ν(C=O) group is shifted to 6-40 cm⁻¹ to a lower wave number in its complexes indicate carbonyl oxygen involved in coordination to the metal ion [10]-[13]. The band at 482-497 cm⁻¹ is assignable to ν(M—O) and weak band at in the region of 524-540 cm⁻¹ are assignable to ν(M—N) [14].

TABLE II
IR SPECTRAL DATA OF LIGAND AND THEIR METAL COMPLEXES

Compound	$\nu(\text{C}=\text{N})$	$\nu(\text{C}=\text{O})$	$\nu(\text{M}-\text{O})$	$\nu(\text{M}-\text{N})$
L	1610	1654	-	-
$[\text{Ni}(\text{L})_2\text{Cl}_2]$	1570	1597	490	533
$[\text{Cu}(\text{L})_2\text{Cl}_2]$	1596	1615	497	524
$[\text{Co}(\text{L})_2\text{Cl}_2]$	1576	1608	482	540
$[\text{Fe}(\text{L})_2\text{Cl}_2]$	1595	1636	485	539

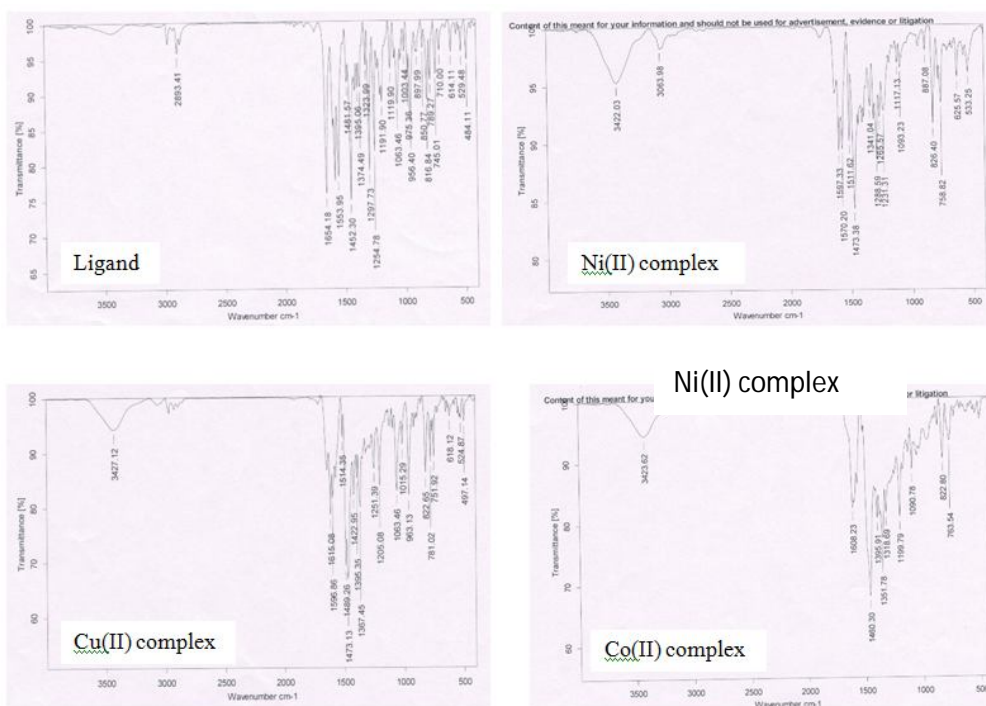


Fig. 2IR spectra of ligand and its metal complexes.

G. ¹H NMR spectra

The ¹H NMR spectrum of ligand recorded in chloroform and its Ni(II), Cu(II), Co(II) and Fe(III) metal complexes recorded in DMSO. The NMR spectral graph of ligand is given in Fig. 3. The spectrum of ligand shows following signals: 8.14 ppm (H, S, -HC=N- azomethine proton); 6.8-7.5 ppm (m, aromatic protons of chromone nucleus); 7.4-9.0 ppm (m, aromatic protons of quinolone nucleus). However, in metal complexes the NMR signal of azomethine proton shifted to downfield as compared to NMR signal of azomethine proton in Schiff base [10], [15]. In Ni(II), Cu(II), Co(II) and Fe(III) complexes resonance signal for azomethine proton at 8.38 ppm, 8.39 ppm, 8.36 ppm and 8.34 ppm respectively. Thus there is confirming the metal complex formation [10], [15].

TABLE III
¹H NMR SPECTRAL DATA OF LIGAND AND THEIR METAL COMPLEXES

Compounds	Chemical shift (ppm)	Assignment
L	8.14	(H, S, -HC=N- azomethine proton)
	6.8-7.5	(m, aromatic protons of chromone nucleus)
	7.8-9.0	(m, aromatic protons of quinolone nucleus)
[Ni(L) ₂ Cl ₂]	8.38	(H, S, -HC=N- azomethine proton)
	6.5-7.7	(m, aromatic protons of chromone nucleus)
	7.9-8.6	(m, aromatic protons of quinolone nucleus)
[Cu(L) ₂ Cl ₂]	8.39	(H, S, -HC=N- azomethine proton)
	6.8-7.8	(m, aromatic protons of chromone nucleus)
	7.9-8.9	(m, aromatic protons of quinolone nucleus)
[Co(L) ₂ Cl ₂]	8.36	(H, S, -HC=N- azomethine proton)
	6.2-7.6	(m, aromatic protons of chromone nucleus)
	7.8-9.0	(m, aromatic protons of quinolone nucleus)
[Fe(L) ₂ Cl ₂]	8.34	(H, S, -HC=N- azomethine proton)
	6.5-7.9	(m, aromatic protons of chromone nucleus)
	8.0-9.1	(m, aromatic protons of quinolone nucleus)

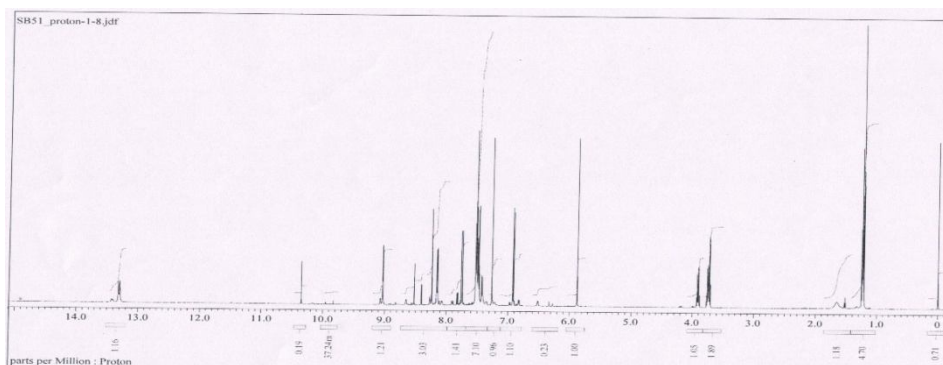


Fig. 3 ¹H NMR spectrum of the Ligand.

H. Electronic and magnetic moment data

The absorption spectra of Schiff base and its Ni(II), Cu(II), Co(II) and Fe(III) complexes were measured in DMSO solution in wavelength range of 200-1100 nm. The electronic spectra of ligand show two bands, one band at 22379 cm⁻¹ is attributed to the n→π* transition. Another band at 32765 cm⁻¹ is due to the π→π* transition [16]. The Ni(II) complex showing three bands at 8734 cm⁻¹, 15367 cm⁻¹ and 22738 cm⁻¹ assignable to the ³A_{2g}(F)→³T_{2g}(F) (ν₁), ³A_{2g}(F)→³T_{1g}(F) (ν₂), ³A_{2g}(F)→³T_{2g}(P) (ν₃) transition respectively characteristic of octahedral geometry [16]. The electronic spectra of Cu(II) complex exhibit bands at 12683 cm⁻¹, 14529 cm⁻¹ and 21874 cm⁻¹ are assigned to ²B_{1g}→²B_{2g}, ²B_{1g}→²E_g and LMCT transitions, respectively. These bands are characteristic for distorted octahedral geometry. Octahedral geometry of Cu(II) complex was also confirmed by magnetic moment value (1.8) [17]-[18]. The electronic spectra of Co(II) complex shown three bands at 8428 cm⁻¹, 15110 cm⁻¹ and 18727 cm⁻¹ are assignable to ⁴T_{1g}(F)→⁴T_{2g}(F) (ν₁), ⁴T_{1g}(F)→⁴A_{2g}(F) (ν₂), and ⁴T_{1g}(F)→⁴T_{1g}(P) (ν₃) transitions, respectively, characteristic of octahedral geometry. Octahedral geometry of Co(II) complex was also confirmed by magnetic moment value (3.72) [17-18]. The electronic transition of Fe(III) complex are generally spin forbidden and hence weak, and are often masked by charge transfer

spectra [17-18]. The Fe(III) complex showing band at 22831 cm^{-1} which can be assigned to the ${}^6A_{1g} \rightarrow {}^4T_{1g}$ transition characteristic of octahedral structure [19]-[21]. The magnetic moment value of all the metal complexes as shown in table no.1 which also confirm their octahedral geometry[18],[20].

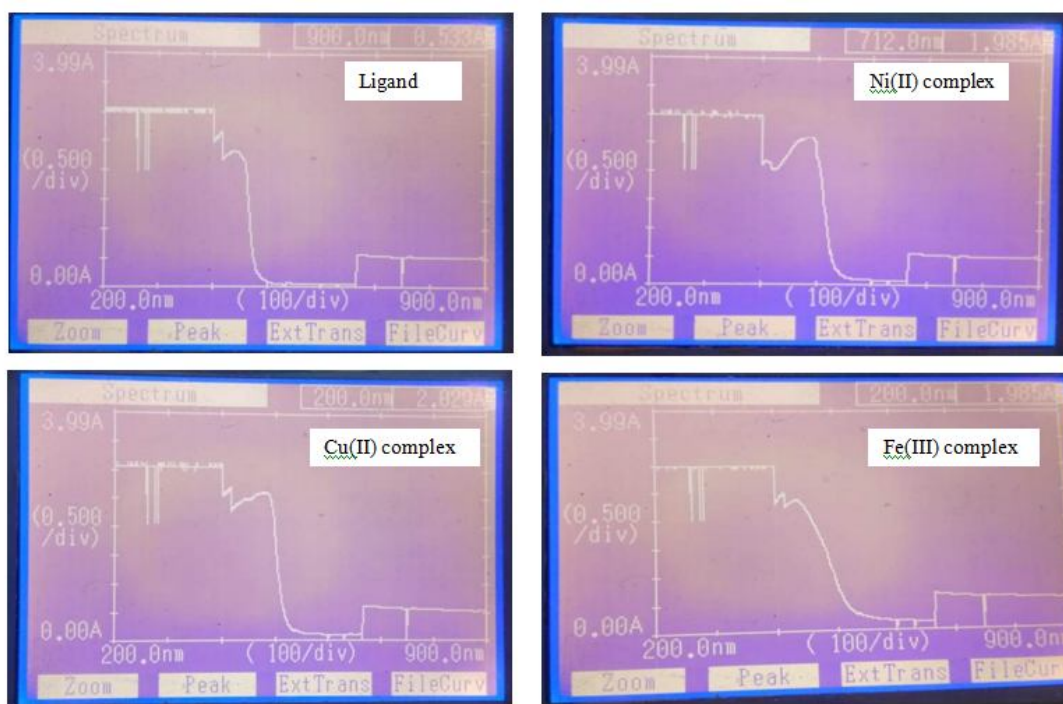


Fig. 4 Electronic spectra of ligand and their metal complexes.

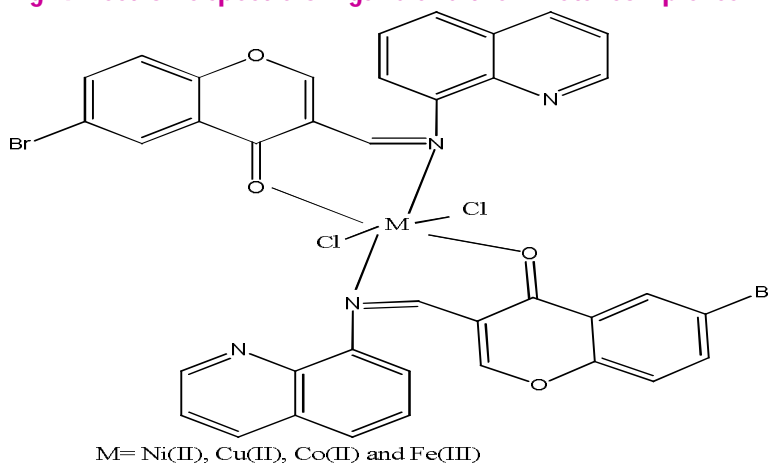


Fig. 5 Proposed structure for all metal complexes.

I. Antimicrobial activity

The minimum inhibitory concentration (MIC) of the complexes have compared with ligand and standard tetracycline are listed in table IV. The antimicrobial screening studies revealed that the metal complexes were shown more antibacterial and antifungal activity compared with parent ligand under similar experimental condition on the same pathogens. The compound 3 have shown significant antibacterial activity against *K. pneumonia* and *Proteus vulgaris* and compound 2 and 4 were displayed good antibacterial

activity against *Staphylococcus aureus* where as compound 3 and 5 have demonstrated antibacterial activity against *Proteus vulgaris*. The compound 3 and 4 were displayed good antifungal activity against *Aspergillusniger*. The Overtone's concept and Tweedy's chelation theory can be explained for the better activity of the complexes compared to that of ligands. The theory states that the complexation causes reduction in the polarity of the metal ion due to the partial sharing of its positive charge with donor groups [22].

TABLE IV
MIC VALUE OF ANTIMICROBIAL ACTIVITY OF LIGAND AND THEIR METAL COMPLEXES (PPM).

Compounds	<i>Klebsiellapneumoni</i> <i>ae</i>	<i>Staphylococcus</i> <i>aureus</i>	<i>Proteus</i> <i>vulgaris</i>	<i>Candida</i> <i>albicans</i>	<i>Aspergillusnig</i> <i>er</i>
L(1)	1000	500	500	1000	1000
[Ni(L) ₂ Cl ₂](2)	500	250	500	500	500
[Cu(L) ₂ Cl ₂](3)	250	500	250	500	250
[Co(L) ₂ Cl ₂](4)	500	250	500	500	250
[Fe(L) ₂ Cl ₂](5)	1000	500	250	500	1000
Tetracycline(6)	250	250	500	500	500

CONCLUSIONS

In the present work, Ni(II), Cu(II), Co(II) and Fe(III) complexes were prepared from 6-bromo-3-formylchromone and 8- aminoquinoline Schiff base and are analysed by various spectral techniques. The analysis of IR spectral data revealed that the nature of ligand is bidentate, coordinating through azomethine nitrogen and carbonyl oxygen atoms. Magnetic and Electronic spectral data indicate octahedral geometry for all the complexes. All the prepared compounds exhibited significant antibacterial and antifungal activity. Metal complexes have shown potent antimicrobial activity than the ligands.

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SOIL HEAVY METAL STATUS AROUND MAHAD MIDC AREA DISTRICT RAIGAD MAHARASHTRA

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ABSTRACT :

Maharashtra is one of the agriculturally most developed state of India and people are mainly in the occupation of agriculture. The investigation focused the analysis of soil metals concentration from Mahad MIDC industrial territory which was used for cultivating paddy and still surrounding people are in the same business. The investigation was completed around Mahad MIDC, District Raigad of state Maharashtra, India. The Industrial zone is known for its different Chemical and Pharmaceutical industries. Industrial effluent are more responsible for the increase in the concentration of poisonous metals into the soil. The examination discovers contamination state of soil. The heavy metals (Iron, Copper, Zinc, Manganese, Nickel, Chromium, Cobalt, and Lead) were studied from fifteen selected stations of Mahad MIDC zone. The remarkable variation in the metals concentration was observed during study period. The outcomes clearly demonstrate that the industrial effluents are affecting adversely on the quality of soil.



KEYWORDS : Heavy Metals, Soil, Pollution, Mahad MIDC area.

INTRODUCTION

Soil is one of the indispensable assets on the planet Earth. In last few year, extensive focus has been paid to waste of industries, which is generally release ashore or into the different water sources. The soil physico-chemical properties affects the soil behavior and therefore the learning of soil property is essential (Rajbala et. al., 2012). Soil is an imperative creation of earthbound environment, and direct release of industrial waste particularly that without treatment may have profoundly impact on natural properties of soil identified in relation to soil productivity (Kumar et. al., 2012). Heavy metal tainting of soil because of different anthropogenic activities has turned into a serious reason for worry all through the world. The expansion in pollution of heavy metals, for example, Cr, Cu, Co, Cd and Pb in cultivable soils because of utilization of agrochemicals and polluted water system, water prompted decay of soil quality (Rayment et. al., 2002; Kaur et al., 2014). Various metals like Cd, Cu, and Zn are accounted as transporting with industrial discharges, bedrock, and lake silt in acidic conditions (Steinnen E., Schindler D.). Heavy metals have more holding power in soil any longer than in different parts of the biosphere. Also, the rehashed utilization of water for water system may prompt the accumulation of toxic metals in agrarian soils and plants (Odoh, 2011). The harmful impacts of heavy metals may rely on the dimensions and oxidation states and kinds of sources (Duruibe, J.O., and F.A. Nicholson), they can influence the nature of agrarian soils, including phytotoxicity. Obviously, soil is considered as the predominant mode for the heavy metals transportations to

human body through harvest or vegetables as a food (F.A. Nicholson). Many scientists (Lasat, M.M., Mireles F, Wei B., Gülten Yaylılı-Abanuz) affirmed that heavy metal contamination of surface soils is because of concentrated and mass industrialization and urbanization that has turned into a genuine worry in many developing nations since soil contamination is the beginning stage of transportation of the poisonous substances to all living things and in to the surrounding atmosphere. The sufficient insurance and rebuilding of soil biological systems polluted by poisonous metals require their analysis and remediation. Contemporary enactment regarding ecological security and general wellbeing, at both national and universal level, depend on information that gives details about physico-chemical properties of natural phenomenon, particularly those related to our food chain (A. Kabata-Pendias). While soil study would give an understanding into toxic metal speciation and bioavailability, efforts for remediation of polluted soils would give insight of origin of pollution, soil chemistry, and impacts of these toxic metals. Evaluation of toxic metals status in soil is a best logical way which help authority to control pollution and saving soil and biological systems on the earth (Q. Zhao).

MATERIAL AND METHODS

Study Area

This study was carried out around the Mahad MIDC area. The study sites covers the area from different agricultural fields.

Material Required

Soil sample, Plastic bag, Shovel, 2 mm sieve, Beakers, Electronic balance, Hot plate, Measuring cylinder, Funnel, 100 ml air tight bottle, Whatman filter paper No. 42, Distilled water, Double distilled water.

Sample Collection

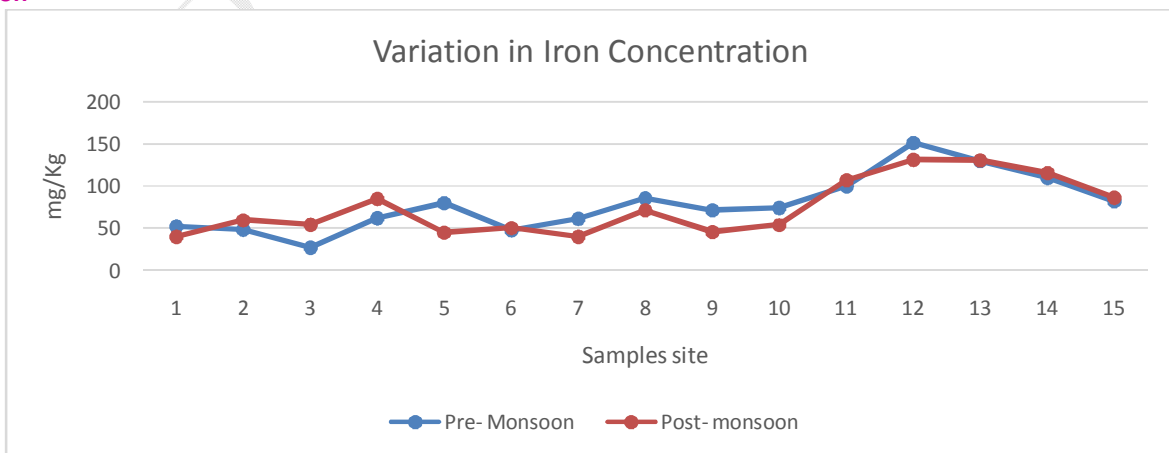
Soil samples were collected using cleaned shovel at 15cm depth and stored in polythene bags. The samples were mix, gently homogenized and sieved through 2-mm-mesh sieve. Air drier was used for the drying of soil samples and placed in electric oven at a temperature of 40 °C approximately for thirty minutes. For further process obtained powder was kept at room temperature.

Instrument Required

Atomic Absorption Spectrophotometer.

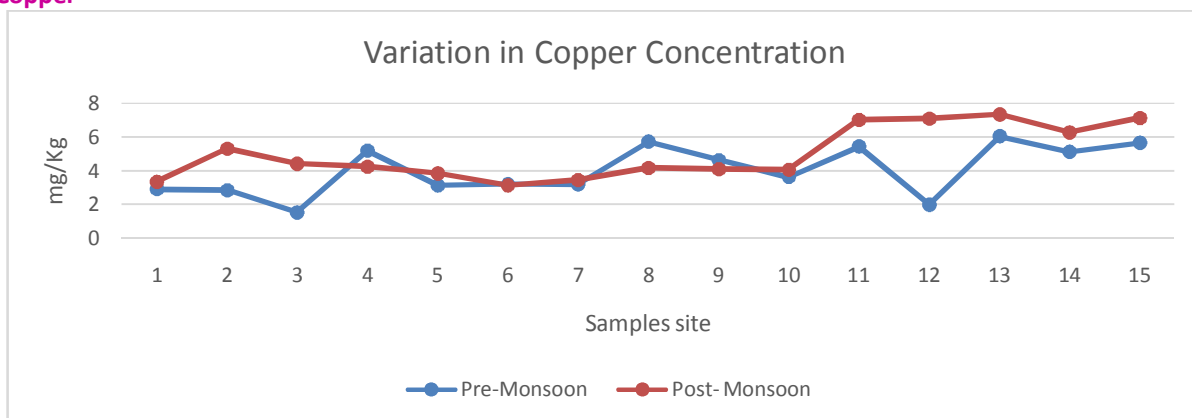
Result and discussion

Iron



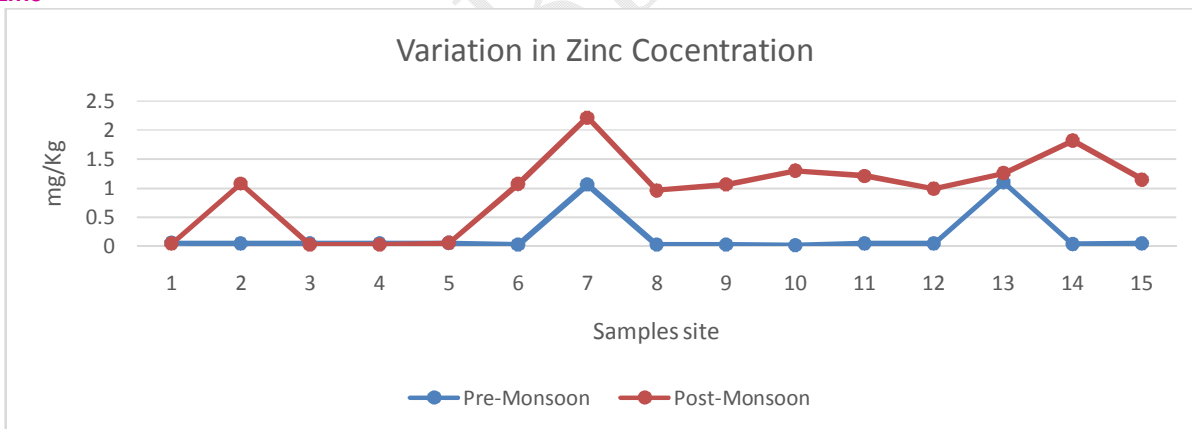
The maximum concentration of iron was 151.2 mg/Kg and mean 78.88mg/Kg observed during pre-monsoon season. While during post-monsoon season maximum was 131.3mg/Kg with average value 74.42 mg/kg. The soil of the Konkan region is red soil having high concentration of the iron contents. Results obtained was almost similar to Borkar V.S. (2018) and these are hardly distinguishable from the analysis of soil carried out by Omar. A. Al-Khashman (2004).

Copper



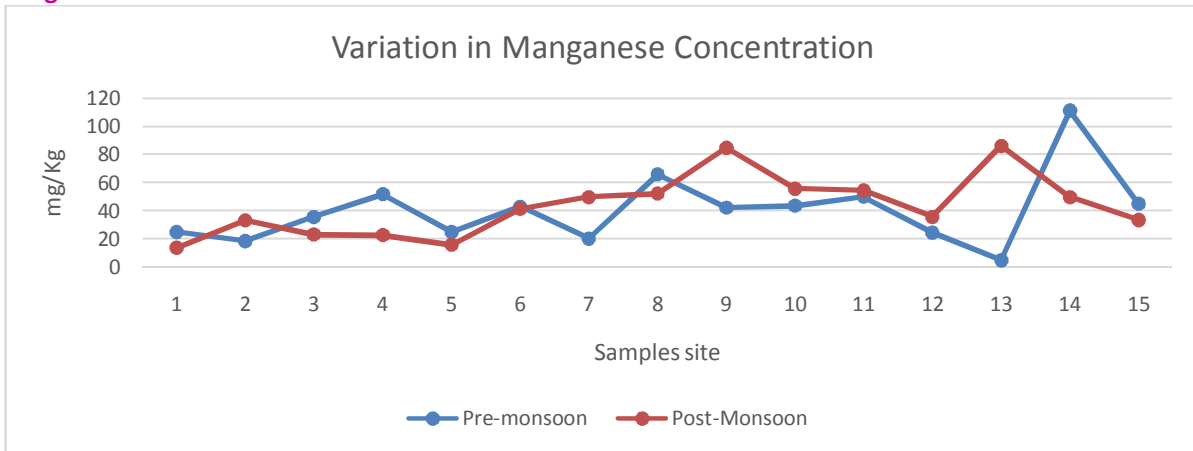
The maximum concentration of Copper before monsoon was 6.05mg/Kg with average of 4.01mg/Kg. The concentration of Copper was maximum up to 7.34mg/Kg with average value 4.98mg/Kg after the monsoon. The concentration of Copper in the soils of Poland was found to be 5 mg/kg; but, the studies carried out by other researcher’s shows higher values (Baize and Sterckeman, 2001; Blaser et al., 2000; Steinnes et al., 1997; Thuj et al., 2000).

Zinc



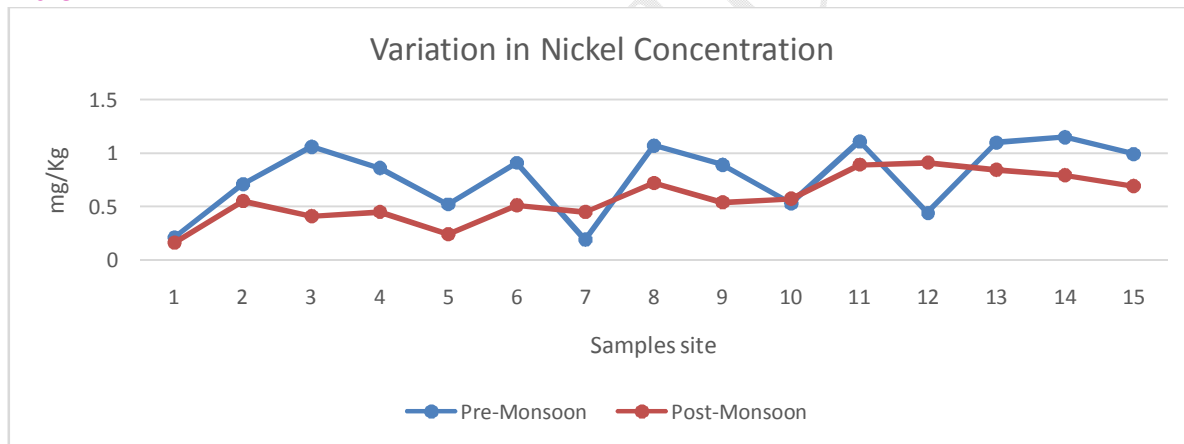
The Zinc metal maximum concentration was 1.1mg/Kg with average value 0.174mg/Kg before the monsoon and after the monsoon it was 2.22mg/Kg with average value 0.9506 mg/Kg. almost similar values of Zn contents was observed in Harare, Zimbabwe(F. Mapanda et.al. 2004) but more zinc was detected in Norway (53.8 mg/kg; Steinnes et al., 1997), Vietnam rural soil (65.5 mg/kg; Thuj et al., 2000) and Switzerland forest soils (60 mg/kg; Blaser et al., 2000).

Manganese



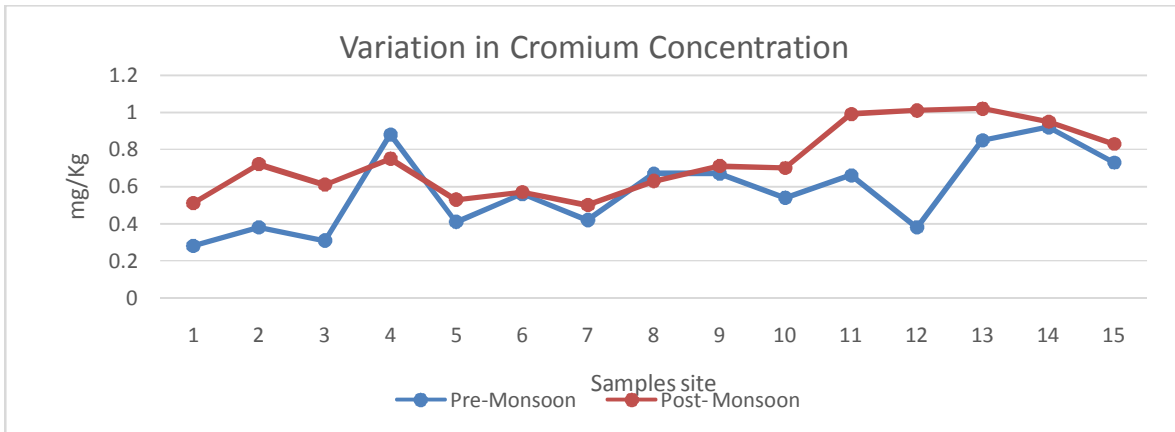
Manganese metals concentration was maximum upto 111.2mg/Kg with average value of 40.44mg/Kg before the monsoon while after the monsoon it was maximum about 86.09mg/Kg with average 43.35mg/Kg. The values obtained are much lower than the reported values in soil analysis at industrial area, Turkey (Gülten Yaylılı-Abanuz, 2011) and Thrace Region, Turkey (Mahmut Coskun, 2004). However it was found to be more than study carried out at Haryana, India (R.S. Malik, 2017).

Nickel



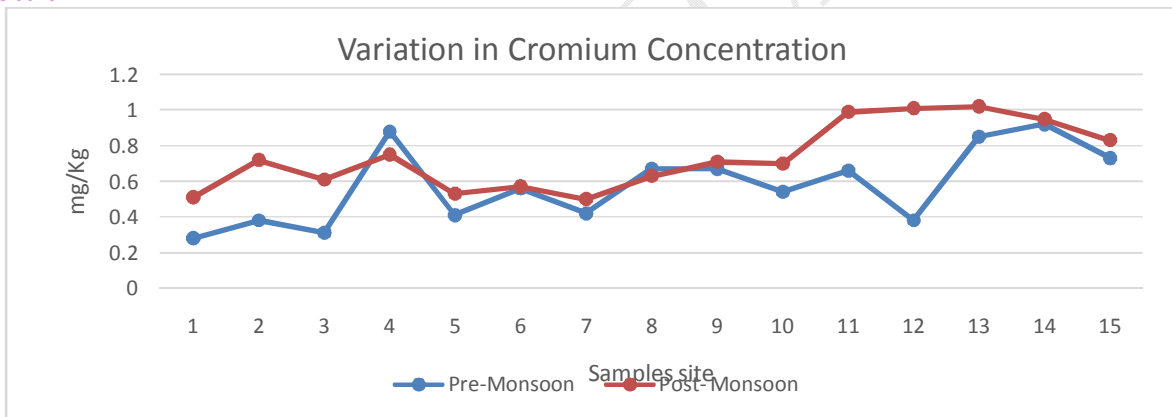
Before the monsoon Nickels concentration was maximum about 1.15mg/Kg with average 0.782 mg/kg. and after the monsoon its maximum value was 0.91mg/Kg and average was 0.581mg/Kg. The mean Nickel contents was found to be about three times lower than the soil of Poland (K. Loska et al, 2004) also quite low concentration was observed than in the Switzerland forest soils (Blaser et al., 2000).

Chromium



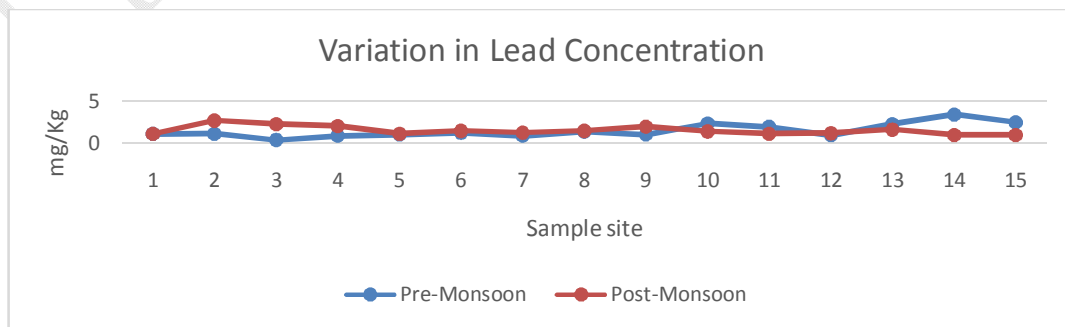
Chromium’s concentration was maximum up to 0.92mg/Kg with mean value 0.577mg/Kg before the monsoon while after the monsoon it was observed to be high up to 1.02mg/Kg and average 0.735mg/Kg. This heavy metals in Vietnam indicates considerably more elevated amounts: 80.8– 116.7 mg/kg. Furthermore, 23.2– 174.5 mg/kg for urban soils (Thuj et al., 2000), likewise in the forest of Switzerland it was higher (Blaser et al., 2000).

Cobalt



Before the monsoon maximum concentration of cobalt was found to be 1.02mg/Kg and average was 0.4626mg/Kg. After monsoon the maximum concentration was found to be 3.1mg/Kg while the mean was 0.942mg/Kg. The mean concentration of cobalt in the soil was much lower than the 16.9 mg/kg, Chennai, Southern India, (A. K. Krishna, 2007) and Central India (K.S.Patel, 2015).

Lead



The lead concentration was ranged from 0.34mg/Kg to 3.46mg/Kg with average 1.49mg/Kg before the monsoon. After the monsoon it was ranged from 0.97mg/Kg to 2.73mg/Kg with an average of 1.61mg/Kg. The obtained mean content was very low compared to the topsoil's of the Baltic countries (Reimann et al., 2000), soils analyzed by Baize and Sterckeman (2001) and Norwegian soils (Steinnes et al., 1997).

CONCLUSION

The present investigation shows that the soil contamination by industrial effluent is increasing day by day. Presence of heavy metals in the soil is worrying condition for all organisms in the surrounding area of Mahad MIDC. This study provide an important data in relations to soil contamination which could be further useful to investigate the industrial pollution influence on soil quality. Obligatory actions like biodegradation and bioremediation policies are need to be followed for the industrial effluents before release into the atmosphere to secure all living organisms and human life.

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Water Quality Analysis Around Mahad Midc Area District Raigad Maharashtra

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Abstract

At present the water pollution is the most seriously focused type of problem. Past decade have witnessed huge growth in deterioration of water quality in and around the industrial zones in the world. Next decade is likely to see a considerable rise in water pollution due to continuous mass industrialization and anthropogenic activities. The present paper aims to validate the findings regarding water quality status of water bodies around the Mahad MIDC area district Raigad Maharashtra. Taken together, these findings indicate that changing water parameters like pH, Electrical Conductivity (EC), Total hardness, Total alkalinity, Bicarbonates, Phosphate, Chlorides, Sulphate, Ammonia, Na, K, Ca, and Mg, impacts directly on biotic and abiotic systems in water. Considering this, continuous analysis of surface water around the industrial area and implementation of an integrated plan to limit the contamination by industries are needed.

Keywords: Water, pollution, pH, total alkalinity.

Introduction

Water is a standout amongst the most essential and most valuable environmental assets. It is basic need in the life of every single living life form from the easiest plant and microorganisms to the most mind boggling living framework known as human body. Water is compound of oxygen and hydrogen atom, with a synthetic formula, H₂O and known to be the most bounteous compound (70%) on earth surface. It is noteworthy because of its extraordinary physical and chemical properties (Amanial Haile Reda). Release of effluents and dangerous waste mixes into riverine frameworks speaks to a progressing ecological issue thus represents a potential risk to all living organisms comes in contact with it. The present investigation manages the quality appraisal of mechanical gushing and its effect on the natural water bodies. Metals in the earth have expanded colossally because of quick anthropogenic exercises. (Salomons and Forstner 1984). India's condition is getting to be delicate and nature's contamination is one of the bothersome effect of Population, urbanization and industrial development and oblivious frame of mind towards the earth. At present, nature's safety is the primary need of the general public. In spite of the fact that industrialization and improvement in agriculture are important to meet the essential prerequisite of individuals, along with this, it is important to protect the nature. In India, as well, the natural contamination has turned into a reason for worry at different dimensions (Paul, et al. 2012). In India, because of absence of sewage treatment plants, for the most part untreated sewage effluents are discharged either on agrarian land for water system or discarded in adjacent water bodies (Ladwani, et al. 2012). The nature of water is indispensable, inferable from its appropriateness for different purposes since it is specifically connected with human welfare. Variation in the quality of ground water is quickly indicates the influence of anthropogenic and geological activities happens around the corresponding water bodies. (Subramani et al., 2005). Determination of chemical composition of water is obtained by the hydrochemical knowledge. (Zaporozec, 1972). The evaluation of water quality has turned into a critical piece of water asset contemplates, planning and the executives. It is increasing huge significance because of extraordinary urbanization, industrialization and agrarian exercises that are expanding the danger of tainting of soil and water. (Tiwari, 2011).

Materials and methods

The study area Mahad is located on the Arabian Sea in the costal kokan region of Maharashtra, south of Mumbai. The geographical coordinates of selected area are Latitude 18°6'12"N and longitude 73°28'40"E, elevation above mean sea level (meters) 177.5m approximately. Water samples were collected from nearby sites of MIDC (Maharashtra Industrial Development Corporation) of Mahad dist. Raigad. In the study area number of factory produces fertilizer, agro-chemical, acid dyes, paints, machine tools materials and resins etc. Fifteen water samples were collected as per the methods of APHA (1998), R. K. Trivedy and P. K. Goel, (1986) and accordingly standards are followed for the analysis of all the physicochemical parameters and metals. AR grade chemicals and reagents are used. Doubled distilled water are used for the preparation of solutions.

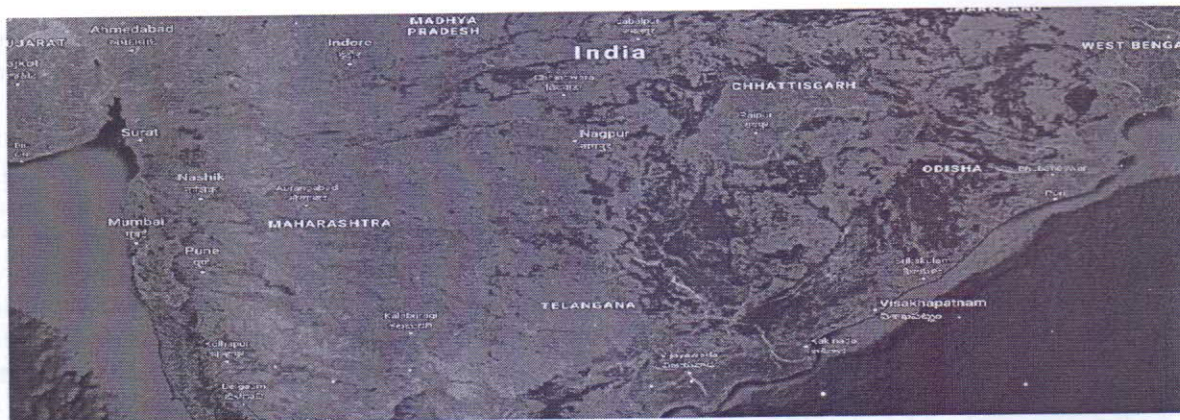


Fig 1. District- Raigad, State- Maharashtra, India.

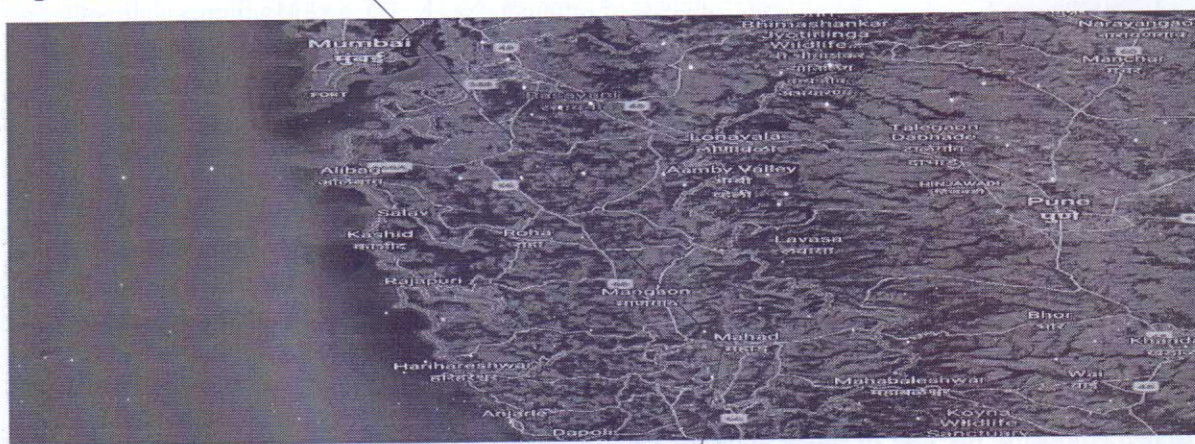


Fig-2. Tal-Mahad, District-Raigad, State-Maharashtra, India.



Fig-3. Mahad MIDC, Tal-Mahad, District-Raigad, State-Maharashtra, India.

Results and discussion pH

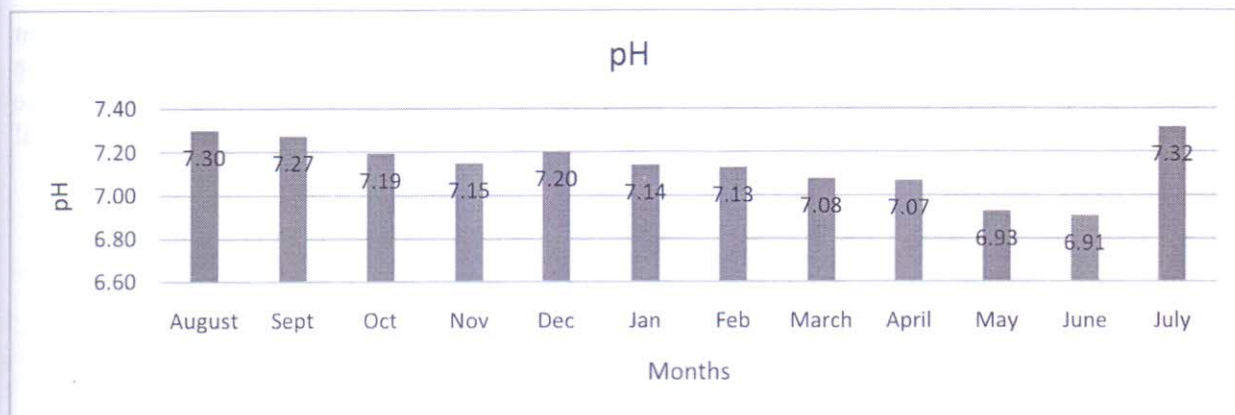


Fig-4. Month wise variation of pH.

The pH value in the study area is found to be in the range of 6.91 to 7.32 and average value is 7.14 during the period of august-2017 to July-2018. pH value is found to be highest in the month of July and lowest in the month of June. This variation observed may be because of more water flow in the month of July and low water flow in the month of June. This indicates continuous use of acidic substances in the industries for the carrying out chemical reactions. The results obtained are consistent with the previous results of P. Debels et. al. (2005) and the values of pH obtained are hardly distinguishable from Gagan Matta et.al (2015).

Electrical Conductivity (EC)

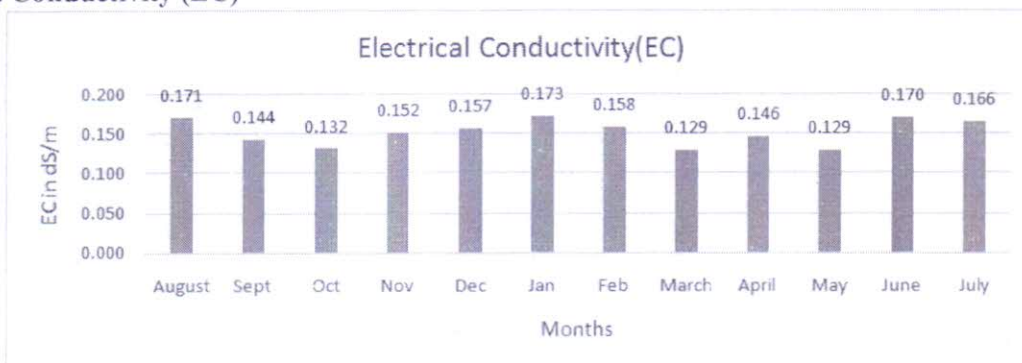


Fig-5. Month wise variation of Electrical Conductivity.

The maximum value observed for the Electrical conductivity was 0.173 dS/m in the month of January-2018 and minimum is 0.129 dS/m in the month of March-2018 with an average value was 0.152 mS/m. slight fluctuation in the value of Electrical conductivity is observed for the selected study area. This change may be due to the presence of more ions carrying electricity in water in the month of January. This is in good agreement with analysis carried out by Muhammad Ayaz Khan et.al. (2015).

Total hardness and Total alkalinity



Fig-6. Month wise variation of Total hardness and Total alkalinity.

The range of Total hardness was found to be from 28.02 mg/L to 61.38 mg/L with an average value 43.66 mg/L and total alkalinity ranged from 35.05 mg/L to 129.90 mg/L having average value 71.29 mg/L. This indicates the variation of concentration of substances responsible for Total hardness and Total alkalinity

during the study period. This may be due to the chemicals used by the industries to carry out the different chemical reactions. The maximum value are found in the month of July-2018 when the flow of water in the rivers was very high. Sampling spot selected were where maximum activities of human are observed. The observations for total hardness are consistent with the Gagan Matta et.al. (2015). Also the values of total alkalinity obtained by Priyanka Trivedi et.al (2009) are nearly same.

Bicarbonates and Chlorides:

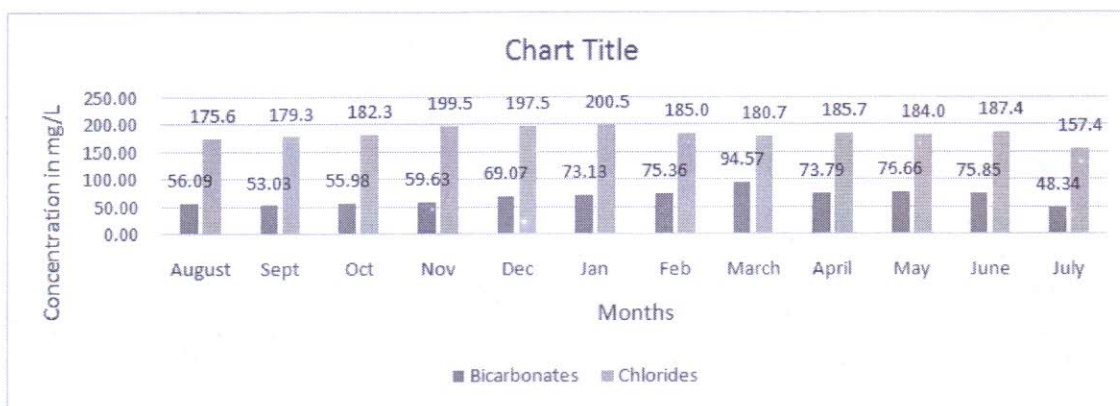


Fig-7. Month wise variation of Bicarbonates and Chloride.

The bicarbonate level in study area during the period of Aug-2017 to July-2018 was ranged between 48.38mg/L to 94.57mg/L with average value 67.62mg/L. While the concentration of chlorides was 157.4mg/L to 200.51mg/L having average value 184.57mg/L. The chloride concentration was maximum in the month of January and bicarbonate concentration in the month of March. The reported results for the Bicarbonates are nearly same with the analysis carried out by Namita Agrawal et al. (2009) and the result for Chloride is matches the values of Peiyue Li et.al (2013).

Sulphate

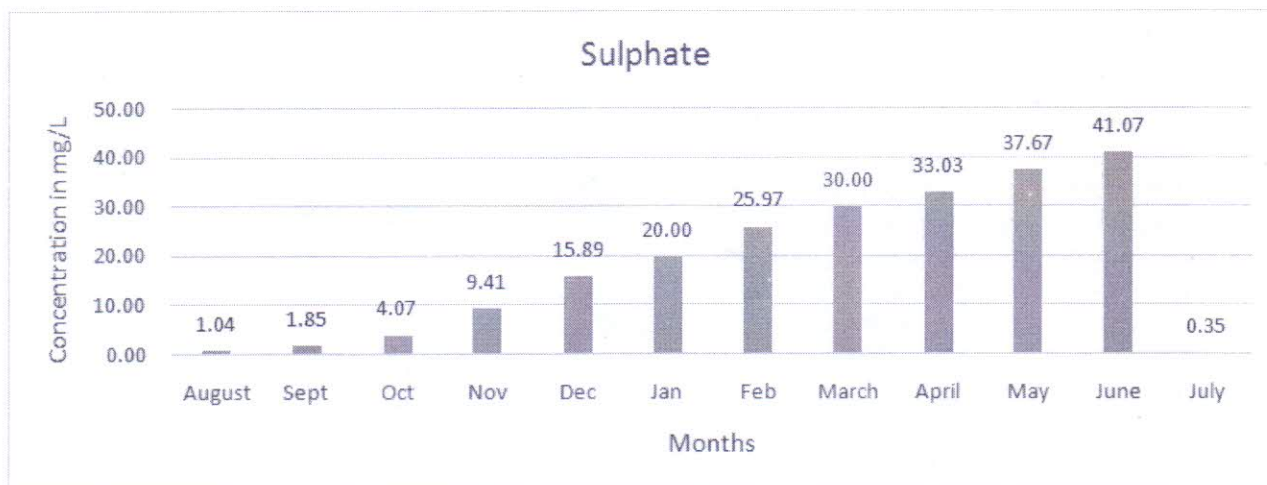


Fig-8. Month wise variation of Sulphate

Sulphate concentration was in the range of 0.35mg/L to 41.07mg/L and average concentration was 18.36mg/L. The maximum concentration of sulphate was observed in the month of June-2018. This shows the use of sulphate compounds may be there in industries. This lends support for previous finding in the literature Yousif Algama (2015), and obtained results correlates favorably with Namita Agrawal et al. (2009).

Phosphate and Ammonia (Nitrogen)

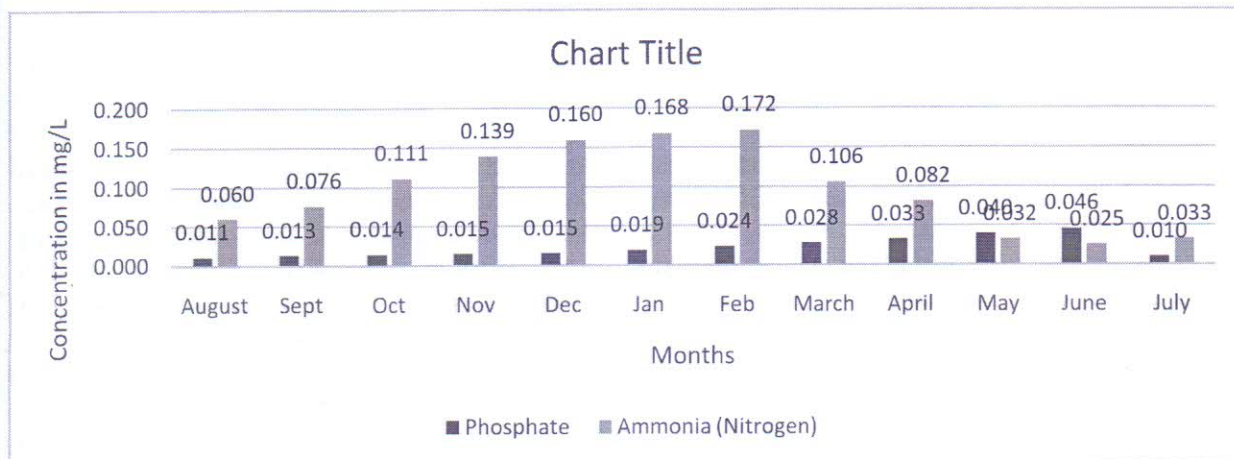


Fig-9. Month wise variation of Phosphate and Ammonia (Nitrogen).

Variation in the concentration of phosphate was from 0.01mg/L to 0.05mg/L with mean value 0.02mg/L, while the concentration of Ammonia was ranged between 0.03 mg/L to 0.17mg/L with mean value 0.10 mg/L. According to these values we can say that there is use of phosphate containing compounds and nitrogen containing compounds in the industries of study area. The values of phosphate are satisfactorily well with Namita Agrawal et. al. (2009) and values of Ammonia show the somehow resemblance with P. Debels et. al. (2005), it further supports the idea of Hefni Effendi et al. (2015).

Sodium (Na) and Potassium (K)

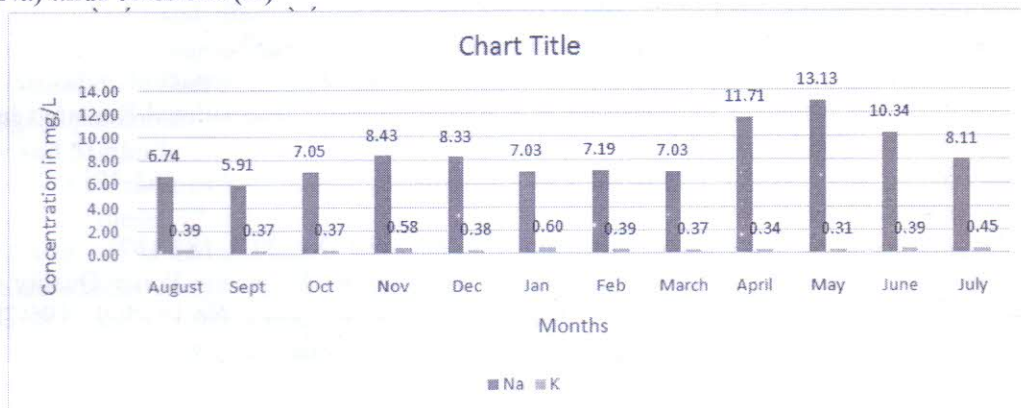
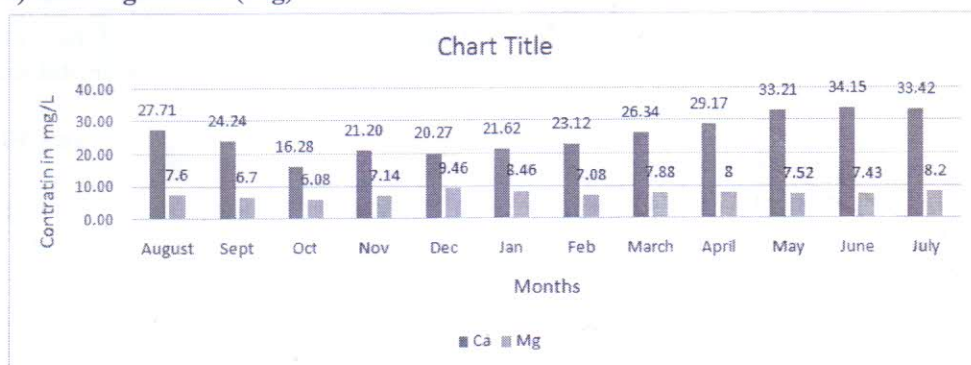


Fig-10. Month wise variation of Sodium and Potassium.

Sodium and Potassium are the alkaline earth metals. The sodium concentration was maximum up to 13.13mg/L and minimum 5.91mg/L with an average value 8.42mg/L and the concentration of potassium ranged from 0.31mg/L to 0.60mg/L with mean value 0.41mg/L during the period of study. These findings for sodium approves the previous results reported in the literature by Sajitha and Vijayamma (2016). No significant difference were found in the values of Potassium by Namita Agrawal et al. (2009). values obtained for potassium further supports the observations of Murhekar Gopalkrushna(2011).

Calcium (Ca) and Magnesium (Mg)



**Fig-11.** Month wise variation of Calcium and Magnesium.

In the selected area for study of water, the calcium concentration was ranged from 16.28mg/L to 34.15mg/L having average value 25.89mg/L. The Magnesium concentration was in the range from 6.08mg/L to 9.46mg/L with mean value 7.63mg/L. This values of Calcium obtained are shows similarity with the results of P. Debels et. al. (2005) and magnesium are concurs well with Trivedi, et al (2009)

Conclusions


In this investigation the collected water tests of Mahad MIDC area were studied for physicochemical parameters of pH, Electrical Conductivity (EC), Total hardness, Total alkalinity, Bicarbonates, Phosphate, Chlorides, Sulphate, Ammonia, Na, K, Ca, and Mg. The outcome uncovered that practically all the deliberate parameters were inside the standard drinking water quality given by WHO. When all is said in done the present examination found that the most extreme parameters were not at a dimension of contamination and may not make hurtful impact the living organisms. But, to shield the water quality, we have to concentrate on the accompanying issues like, Prevention of contamination by treatment of dirtied water; Better comprehension of water quality and its effects through enhanced checking, Information gathering and examination and situation building, Social mindfulness and instruction with respect to protection of water and improved lawful, institutional courses of action, innovation and foundation.

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Physico-Chemical Analysis Of Commercial And Wild Honey From Konkan Region Of Maharashtra

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ABSTRACT

The qualitative analysis of honey can be done by analyzing its physico-chemical characteristics. The nutritional value of honey depends on its glucose and mineral content. The amount of glucose and minerals present in the honey is affected by various factors like – stage and time of harvesting, seasonal and geographical conditions. The moisture content in the honey decides its storage life. Due to high calorific value of honey, it is used in breakfast to retain energy in daily life. So, honey having valuable commercial importance. Hence current study was undertaken to determine quality and storage life of honey. The main objective of the study was to compare wild and commercial honey from the different Konkan region of Maharashtra in order to determine the factors which control quality and storage life of honey to increase its commercial importance. The characteristics studied for comparison were color, smell, taste, moisture content, ash content, pH, electrical conductivity, free acidity and glucose content. The honey with low moisture content, high glucose and mineral content has high calorific value and longer storage life.

Keywords: Honey, Physico-chemical Properties, Sugar

1. INTRODUCTION

Honey is the opaque viscous liquid extracted from honeycombs. It is produced by honey bees and stored in honeycombs. The composition of honey mainly depends on its maturity and season in which it is produced. The floral source and temperature decide the color of honey. It ranges from light amber through dark amber to dark. Dark honey is rich in antioxidant [1]. Honey is sweet in taste due to presence of carbohydrates like glucose, fructose and sucrose. Mainly monosaccharides (Glucose and fructose) constitute major (about 70-80%) proportions of honey [2]. Besides monosaccharide's, the presence of organic acids responsible for sweetness of honey. The organic acids, which were identified in honey are formic, malic, tartaric, succinic, acetic, lactic, citric, oxalic, gluconic, malonic, valeric acids, but the major proportion of total acids is of gluconic acid [3-4]. The moisture content is another important physicochemical property of honey as it affects its storage life. Low moisture content shows antimicrobial property of honey [5]. The electrical conductivity of honey is directly proportional to concentrations of inorganic salts, organic acids, complex sugars and mineral contents [6].

Honey is used in daily meals due to its high calorie contents. Due to its anti-oxidant and antimicrobial property, it also shows some therapeutic action [7]. The quality of honey is decided by its above stated physico-chemical properties like- color, smell, taste, pH, moisture, ash, electrical conductivity and reducing sugar. Therefore an attempt is made to study the quality of commercial honey from the different market places of Konkan region of Maharashtra by analyzing its physical-chemical properties and comparing it with wild honey from the same region.

2. MATERIALS AND METHODS

2.1 Materials

2.1.1 Chemicals and Reagents

Distilled and conductivity water, Buffer solution of pH-04, KCl, $\text{Na}_2\text{S}_2\text{O}_3$, $\text{K}_2\text{Cr}_2\text{O}_7$, Conc. HCl, Conc. H_2SO_4 , Iodine, NaOH, Starch powder, KI. All the chemicals and reagent used are of AR grade quality.

2.1.2 Equipment's and Apparatus

Conductivity meter (Equiptronics, Model No-EQ660 B, SR.No-082815), pH meter (Equiptronics, Model No.EQ610, Sr.No. 081215), Hot air oven (Innovative, DTC-96), Muffle furnace, Conductivity Cell (Cell Constant = 1), Combined glass electrode, Desiccator, Std.volumetric flask (100 cm^3), Beakers (100 cm^3 , 250 cm^3), Petry dish, Silica Crucible, Glass electrode, Burette (25 cm^3), Volumetric Pipettes (10 cm^3 , 25 cm^3), Reagent Bottles (100 cm^3), Conical flask (250 cm^3), Measuring cylinders (5 cm^3 , 10 cm^3).



2.2 Methods

To determine quality of honey, its physicochemical properties were studied by analyzing its color, smell, taste, moisture, pH, ash, conductance and amount of reducing sugar.

2.2.1 Collection of Honey samples

Commercial honey samples were purchased from the market while wild honey was collected from beekeepers. A total 5 samples were collected and they are classified as follows:

(i) Commercial honey samples: C₁, C₂, C₃.

(ii) Wild honey samples: W₁, W₂.

The honey samples C₁ and C₂ are commercially available all over India while C₃ is found only in Konkan region of Maharashtra. The wild honey samples were found to be extracted from honeyhives from Ratnagiri district of Maharashtra.

2.2.2 Storage and preservation of honey samples

All the collected samples were stored in an amber color bottle and preserved at room temperature until analysis.

2.2.3 Sensory evaluation and Physicochemical analysis of honey samples

The sensory evaluation of the honey samples includes color, smell and taste. The physicochemical analysis of honey samples depends on the methods of A.O.A.C. [8]. The physical properties studied were including moisture, ash, pH and electrical conductivity while chemical properties include free acidity and reducing sugar.

(i) Sensory evaluation

The color, smell and taste of honey samples based on the sensory character were analyzed by the free choice profile method according to VIT and co-workers [9].

(ii) Moisture content

5 mg of each honey sample was weighed in clean and dry flat Petry dish and kept for drying in a hot air oven at 110°C for 3 hrs. After 3 hrs drying each sample was cooled in an inert atmosphere in a desiccator and weighed. Drying and weighing was continued till constant dry weight was obtained. The moisture content in the honey sample was calculated by using a formula

$$W_1 - W_2$$

$$\text{Percentage moisture content} = \frac{\quad}{W_1} \times 100$$

Where, W₁ = Weight of petry dish+ weight of fresh honey

W₂ = Weight of petry dish+ weight of dry honey

(iii) Ash content

3 gm of honey sample taken in a silica crucible was subjected to calcination for 3 hrs at 600°C in a muffle furnace. The percentage ash content was determined by using following formula

$$W_1 - W_2$$

$$\text{Percentage ash content} = \frac{\quad}{W_1} \times 100$$

Where, W₁ = Wt. of silica crucible and honey before calcination

W₂ = Wt. of silica crucible and honey after calcination

(iv) pH

The solution of each honey sample was made by dissolving 10 gm of honey in 75 cm³ of CO₂ free distilled water. The pH of each solution was then measured by using pH meter. Before measurement standardization was carried out by using the pH-4 buffer solution.

(v) Electrical conductivity

20 % solution of each honey sample was made in 100 cm³ standard volumetric flask by using deionized water. The solution was thoroughly shaken to make homogeneous solution and conductance of each solution was then measured by using conductivity meter. Before measurement the instrument was calibrated by using 0.1 N KCl solution.

(vi) Free acidity

A solution of honey made by dissolving 1.0 gm of honey in distilled water was titrated with standardized 0.05 M NaOH by using phenolphthalein indicator. The end point was colorless to permanent pink. From the burette reading, the percentage acidity was calculated by using the following formula

$$\% \text{ Acidity} = \frac{(0.23 \times \text{Burette reading})}{\text{Weight of honey sample}}$$

(vii) Reducing sugar (glucose) content

Honey contains different monosaccharaides - glucose, fructose, maltose and sucrose. The amount of reducing sugar (glucose) from honey sample was determined by Wilstatter's method. The glucose present in honey contains easily oxidisable aldehyde group. A sample of honey was made by dissolving 2.0 gm of honey in 100 cm³ of distilled water. 10 cm³ of diluted honey sample was treated with known excess of 0.1 N I₂ solution in the presence of 0.5 N NaOH which oxidizes glucose to gluconic acid. The unreacted I₂ was back titrated with standardized 0.1 N Na₂S₂O₃ solution using freshly prepared starch indicator. The percentage of glucose present in the sample was calculated by using following formula

$$90 \times (Z - Y) \times 0.1$$

$$\text{Percentage of glucose} = \frac{\text{Result}}{\text{Weight of honey Sample}}$$

3. RESULTS

3.1 Sensory evaluation

The color of honey samples ranged from yellow to dark brown. All the honey samples gave sweet smell and taste. The results are summarized in the following table.

Table 1. Results of Sensory evaluation

Sample	Smell	Color	Taste
C1	Sweet	Dark Yellow	Sweet
C2	Sweet	Yellow	Sweet
C3	Sweet	Golden Yellow	Sweet
W1	Vitriolic	Dark brown	Piquant
W2	Sweet	Light brown	Sweet

3.2 Physicochemical analysis

Table 2. Physicochemical parameters of honey

Honey	Moisture	Ash	pH	Electrical	Free	Reducing
	%			Conductivity	Acidity	Sugar
	(w/w)			mS/cm	Meq/Kg	%(w/w)
C ₁	15.37	1.03	4.58	1.192	10.5	31.43
C ₂	19.86	0.54	5.36	0.626	17.3	31.56
C ₃	13.81	0.31	3.98	0.333	37.6	24.78
W ₁	14.40	0.43	4.10	0.534	8.9	34.16
W ₂	9.52	0.76	4.21	0.739	33.7	45.60

4. DISCUSSIONS

4.1 Sensory properties

The color of the honey sample ranged from dark yellow to dark brown. The variation in color depends on the floral source, seasonal variation and storage condition. All the honey samples gave a sweet taste except W₁, which gave a piquant taste.

4.2 Physico-chemical properties

i) Moisture content

The moisture content of pure honey should be in between 14 % to 18 %, which also depends upon seasonal and geographical condition [10]. High moisture contents marks the progress of the fermentation process and it decreases the storage life of honey. The observed moisture content in all honey samples was within the above indicated limit except C₂, which shows 19.86 % moisture content. Therefore, all honey samples except C₂ have a longer storage life. The low moisture content in C₃ sample prevents it from fermentation and attack by microorganisms.

**ii) Ash content**

Ash content of a honey sample reflects the amount of minerals present in that sample. Though the ash content is low, it is an indicator of nutritional value of honey sample. The ash content of honey decreases with the addition of water and sugar [11]. So, ash content will detect the additives in the honey sample. The ash content in both wild and commercial honey samples were in agreement with the standard. Among the commercial honey sample, the C₁ honey sample showed higher ash content while C₃ showed the lowest.

iii) pH

The pH values of wild and commercial honey sample were found to be nearly equal and acidic except C₂ sample, which showed high pH equal to 5.36. The pH value varies from 3.98 to 4.58. The low pH of honey resists for growth of microorganisms and provides stability and texture to honey [12]. The commercial sample C₂ shows high pH 5.36 due to comparatively larger moisture content, i.e. 19.86 % (Table 2).

iv) Electrical conductivity

Conductance of any aqueous solution is directly proportional to the ions present in it. The Honey solution shows conductivity due to the presence of minerals and organic acid, which undergo reversible ionization. The seasonal and regional factor controls the mineral content of honey. The mineral content of honey indicates its nutritional value. So, nutritional value of C₁ honey is high as it showed high conductance (1.192) while nutritional value of C₃ honey is low as it showed low conductance (0.333). The wild honey samples show moderate conductance (Table 2).

v) Free acidity

The free acidity is a marker of freshness. Lower the free acidity more fresh is the honey. The free acidity of the wild honey sample was found to be nearly equal. The free acidity of commercial sample studied ranged from 8.9 to 37.6 meq/kg, which is less than 50 meq/kg allowed by Council Directive of the European Union [13]. The harvesting season will affect on free acidity in honey [14].

vi) Reducing sugar

Sugar represents the amount of carbohydrates present in the honey. In the current study only the glucose content in the honey sample was analyzed. The C₃ sample showed lowest glucose content while W₂ honey sample showed highest glucose content. Low glucose content in the honey may be due to early harvesting as sucrose is not converted to glucose and fructose [15].

5. CONCLUSION

The current study revealed that, the wild honey samples showed nearly equal physico-chemical characteristics while there is variation in physico-chemical characteristics of commercial samples. The commercial sample with low moisture content, low free acidity, high electrical conductivity and high glucose content will be having high nutritional value, longer storage life and thus having good quality. Among the commercial sample studied, C₁ honey sample have good quality and both the wild honey samples have good quality.

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Handling Twitter using .Net MVC in C#

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ABSTRACT

The world is growing fast with the technology. Due to the use of information technology is increased; every activity may have to perform on the computers. The one roof covers the huge activities in the information technology. The internet has bounded the core group of people. There are the people are using social media to connect with the people in the entire world. The Social media is used to viral messages over the internet. As the social media playing the very important role in accessing and providing the related information. There are many sources of social media which are used to communication on the internet. In that Twitter, YouTube, Whatsapp, Facebook etc. are the common using applications which people are using for communicate over the internet. These application can operated from the another applications through computer. Some social media applications provide the developer tool to perform such development operations.

Keywords : Technology, Social Media, Internet, Twitter, Viral, Applications, Communicate.

I. INTRODUCTION

The 21st century is the going forward with the digitalization. The use of social media is increased in this today's world. Many social media applications are now a days increasing as per increasing rate of the technology. The growing phenomena of social media, such as: Facebook, Twitter, LinkedIn, and Instagram, with each one has its own characteristics and its usages, are constantly affecting out societies (A Literature Review on Twitter Data Analysis, Hana Anber, IJCEE, Volume 8, Number 3, June 2016, Page No. 1). It is now very difficult to keep things secret in the social media. The Information posted on the social media applications is circulating vastly over the internet. The time of viral the messages is decreased today due to the social media. Twitter-API is a widely used application to retrieve, read and write twitter data (A Literature Review on Twitter Data

Analysis, Hana Anber, IJCEE, Volume 8, Number 3, June 2016, Page No. 2). Retweet in twitter is the agreement action to a specific tweet, as in some cases the user passes information to his/her audiences to express their opinion on a particular tweet. The mechanism of retweet ability plays a prominent role in information diffusion (A Literature Review on Twitter Data Analysis, Hana Anber, IJCEE, Volume 8, Number 3, June 2016, Page No. 4).

The aim of this paper is Handle the twitter posts through the third party application from the computer. Twitter is an important platform for journals as studies have shown that journals with Twitter accounts have higher number of tweets and citations of their articles, when compared with other journals (Ortega, 2017). The tweets which contained links to research articles were identified using a two-step process. First, the tweets containing Uniform

Resource Locators (URLs) were filtered. From this filtered list, further filtering was carried out based on the presence of any one of the keywords ‘doi’, ‘article’ and ‘issue’ to identify the candidate tweets (Understanding the Twitter Usage of Humanities and Social Sciences Academic Journals, Aravind Sesagiri Raamkumar, Page No. 2).

Social media has become a valuable marketing tool for publishers to promote research articles (Thelwall, Haustein, Larivière, & Sugimoto, 2013).

The Twitter can be handled by the Asp.net Model View Controller (MVC). How it will work and outputted is demonstrated in this research paper and demonstrated below.

II. EXISTING WORKING OF THE TWITTER

It could be said that a micro-blog is a platform in which users share short messages, links to other websites, images or videos. Normally a message on a micro-blog is written by one person and read by a number ranging from zero to hundreds of thousands of people, which in this context are called followers (Sentiment analysis in Twitter, November 2012, pp 1 28).

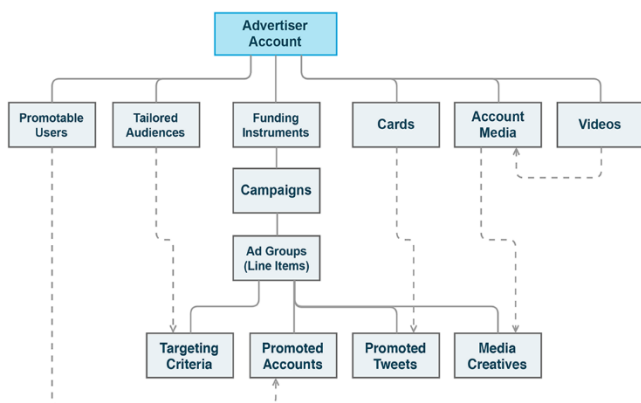


Fig 1. Working of twitter. Source:- Twitter

III. METHODS AND MATERIAL

A. Handling twitter using .Net MVC in C#:-

Here is step by step guide to post tweet automatically to your twitter handler using C# .Net MVC. At the time of the publishing our website on the internet, we can tweet the same thing at the same time automatically.

Configuring your twitter handler access tokens:-

Initially, it is required to give the twitter account credentials to get access tokens, secret key and the content key.

Step 1:- Login with your credentials on twitter site.

Once you are done with the login go to link developer site url <https://apps.twitter.com/>

Step 2:- You will see button Create New App as below.

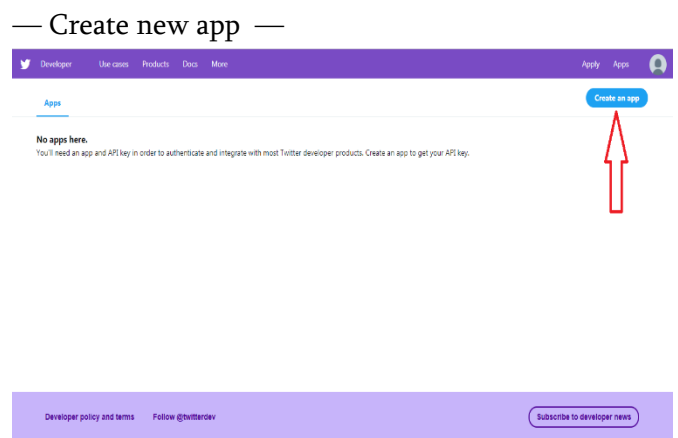


Fig 2 : Screen showing “Create new app” button

When you click on “Create an app”, it will ask for “Apply”. Click on it. It will show following screen:-

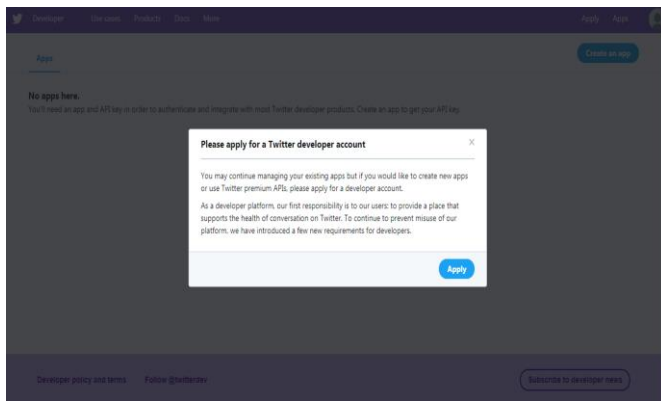


Fig 3 : Click on Create new app

After clicking “Create an app” it will ask for account details and other credentials as below.

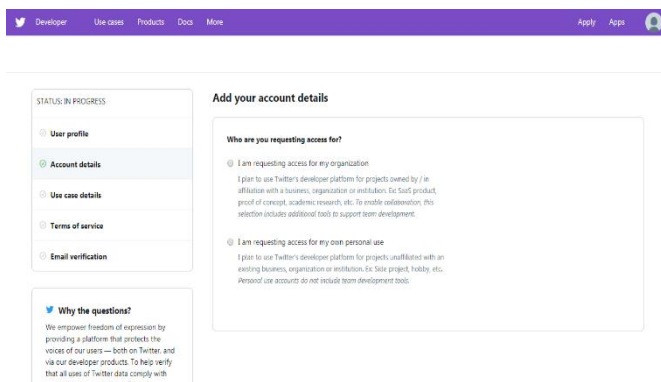


Fig 4 : Credentials for developer account

After clicking on the button you will get the Create an application form.

— Create new app form —

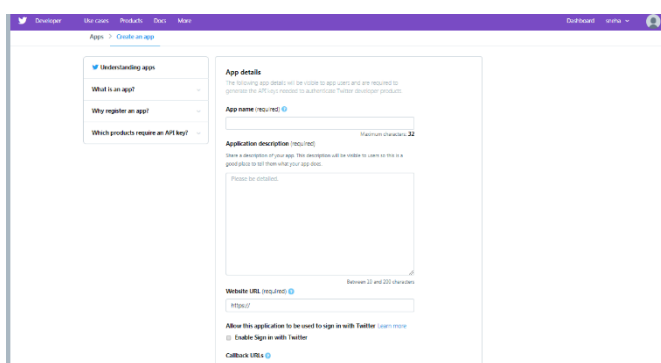


Fig 5 : Credentials for app

Step 3: Fill the form as your app details.

Name – Enter the Name of the Twitter app you are creating.

Description – Enter the Description of the App which you are creating.

Website – Enter the Name of the website where you are going to Use this Code or App.(the website URL should be genuine or else you will not able to create the App)

Callback URL – Enter the Callback URL when after authentication the user will go.

To go through the developer work, firstly you need to accept the term and conditions. That’s are also called as Developer Agreement. Then you are able to create you app. When you are done with app development then you can see the screen as below:-

— App Details —

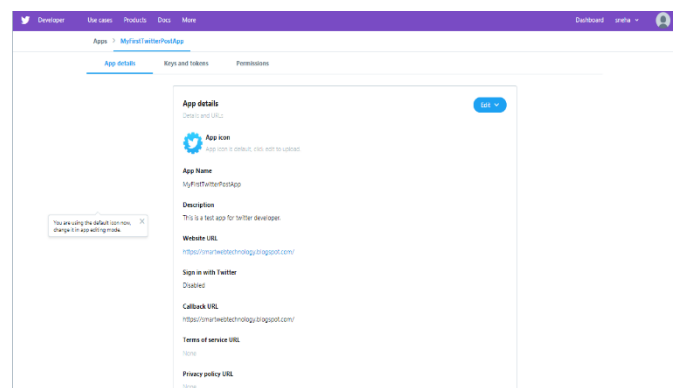


Fig 6 : Created app details

Step 4 :- Now you can see the “App details”, “Keys & Tokens” and “Permission” tabs on the screen.

Click on the “Keys and Tokens”. It will bring you to the confidential details.

— Keys and Access Tokens —

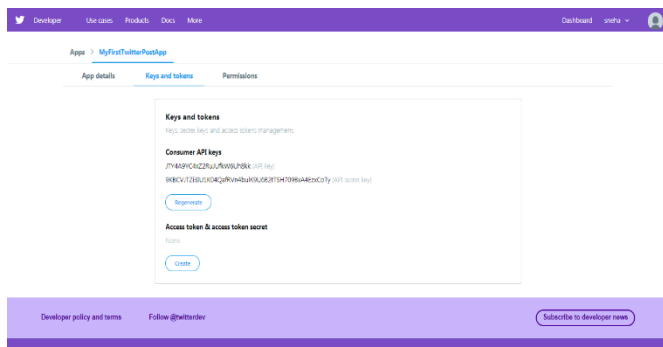


Fig 7 : Keys and Access Tokens

Step 5:- Now you are on the screen where you can see the “Consumer API” keys (API Keys and API Secret Key). But at the same time you can see that the “Access token” and “Access token secret” keys are still not generated.

To generate them click on “Create”.

— Access Token —

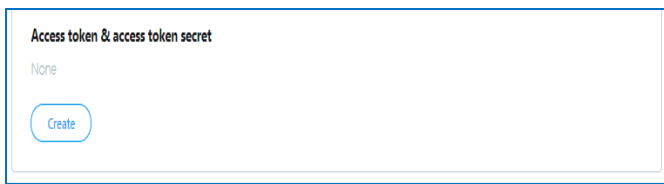


Fig 8 : Access Tokens

After the clicking on the “Create” button, you can get the “Access token” key and “access token secret” sequentially on the screen. It looks as below:-

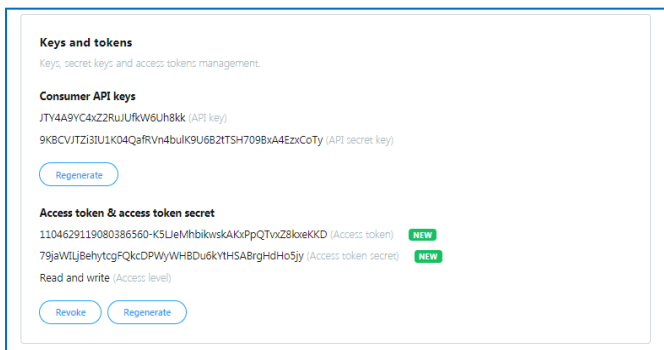


Fig 9 : Access token and token secret

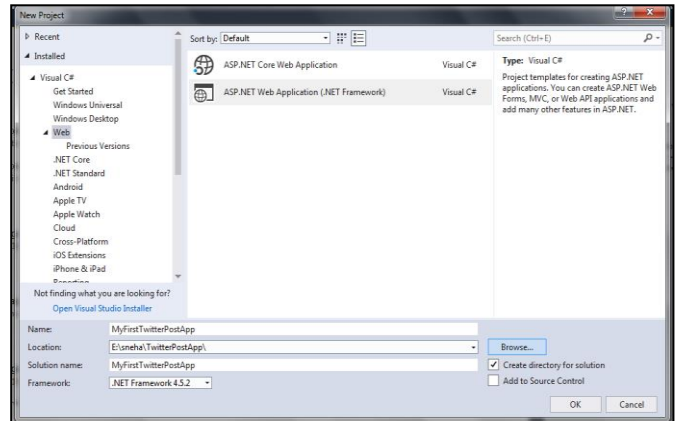
Remember them strictly because the posting on the twitter is not possible without these credentials.

After configuring your twitter app, we will be moving towards the Web Application C# Part.

B. Development

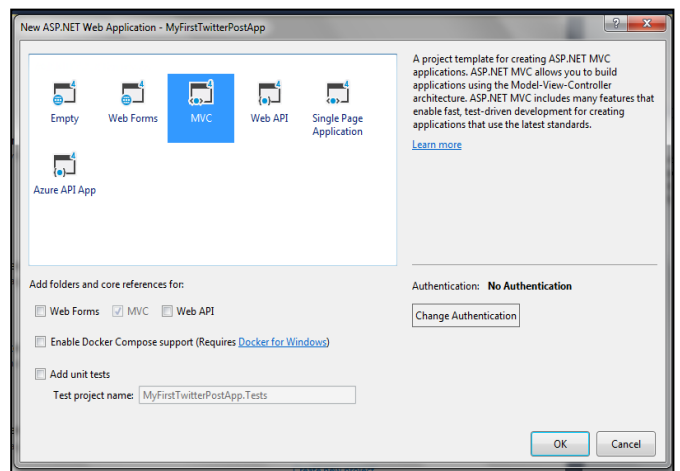
Open the Visual Studio & Create a MVC Project.

— Create new MVC Project —

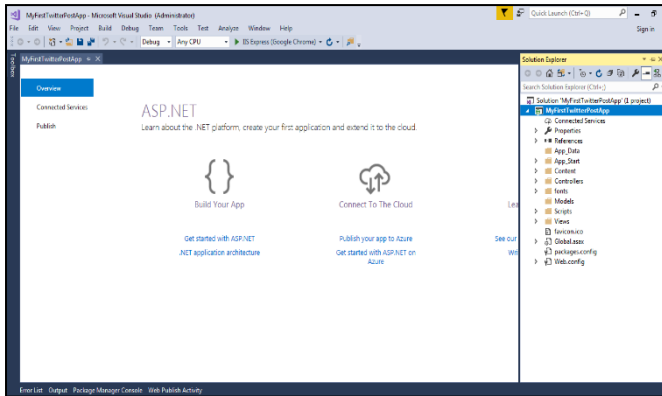


Give the preferred name to the application and click on OK.

Select MVC Project Option & Create It.



Now, open the Solution Explorer on right & go to >>Models Folder >>Right Click >>”Add new Class File “>>Give the Name to class file as “Tweet.cs”



Limitations

- The enterprise (paid subscription) APIs include filtered firehose, historical search and engagement APIs for deeper data analytics, listening and other enterprise business applications [3].
- Methods to retrieve data from the Twitter API require a GET request [3]. Methods that submit, change or destroy data require a POST [3]. A DELETE request is also accepted for methods that destroy data [3]. API methods that require a particular HTTP method will return an error if not invoked using the correct style [3]. HTTP Response Codes are meaningful [3].

IV.CONCLUSION

The digitalization prefers the Improvisation and innovation in the technology. The use of social media is increased in this today's world. Many social media applications are now a days increasing as per increasing rate of the technology. Twitter is one of the social media application which is used to provide information and news from worldwide. The Twitter developer tool provided by twitter and it can be used to develop twitter applications on twitter. The developer tool is also handled by the third party applications. It uses the access token and secret key to handle it from another application. Here I used the asp.net c# mvc to handle the twitter post through it.

The paper shows the steps that defines how it will work to posting on twitter.

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