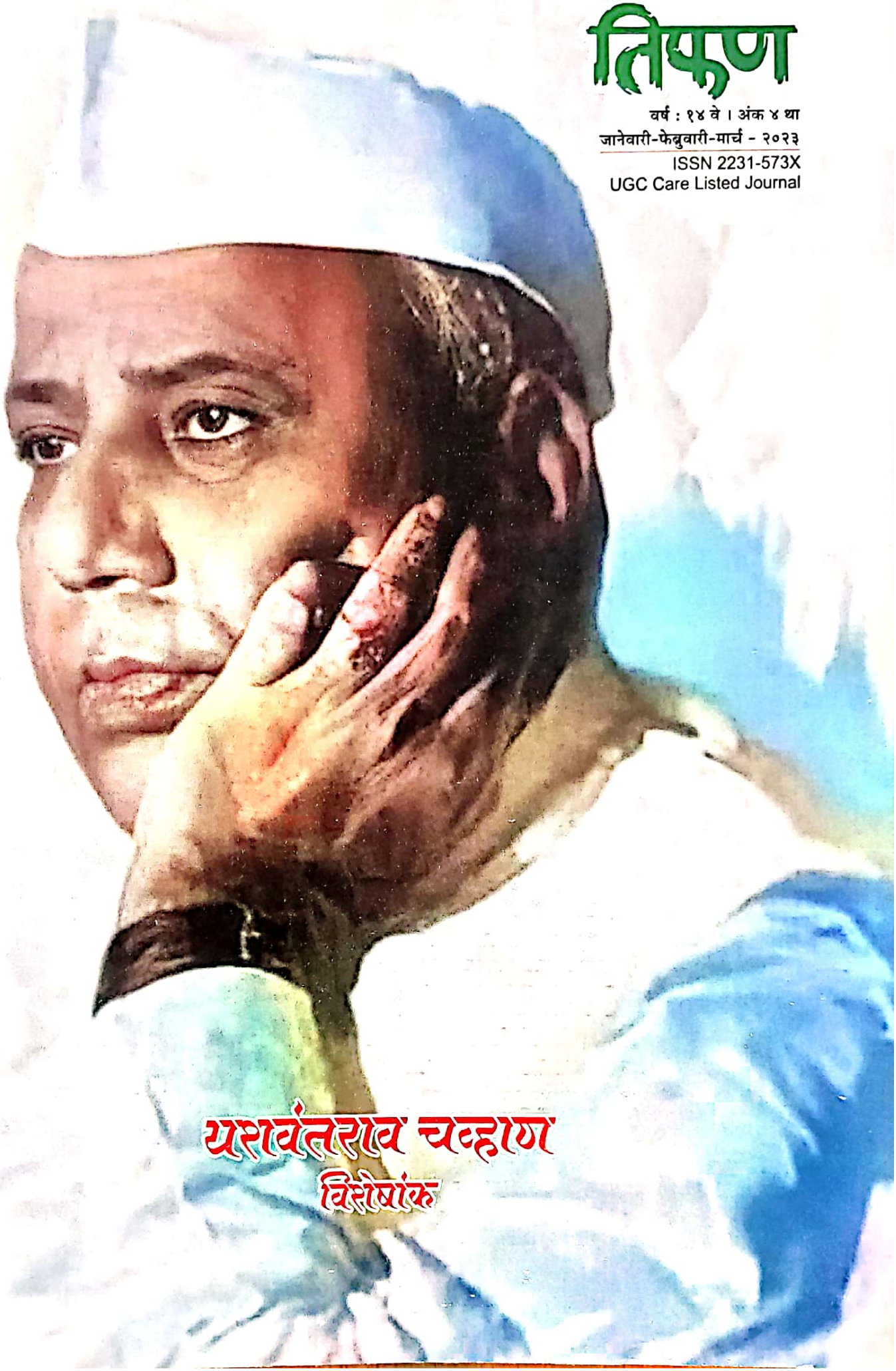
तिफण

वर्ष : १४ वे । अंक ४ था
जानेवारी-फेब्रुवारी-मार्च - २०२३
ISSN 2231-573X
UGC Care Listed Journal



यशवंतराव चव्हाण
विशेषांक

भाग - ४ अनुक्रमणिका

३. यशवंतराव चव्हाण यांचे साहित्यिक क्षेत्राच्या विकासातील योगदान

प्रा. डॉ. गोपीनाथ पांडुरंग बोडखे
मराठी विभाग प्रमुख, आनंदराव धोंडे ऊर्फ बाबाजी महाविद्यालय,
कडा, ता. आष्टी, जि. बीड.

समाजाचा विकास हा त्या समाज नेतृत्व करणाऱ्या व्यक्तीवर अवलंबून असतो. नेतृत्व करणाऱ्या व्यक्तीच्या वैचारी भूमिकेला सामाजिकतेचा किती स्पर्श आहे, हाही महत्त्वाचा भाग होय. वर्तमान कालखंडात पक्षीय राजकारणात नेतृत्व करणारे व्यक्ती स्वतःभोवती कोष करून सामाजिकतेचा आव आणताना पहावयास मिळतात. पण जे नेतृत्व समाजाच्या उपयोगी पडते त्यावर त्या मोठेपण अवलंबून असते. वैयक्तिक हित संबंधाचा विचार न करता, अविरतपणे समाजसेवेचे व्रत स्वीकारून राष्ट्रसेवेचे कार्य भारत ज्या ज्या व्यक्तींनी केले त्या व्यक्तींमध्ये यशवंतराव चव्हाण यांचे नाव घेतले जाते. भारतीय स्वातंत्र्य लढ्यातील थोर स्वातंत्र्य सेना पुरोगामी विचारवंत, संयुक्त महाराष्ट्राचे पहिले मुख्यमंत्री, लोकसभेचे विरोधी पक्षनेते, कर्तबगार संरक्षणमंत्री, गृहमंत्री, अर्थमंत्री, कि मंत्री, भारताचे उपपंतप्रधान अशा विविध जबाबदा-याच्या माध्यमातून कर्तृत्व यशवंतरावांनी सिध्द केले.

राजकारण, समाजकारण, शेती, उद्याने, सहकार, शिक्षण, कला, संस्कृती, तंत्रज्ञान व साहित्य अशा विविध क्षेत्रां मनापासून रूची असणारे व महाराष्ट्राच्या मातीची जाण असणारा नेता म्हणजे यशवंतराव चव्हाण होय. गरीब शेतकरी कुटुंबात ज होऊन सुध्दा संघर्षमय जीवनातून स्वबळावर पुढे आलेला कर्तबगार लोकनेता, माणसातील माणूस शोधणारा, संघर्षाऐवजी समन्वय भूमिका घेणारा, समाजकारणातून राजकारणाकडे पाहणारे, सह्याद्रीचे प्रतिभासंपन्न साहित्यिक, आधुनिक महाराष्ट्राचे शिल्पकार न यशवंतराव चव्हाणांना ओळखले जाते.

त्याच यशवंतराव चव्हाणांच्या आई स्वरचित जात्यातील ओव्या भल्या पहाटे म्हणते असे. त्या ओव्यामध्ये जीव आशय दडलेला असायचा आशयाचा धागा शोधत यशवंतराव लहानाचे मोठे झाले. आईसोबत गावातील मंदिरामध्ये महाभ रामायण, कीर्तन, प्रवचन ऐकत यशवंतरावांचे वैचारिक भरण पोषण झालेले पहावयास मिळते. निसर्गाच्या सान्निध्यात वाचनाच त्यांना लागला. तो त्यांनी आयुष्यभर जोपासला. ललित साहित्याबरोबरच ललितेत्तर साहित्यही ते रसिकतेने वाचत असत. त्य प्रभाव म्हणून त्यांच्या भाषणातून संत-पंत-तंत परंपरेसह फुले-शाहू-आंबेडकर परंपराही येत असत. अगदी अलीकडच्या कवी न सुर्वे आणि ना. धो. महानोर यांची त्यांना विशेष आवड होती. ना. धो. महानोरांनी त्यांच्यावर पुस्तकच लिहिले आहे. त्यामध्ये आठवणी सांगितल्या आहेत. यशवंतरावांविषयी भाष्य करताना ना. धो. महानोर म्हणतात, ''यशवंतरावांच्या संपन्न, विचा साहित्यिक व्यक्तीमत्त्वाने मी व माझे कित्येक स्नेही त्यांचे झालो.''

यशवंतरावांनी महाराष्ट्र राज्य साहित्य संस्कृती मंडळाची स्थापना करून महाराष्ट्राच्या सांस्कृतिक उत्थानाची दिशा केली. ज्ञानभाषा व लोकभाषा एकच हवी, असा त्यांचा आग्रह होता. कारण लोकभाषेपेक्षा ज्ञानभाषा वेगळी असली तर

ISSN-2320-4494
RNI No.MAHAUL03008/13/2012-TC
Impact Factor : 3.7286

POWER OF KNOWLEDGE

An International Multilingual Quarterly Peer Review Refereed Research Journal

SPECIAL ISSUE MARCH 2023

कला, विज्ञान व वाणिज्य महाविद्यालय शिवाजीनगर, गढी

राष्ट्रीय चर्चासत्र

समकालीन मराठी साहित्यातील जाणिवा

दि.१६ मार्च २०२३

भाग एक

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अनुक्रमणिका (Index)

समकालीन मराठी साहित्य आणि ऊसतोड कामगारांच्या साहित्यातील जीवन जाणिवा

प्रा .डॉ .गोपीनाथ पांडुरंग बोडखे,
'मराठीविभाग प्रमुख
आनंदराव धोंडे ऊर्फ बाबाजी महाविदयालय, कडा ता .आष्टी जि .बीड

प्रस्तावना:

मराठी साहित्याच्या माध्यमातून ग्रामीण वास्तवाचे चित्रण अभिव्यक्त होत आहे .ग्रामीण सहकारी संस्था, शेतकरी, शेतमजूर इत्यादी अनेकविध व वेगवेगळया घटकांना स्पर्श करत ग्रामीण व्यवस्थेतील पैलूवर प्रकाश टाकण्याचा प्रयत्न होत आहे .स्वातंत्र्योत्तर काळात ग्रामीण भागात खुप मोठ्या प्रमाणात बदल झालेले पाहवयास मिळतो .शेतीवर आधारित उद्योगधंदे निर्माण करण्यात आले .स्थानिक लोकांना रोजगार उपलब्ध व्हावा आणि शेतकरी, शेतमजूरांना अधिकचा रोजगार मिळावा यासाठी महाराष्ट्रात ग्रामीण भागांमध्ये साखर कारखाने स्थापन झाले.

ज्या परिसरामध्ये नैसर्गिकदृष्ट्या जलसिंचन चांगले आहे अशा भागात प्रारंभी सहकारी तत्त्वावर कारखाने उभारले गेले .त्यामुळे खेड्यांमध्ये आर्थिक विकासात काही प्रमाणात भर पडून त्याचा फायदा शेतकरी, शेतमजुरांना होऊ लागला .खेड्यापाड्यातील लोकांना त्या माध्यमातून रोजगार निर्माण होऊन शेतीचे आधुनिकीकरण, यांत्रिकीकरण व पूरक व्यवसायांमध्ये रोजगार निर्मितीत भर पडलेली आहे.

ग्रामीण भागांमध्ये आर्थिक प्रगती होऊ लागल्याने खेड्यातील सामान्य शेतकरी, शेतमजूर कुटूंबातील मुला-मुलींचे उच्चशिक्षण घेऊ लागले .शिक्षणामुळे शेतकरी, शेतमजूर सामान्य कामगारांमध्ये आत्मभाग जागृत झाले .त्यांना स्वतःचे हक्क, अन्याय, अत्याचार याविषयी जाणिव होऊ लागली .या सर्वांचे प्रतिबिंब त्यांच्या लेखनाच्या माध्यमातून अभिव्यक्त होऊ लागली तसेच सहकारी संस्था, बँका, साखर कारखाने यांचा सत्तेच्या राजकारणासाठी वापर होऊ लागला .पर्यायाने यामधून राजकारणी लोक, शेतकरी, शेतमजूर व कामगार यांच्या विकासाऐवजी स्वतःच्या विकासाचा विचार करू लागले .आधुनिकीकरणातून शेती विकास करण्याऐवजी शेतकऱ्यांच्या माथी कर्जाचे ओझे होऊ लागले .ऊस कारखान्याच्या माध्यमातून शेतकऱ्यांची ससेहोलपट होऊन रासायनिक खते, ज्यादा प्रमाणात पाणी, यामुळे जमिनीत क्षार वाढवून शेती उत्पादनावर परिणाम होऊ लागला .या सर्व बाबींचा समाज विकासावर परिणाम झालेला दिसून येतो.

सार्वजनिक शिक्षणामुळे खेड्यातील सामान्य मुलांपासून ते श्रीमंतांपर्यंत सर्वजण शिक्षण घेऊन वेगवेगळया क्षेत्रात नोकरी व व्यवसाय करू लागले .ज्या परिसरातून शिक्षण घेऊन मुले पुढे आलेली आहेत त्यांनी त्या समाज जीवनातील सुख दुःख प्रत्यक्ष अनुभवले आहेत .त्या समाज जीवनाविषयी चिंतन करुन साहित्य लेखन केले आहे .खेड्यांमध्ये ऊस लागवड करणारे शेतकरी आहेत .त्याप्रमाणे ऊस तोडणारे ऊसतोड कामगार म्हणून काम करणारे लोकही मोठ्या प्रमाणात आहेत .ऊस तोडणी करणाऱ्या कामगारांच्या व्यथा, वेदना, दुःख, अन्याय, अत्याचार व इतर त्याच्या प्रश्न आणि समस्यांची मांडणी मराठी लेखक कवींनी १९७० नंतर केलेली पहावयास मिळते .श्रीराम

Aayushi International Interdisciplinary Research Journal (AIIRJ)

Peer Reviewed And Indexed Journal

ISSN 2349-638x

Impact Factor 7.367

Website :- www.aiirjournal.com

Theme of Special Issue

मराठी साहित्य प्रवाहांमधून व्यक्त होणारे समतामूल्य : एक शोध

(Special Issue No.125)

ग्रामीण साहित्यातून व्यक्त होणारे समतामूल्य

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कडा ता.आष्टी जि. बीड

प्रस्तावना -

शेतकऱ्यांच्या स्थिती-गतीचे वास्तव चित्रण आपल्या लेखनकर्तृत्वातून महात्मा जोतीराव फुलेंनी मांडले. शेतकरी जीवनाकडे जाणीवपूर्वक लक्ष वेधले. ग्रामीण माणसांचे शोषण चव्हाट्यावर आणण्यासाठी व त्यांच्या अर्थकारणात बदल घडवून यावा म्हणून शेती आणि शेतकऱ्यांची स्थिती याची कारणमींमासा व त्यावरील उपाय सुचवण्यासाठी त्यांनी प्रामुख्याने लेखन केले.त्यांच्या लेखन कार्याच्या निमित्ताने एकूणच ग्रामीण समाजव्यवस्थेचे वास्तवरूप समोर आले. इंग्रजांनी प्रस्थापित केलेली व्यवस्था आणि त्याच व्यवस्थेची परंपरा अस्तित्वात असलेली आजही आपणास पहावयास मिळते. स्वातंत्र्योत्तर काळात शासन-प्रशासन, राजकारण यामुळे ग्रामीण जनांचे प्रश्न अधिक गंभीर झालेले दिसतात. त्याचा विपरीत परिणाम आजच्या शेतकऱ्यांच्या आर्थिक स्थिती- गतीवर झालेला दिसतो. शेतकऱ्यांच्या आत्महत्या करण्याच्या मानसिकतेचा शोध आणि बोध या निमित्ताने घेण्याचा प्रयत्न होतो. शेती आणि शेती व्यवसाय संदर्भात आधुनिक दृष्टिकोनातून विचार केला तर उत्पादनतंत्र,बाजारपेठ आणि बाजारभाव या बाबींचा विचार करावा लागतो. या सर्व व्यवस्थेच्या शोषणाचा केंद्रबिंदू शेतकरी हाच राहिला आहे. ग्रामीण साहित्यामधून अशा व्यापक मराठी समाजाची जाणीव व्यक्त होते. मराठी समाजाचे प्रतिनिधित्व करणाऱ्या ग्रामीण साहित्य निर्मितीच्या प्रेरणाचा शोध घेत मागे वळून पाहिल्यास आपणास जोतीराव फुले यांच्या साहित्याजवळ येऊन थांबावे लागते. ग्रामीण साहित्याचा आरंभ हा साधारणतः आधुनिक मराठी साहित्याच्या बरोबरीनेच झालेला दिसून येतो. 'शेतकऱ्याचा आसूड',च्या रूपाने जोतिराव फुले यांनी सर्वप्रथम शेतकऱ्यांचे प्रश्न ,समस्या व त्यावरील उपाय-योजना संदर्भात मांडणी केलेली दिसून येते. त्यानंतर कृष्णराव भालेकरांनी 'बळीबा पाटील' आणि वी.रा टिकेकर (धनुर्धारी)यांची 'पिराजी पाटील',कादंबऱ्यांचा जरूर उल्लेख करावा लागतो. ग्रामीण कादंबरीचा हा प्रथम कालखंड होय. या कालखंडात महात्मा जोतिराव फुलेंच्या विचारांचा प्रभाव स्पष्टपणे जाणवतो. धनुर्धारी नंतर ना.वी.कुलकर्णी त्यांनी 'मजूर', 'दिवस कसे जातील' या कादंबऱ्या मधून ग्रामीण जीवनाचा वेध घेण्याचा महत्त्वपूर्ण प्रयत्न केला. १९२० नंतर गांधीजींच्या विचारांचा परिणाम म्हणून लेखकांचे लक्ष खेड्याकडे गेले त्या विचारधारेचा परिणाम म्हणून मराठी साहित्यातून ग्रामीण जीवनदर्शन घडविण्याचे काम प्र. ह. खाडिलकर ,भा.वि.वरेकर, रामतनय, वी.व.हडप,वि.ल.बर्वे या लेखकांनी केले. या सर्व लेखकांच्या साहित्यकृतींवर जोतीरावांचे विचार कमी-अधिक प्रमाणात जाणवतात. या काळात साने गुरुजी गांधीजींच्या तत्त्वज्ञानाने भारावून गेलेली दिसून येतात. त्यांच्या ठिकाणचा मानवतावाद जागृत झालेला दिसून येतो. महात्मा गांधी आणि महात्मा जोतिराव फुले यांच्या मानवतावादाचा आदर अनेक लेखकांनी केलेला दिसून येतो. 'पानकळा'(र.वा.दिघे),'गावगुंड'(ग.ल.ठोकळ), 'तांबडी माती'(मर्ढेकर) आणि 'बळी'(विभावरी शिरूरकर) ग्रामीण मानवीजीवनाचे चित्रण केले असून कमी-अधिक प्रमाणात जोतिरावांच्या लेखनातील ग्रामीण जाणीव आणि समतामूल्याचा अनुबंध लक्षात येतो.

शेतकऱ्याचा आसूड' मधून जोतिराव फुल्यांनी ग्रामीण शेतकरी जीवनातील वास्तवचित्र रेखाटले आहे. आधुनिक मराठीतील पहिली ग्रामीण कथा होय,असे वासुदेव मुलाटे यांचे मत असून व्यापक अर्थाने ते पटण्यासारखे आहे. हरिभाऊ आपटे यांच्या 'काळ तर मोठा कठीण आला' या कथेने ग्रामीण कथा वाङ्मयाचा आरंभ केला. वि.स.सुखठणकर, लक्ष्मणराव सरदेसाई यांनी ग्रामीण कथेच्या प्रारंभीच्या काळातील योगदान मोलाचे आहे. तसेच मुकुंदराव पाटील यांनी जोतिरावांचा सत्यशोधक विचार आपल्या कथेतून पुढे नेला आहे. म्हणूनच जोतीरावांचे वैचारिक वारसदार मुकुंदराव पाटील ठरतात.

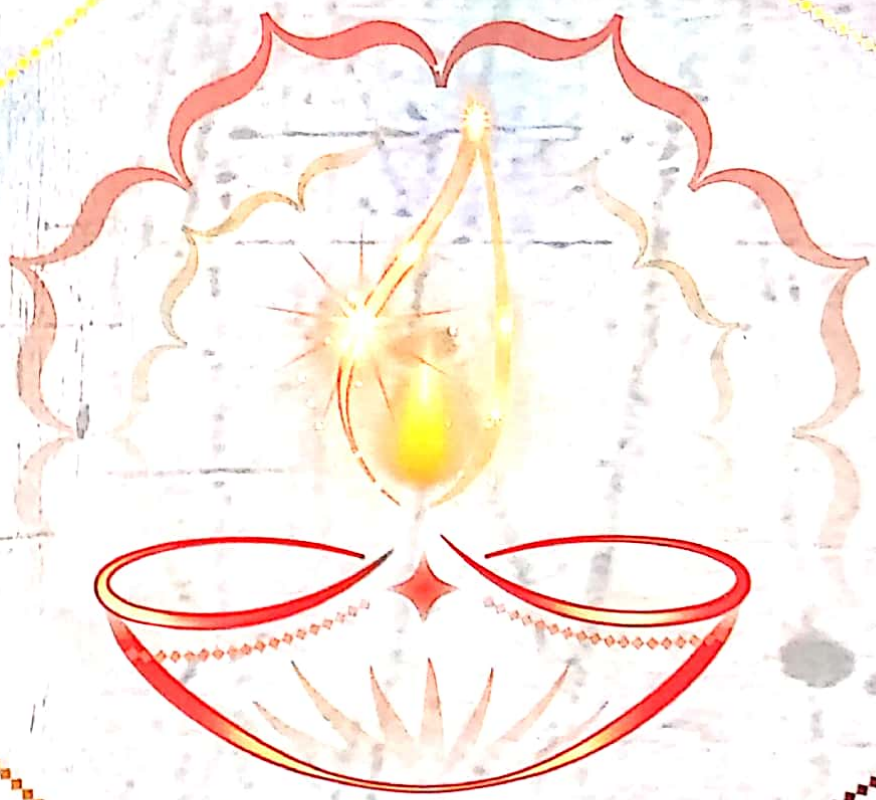
ग.ल.ठोकळ, श्री.म.माटे, र.वा.दिघे आणि बी.रघुनाथ या लेखकांच्या लेखनामागेही ग्रामीण जीवनाविषयीची ओढ दिसून येते. तसेच जोतीरावांच्या विचारांची दिशाही ध्वनीत होतांना दिसते.ग्रामीण कथेला वास्तवाभिमुख करण्याचे काम पुढील काळात व्यंकटेश माडगूळकर, शंकर पाटील, बाबा पाटील यांनी केले.स्वातंत्र्योत्तर काळात ग्रामीण साहित्यामध्ये शंकर

ISSN 2394-6303

Printing Area®

Peer reviewed International Research Journal

Issue-107, Vol-03, November 2022



Happy Diwali

Editor
Dr.Bapu G.Gholap

लोकविधी परंपरा आणि जीवनमूल्ये

प्रा.डॉ.गोपीनाथ पांडूरंग बोडखे,
(मराठी विभाग प्रमुख)
आनंदराव धोंडे ऊर्फ बाबाजी महाविद्यालय,
कडा ता. आष्टी जि. बीड

प्रस्तावना :

माणसाचा दैनंदिन भाषिक व्यवहार पूर्णत्वास जाण्यासाठी अनेक म्हणी, वाक्प्रचारांचा वापर मनुष्य करीत असतो. बालपणी आजी किंवा आई गाणी शिकवते. वेगवेगळ्या कथा/गोष्टी सांगते. अशा गोष्टी, गाणे, म्हणी आणि वाक्प्रचार या मुद्दामहून कोणी शिकत नाही. त्या बोलीभाषेतून ऐकून–ऐकून आपोआप आपण शिकत असतो. एका पिढीकडून दुसऱ्या पिढीकडे हा मौखिक वारसा आपोआप पुढे जात राहतो. त्यामधूनच लोकसंस्कृतीची परंपरा निर्माण होत राहते.

लग्न, सण–समारंभ, धार्मिक कार्यक्रमांमध्ये वेगवेगळ्या प्रकारची गाणी म्हटली जातात. हे आपण आकाशवाणी आणि दूरचित्रवाणीवर अनेक सामाजिक, सांस्कृतिक, धार्मिक आणि राष्ट्रीय कार्यक्रमातून लोक परंपरेने चालत आलेले कलाप्रकारांचे माध्यम वापरत असतो. विधीकर्माच्या प्रसंगी लोकांनी पिढ्यान पिढ्या अंगीकारलेली रीत म्हणून गीते गायली जातात. अशा साहित्यांचा कोणी एक कर्ता नसतो. लोकांनी परंपरेने सांभाळलेला वारसा असेच त्याचे स्वरूप असते. म्हणून या साहित्याला 'लोकसाहित्य' म्हणतात.

लोकसाहित्य हे लोकांनी लोकांसाठी व लोकभाषेत निर्माण केलेले साहित्य असते. मौखिक स्वरूपात जतन केलेले हे साहित्य एका पिढीकडून दुसऱ्या पिढीकडे परंपरेने चालत आलेले असते. म्हणजेच लोकसाहित्य हे मानवी संस्कृतीचे एक अंग असते.

इंग्रजी भाषेतील श्थ्वसा स्वतमश या शब्दांसाठी मराठीत 'लोकसाहित्य' शब्दाचा वापर केला जातो. यामधील 'लोक' हे पद श्थ्वसाश साठी तर 'साहित्य' हे पद श्स्वतमश साठी वापरले जाते. 'लोक' शब्दांचा अर्थ 'वाहणारा' किंवा वाहण्याचे काम करणारा 'जनसमुदाय' असाही होतो. १८४६ साली विल्यम जॉन थॉमस यांनी प्रथम श्थ्वसा स्वतमश ही संज्ञा वापरली. श्थ्वसा स्वतमश ही काहीशी व्यापक संकल्पना असून त्यात लोककथा, लोकगीते, लोकनाट्य यासारखी वाङ्मयीन रूपबंध नाजवळ जाणारी आविष्कार रूपे, म्हणी, वाक्प्रचार ही भाषिक अभिव्यक्तीरूपे तसेच श्रद्धा, समजुती, रुढी, सणसमारंभ, उत्सव, कर्म–कौशल्ये यांचाही श्थ्वसा स्वतमश या संज्ञेत समावेश होतो. 'लोकसाहित्य' या शब्दातून लोकमनाचा आविष्कार होतो. लोकसाहित्यामधून लोकसाहित्याचा आशय लोकभाषेतून व्यक्त होत असतो. इंग्रजीतील श्थ्वसा स्वतमश ही संज्ञा लोकाविष्कारांचा वेगळेपणाचा संदर्भ घेऊन योजण्यात येते. लोकसाहित्य लोकांच्या लोकभाषेतून, मौखिक परंपरेतून अविष्कृत होत असते.

लोकसाहित्याच्या व्याख्या :

लोकसाहित्याच्या व्याख्या अनेक अभ्यासकांनी करण्याचा प्रयत्न केला आहे परंतू प्रत्येक अभ्यासकांनी विशिष्ट एका अंगावर व्याख्येत भर दिलेला पहावयास मिळतो. उदा. समाजशास्त्रज्ञ समूहाच्या भौतिक रचनेला महत्त्व देतात तर मानसशास्त्रज्ञ लोकसाहित्यातून लोक माणसाचा आविष्कार होतो अशी भूमिका घेतात. लोकसाहित्य हे मौखिक स्वरूपाचे, क्षेत्रीय किंवा स्थाननिष्ठ असते.

१. 'लोकसाहित्य हा शब्द लवचिक असून त्यात लोकसमूहाच्या अलिखित किंवा मौखिक स्वरूपाच्या भावाविष्कारांचा समावेश होतो.' – जॉर्ज एम् फॉस्टर

२. 'लोकसाहित्यास सांस्कृतिक विकासाच्या बौद्धिक आणि वाङ्मयीन अवस्थांचे दर्शन घडते. याचे कारक मौखिक परंपरेने भूतकालीन अवशेष टिकवून ठेवलेले असतात.' – जॉर्ज हरझॉक

PHYSICAL- CHEMICAL RELATIONSHIP IN FRESHWATER ZOOPLANKTON AT LAKE KALINJUR, VELLORE, TAMIL NADU.

K. Santhi[1], N. Uma Chandra Meera Lakshmi[2*], Khaire B. S[3], R.Sureshkumar[4], M.Akilan[5]

ABSTRACT

The zooplankton found in almost all water bodies is diverse. Because of the pivotal role of zooplankton in most aquatic ecosystems, Usethere is a constant need to explore the effect of stressors (such as physicochemical properties of freshwater) on their abundance Present paper deals with the study of monthly variations in the zooplankton population and their correlations with some physical characteristics of Kalinjur lake in Vellore district, Tamilnadu. From January 2021 to December 2021, Statistical analysis of data involves Pearson's Correlation analysis and various diversity indices viz. Zooplankton diversity and population dynamics are controlled by numerous physicochemical factors. Zooplankton populations fluctuate with physicochemical factors. A total of 27 species of zooplankton from 4 major taxonomic groups were observed: Rotifera (9 species), Cladocera (7 species), Copepoda (6 species), and Ostracoda (5 species). Physico-chemical parameters of Kalinjur Lake revealed well-marked fluctuations with maxima and minima values of each parameter during specific seasons and zooplankton analysis revealed seasonal variations with an increase during winter and a fall during monsoon and summer seasons. Zooplankton populations were highest in December and January. The present investigation showed positive correlations with Rotifer parameters like calcium, nitrite, phosphate, chloride, and the Tidey test. In contrast, Turbidity, Electrical Conductivity, pH, Alkalinity, Total Hardness, Magnesium, Ammonia, Nitrite, Fluoride, Sulfate, BOD, and COD water showed negative correlations with the zooplankton population.

KEYWORDS: Physico-chemical parameters, Monthly variation, Zooplankton, Correlation

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DOI:- 10.48047/ecb/2023.12.si5a.090

INTRODUCTION

Aquatic systems' performance is heavily influenced by water physicochemical characteristics (Sharmila and Rajeswari, *et al.,* 2015). An ecosystem's water quality provides insight into the resources available for supporting life as well as the health of the water body (Shinde *et al.,* 2011). In the aquatic environment, temperature, rainfall, dissolved oxygen, and free carbon dioxide are among the factors influencing its physical and chemical characteristics. Plankton analysis can also be used to explain color, turbidity, odor, taste, and visible particles in water (Pradhan, *et al.,* 2014). Zooplankton has fascinated scientists for a long time. In the last two decades, much attention has been paid in tropical countries to the study of the biology, ecology, and toxicology of zooplankton. This is because of their importance in various emerging concepts in environmental management like environmental impact assessment (EIA), bioindication of pollution, and biological monitoring. Zooplankton consists of microscopic organisms such as Rotifers, Copepods, cladocerans, and Ostracods. These organisms are indicators and fast lake to environmental stressors (Pawlowski *et al.* 2016) such as nutrients (Xiong *et al.* 2019) and pesticide accumulation (Hanazato 2001). Zooplankton contributes to aquatic ecosystem biodiversity.

Physicochemical parameters determine the species distribution and abundance of zooplankton in any water body (Patra *et al.,* 2011). Zooplankton occupies an intermediate position in the food web. Additionally, they play a significant role as indicators of trophic conditions in both cold temperate and tropical glasses of water (Ahmad *et al*., 2011). Research has shown that zooplankton species have different tolerance limits to physicochemical parameters. Balakrishna *et al.* (2013) reported changes in zooplankton species densities affected by changes in physicochemical parameters across seasons. According to Waikato Environmental Technical Report (2008) in New Zealand, rotifers can be used to grade the eutrophic status of lakes. This study aimed to determine the relationship between physicochemical parameters and zooplankton abundance in Kalinjur Tamil Nadu, India. A zooplankton study and its relationship to physicochemical parameters will provide insight into the current limnological status of Lake Kalijur, which has never been done. That will be valuable baseline information for researchers and government agencies interested in the lake management

MATERIALS AND METHODS

WORK AREA

In the southern district of Vellore, Kalinjur Lake is one of the most prominent lakes in Katpadi. It is used for a wide variety of purposes, including irrigation, laundry, and other uses. Geologically, it is located at 12.962429 latitudes and 79.127706 longitudes. It is located at an altitude of 118 meters, as shown in Figure 1. The lake is shown on this map.

WATER SAMPLING AND ANALYSIS

For the analysis of physical and chemical parameters, a monthly collection of water samples was done for one year (January to December 2021) from the selected study sites of the water body. An accurate understanding of water quality requires physicochemical studies. Various aspects of physicochemical characteristics and their impacts on lake water quality. The following parameters were analyzed in the current study: Color, Odor, Turbidity, Electrical Conductivity, pH, Alkalinity, Total Hardness, Calcium, Magnesium, Ammonia, Nitrite, Nitrate, Chloride, Fluoride, Sulfate, Phosphate, BOD, and COD. Water samples were collected in glass bottles and brought to the laboratory for further analysis. Table show 1. Planktonic invertebrates or zooplankton were collected by filtering a 1-liter surface of water samples passed through a conical plankton net of standard bolted silk cloth no. 45 (mesh size 0.003-0.004 microns). Finally, zooplankton samples were adjusted to 10 ml. The collected samples were preserved in a 10 % formalin solution. The preserved zooplankton samples were then brought to the laboratory and analyzed qualitatively and quantitatively. Dhanpathi (2000) identified this using keys. Sedgwick Rafter Cell counted Zooplanktons by taking one ml of diluted sample.

STATISTICAL ANALYSIS OF DATA

The correlation coefficient (r) is computed with the help of the computer. Correlation analysis between abiotic and biotic parameters was also done by using Excel and Statistical Package for the Social Sciences software(SPSS Software) (Version 2.0)

RESULTS AND DISCUSSION

Water contains dissolved and suspended constituents in varying proportions. They often have different physical and chemical properties along with biological variations. The physical-chemical environment of water bodies was found to limit the diversity and density of zooplankton and other microorganisms. The present study helped to understand the effect of different physicochemical parameters and their interactions

among themselves. This helped to decide the final biotic and abiotic environment of the water body. During the present investigation, 27 Zooplankton taxa were observed from Kalinjur Lake belonging to 4 major taxonomic groups: Rotifera (9 species), Cladocera (7 species), Copepoda (6 species), and Ostracoda (5 species).Population dynamics of zooplankton. Overall, the percent contribution of different groups to the total zooplankton population inhabiting the Kalinjur Lake during the study period of one year revealed the dominance of Rotifera (32.4%) followed by Copepoda (29%), Cladocera (25%), and Ostracoda (14%) (Fig. 3).

Figures2-3 reveal the order of dominance of different taxonomic groups at all stations depicting the dominance of Rotifera over other zooplankton groups and the main species which contributed maximally to the Rotifera population and its abundance may be due to its high growth rate with the attainment of maximum size in a very short period (Moreira *et al.,* 2016). Apart from this, more food availability and optimum temperature also favored Rotifers' growth over other zooplankton groups, while the observational Kadam *et al.* (2014) also recorded a similar dominance order.

SEASONAL VARIATIONS IN WATER QUALITY PARAMETERS

It's common knowledge that water's physicochemical properties are crucial to aquatic life. Several physicochemical parameters, including electrical conductance, pH total alkalinity, total hardness, magnesium, ammonia, nitrite nitrates, chloride fluoride, sulfate, phosphate, tidey test, chemical oxygen demand, and biological oxygen demand, were measured for one year in Kalinjur Lake. While the Mean and SD values for electrical conductance (8.78E), and total alkalinity (7.83E) improved significantly, the water's pH remained fairly alkaline (2.74E). The overall total hardness concentration was (1.29E). The average calcium concentration was (1.29E). The average magnesium concentration was (2.00E). While the most common nitrite concentration was (1.39E) the concentration of chloride concentration was(1.81E) The most common sulfate concentration was (2.11E) the highest phosphate concentration was (1.54E), The symptomatic tide test concentration was (1.39E) the most common BOD concentration was (2.70E) The total COD concentration was (1.96E) With this, we agree with the finding of Monthly variations in the physicochemical parameters of Kalinjur Lake revealed well-marked fluctuations with maxima and minima during specific seasons. Mean standard deviations of each parameter of all the stations of the lake in which air temperature, water temperature, Water Temperature, Turbidity, pH, Alkalinity, EC, Hardness, Phosphate, Calcium, Magnesium, Nitrate, Nitrite Sulfate, Phosphate, Chloride, Ammonia, Fluoride, Bio-Chemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD) showed a summer hike in their values. Their summer maxima might be attributed to the accelerated decomposition of organic matter with the rise in temperature and release of excessive nutrients (c) and increased respiratory activity of aquatic organisms at high temperatures and magnesium during winter. Another parameter like water depth revealed maximum values during the physicochemical parameters of water plays a significant role in water productivity. It also plays a conspicuous role in zooplankton diversity and biomass in tropical shallow freshwater bodies. (Dhanpathi 2000). Some biological parameters affect zooplankton metabolic activities and proliferation.

CORRELATION COEFFICIENT (R) BETWEEN THE ZOOPLANKTON AND PHYSICOCHEMICAL

The correlation coefficient (r) between zooplankton and physicochemical parameters exhibited significant positive and negative correlations (Table 2). **Rotifera** recorded a positive and significant correlation with air temperature (r= 0.586), water temperature (r=0.555), chloride (r=0.63766), phosphates (r=6.00518), sulfates (r=0.729)Ec(r=0.63875), Calcium (r=0.351649) nitrite (r=6.00518) while the negative and significant correlation with pH(r= -0.1682), Alkalinity (r=-0.53031), TH (r=-77821)and magnesium (r=-0.19649) sulfates (r=-0.5225) BOD (r=-o.480899), COD(r=-5938. Tidame and Shinde (2012), Bera *et al.,* (2014), and Sivalingam et al. (2016) also found a strong positive correlation between the rotifer and temperature and free carbon dioxide. These parameters exhibited significant correlations and negative correlations.

Shinde (2011) also recorded a significant positive correlation between temperature and free carbon dioxide. During the present study, Rotifer occupied the first position of dominance in total zooplankton**. Copepods** are essential contributors to zooplankton population dynamics and are almost universally distributed. They form a primary food source for planktivorous fish and constitute an essential link in the aquatic food chain. The relative contribution of different planktonic groups in lentic habitats was influenced by the tropical level of water. Copepods recorded a positive and significant correlation between EC

(r=0.09618), alkalinity (r=0.2216), calcium (r=0.17219) magnesium (r=6168), and chloride (r=0.458) while invertebrate predators from aquatic environments, Copepods represent a key group in energy transfer along the food chain.

During the present study, Copepods occupied the 2nd position of dominance in total zooplankton The general scarcity of **cladocerans** in lakes has been related to factors like shortage of suitable-sized food particles and fish production (Ahwange *et al.,* 2012). Cladocerans recorded a negative and significant correlation with EC (r=-5306) alkalinity (r=-0.59809113), magnesium (r=-0.764057), calcium(r=-0.518) chloride(r=-0.3311), sulphate (r=-0.6462) BOD(r=-0.4708) COD(r=-0.61148) while positive and significant correlation with pH (r=0.6549)calcium(r=0.2753).During the present study, Cladoceran occupied the 3rd position of dominance in total zooplankton **Ostracods** recorded a positive and significant correlation with EC(r=0.059844) calcium (r=0.19844) BOD (r=0. 173917) COD(r=0.16269) while a negative and significant correlation with pH (r=-0.01259) alkalinity (r=-0.14942) TH (r=-0.04651) and magnesium(r=-0.4159) phosphate (r=-3.97205), Tidey test (r=-3.97205) Significant positive correlation of Ostracods with dissolved oxygen and bicarbonate coincides with the findings of (Sivalingam *et al.,* 2016). During the present study, ostracods occupied the fourth position of dominance in total zooplankton.

CONCLUSION

The present study revealed 27 genera of Zooplankton from the freshwater lake belonging to four groups namely Rotifera, Copepoda, Cladocera, and Ostracoda. Among all four groups, a maximum abundance of Rotifera (34%) was observed (Table 2). The present study indicated that rainy is the most favorable season for the maximum abundance of zooplankton followed by monsoon, winter, and summer, and their distribution was greatly influenced by different environmental factors and physicochemical parameters viz; temperature, pH, calcium, magnesium, chloride, nitrates, phosphates, and sulfates. Moreover, the maximum abundance of Rotifera both qualitatively and quantitatively in the present study indicated the eutrophic status of the studied water body. It was evident from the current investigation that monsoons are the high and most diverse seasons, while the rainy season is the high dense and summer is low dense and diverse. The physicochemical parameters of this lake were almost suitable for domestic use and aquatic life.

Thus, it is clearly understood that the provides a diverse array of freshwater habitats and their ecology. Thus, the presence, diversity, and seasonal abundance of various components of zooplankton- Rotifera, Cladocera, Copepoda, and Ostracoda in Kalinjur Lake is different in diverse habitats.

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Fig. 1 Map showing the locations of the freshwater lake in Kalinjur (Vellore District)

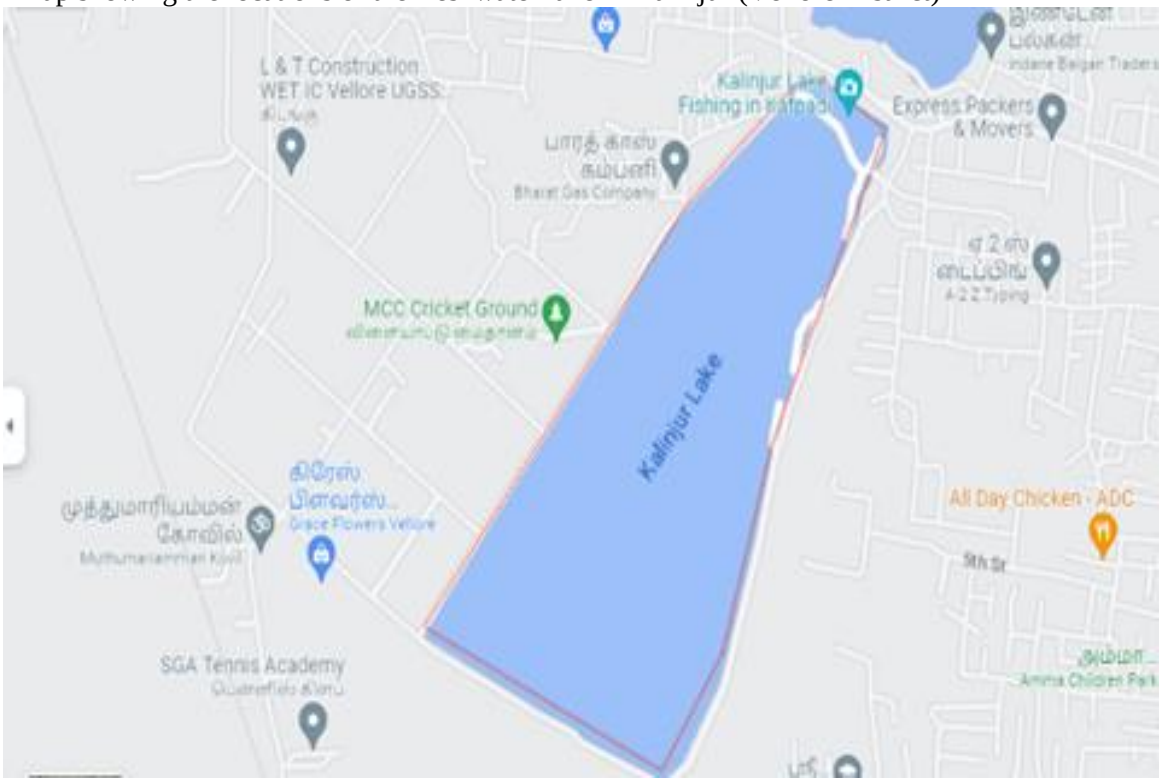

Fig 2. Graphical representation of seasonal variations of different groups of zooplankton in Kalinjur Lake (Jan-Dec 2021)

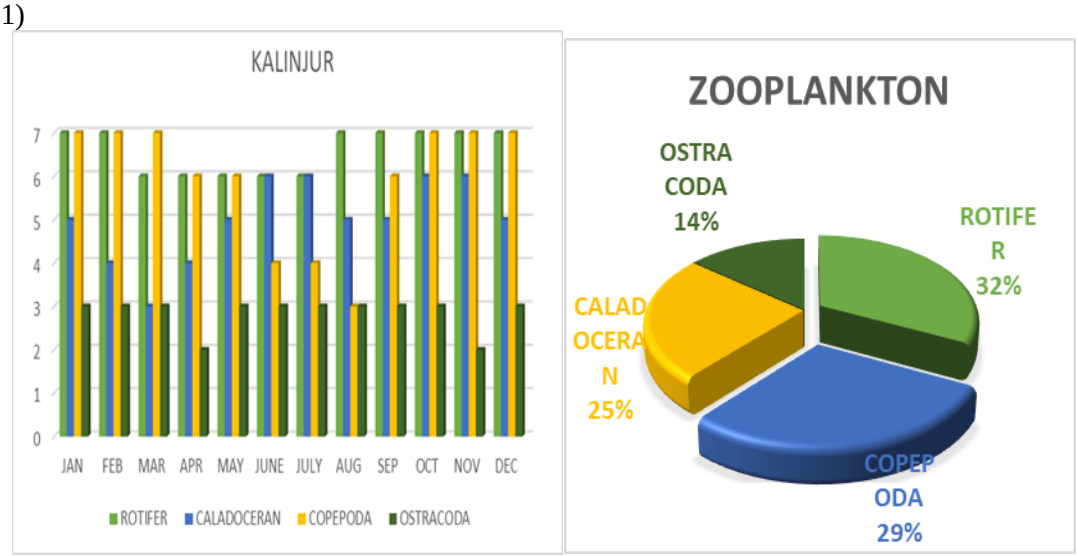

Table:1 Correlation coefficient (r) between the zooplankton fauna and various physicochemical parameters of water in Kalinjur Lake.

PARAMETER	ROTIFERA	CALADOCERAN	COPEPODA	OSTRACODA
EC	-0.63875	-0.53064	0.096186	0.059844
pH	-0.1682	0.654952	-0.56836	-0.01259
Alkalinity	-0.53031	-0.59809	0.221622	-0.14942
TH	-0.77821	-0.40906	-0.12599	-0.04651
Calcium	0.351649	0.275396	0.17219	0.198443
Magnesium	-0.19649	-0.76406	0.61688	-0.4159
Nitrite	6.00518	0	-2.14237	-3.97205
Chloride	0.637665	-0.33113	-0.19461	0.194666
Sulphate	-0.52254	-0.64626	0.085532	-0.07298
Phosphate	6.00518	0	-2.14237	-3.97205
Tidey Test	6.00518	0	-2.14237	-3.97205
BOD	-0.4809	-0.47085	-0.22933	0.173917
COD	-0.59382	-0.61148	-0.10467	0.162699

JCBPS; Section A; February 2023 to April 2023, Vol. 13, No. 2; 235-245. E- ISSN: 2249 –1929
[DOI: 10.24214/jcbps.A.13.2.23545.]

Journal of Chemical, Biological and Physical Sciences

An International Peer Review E-3 Journal of Sciences

Available online at www.jsbsc.org

Section A: Chemical Sciences

CODEN (USA): JCBPAT Research Article

Screening of Bioactive Phytochemical Constituents of *Cassia Siamea* Lam using LC-MS/MS and its α-Amylase Inhibition Activity

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Received: 25 February 2023; **Revised:** 09 March 2023; **Accepted:** 18 March 2023

Abstract: The objective of the present study was to screen the bioactive phytochemical constituents and α-amylase inhibition activity of aqua-ethanol extract of *Cassia siamea* Lam plant dried leaves. Phytochemical constituents screening was performed by LC-MS/MS analysis technique and qualitative analysis through the well-known standard tests protocol available in the literature. The study was aimed to screen α-amylase inhibition activity of leaves aqua-ethanol extract of *Cassia siamea* Lam as well-established chemical compositions responsible for such activity by porcine pancreatic α-amylase enzyme inhibition *in vitro* assay. The LC-MS/MS analysis of aqua-ethanol extract confirmed the occurrence of a total 13 phytocompounds in the leaves of *Cassia siamea* Lam, while Phytochemical qualitative analysis of leaves aqua-ethanol extract also confirmed the presence of secondary metabolites like carbohydrates, proteins, amino acids, flavonoids, tannins, glycosides, triterpenes and phenolic compounds. IC_{50} values obtained by α-amylase inhibition activity for *Cassia siamea* Lam aqua-ethanol extract was found to be 32.12 µg/mL and acarbose as a standard reference was found to be 26.19 µg/mL. The extract

showed promising α-amylase inhibition activity against tested porcine pancreatic α-amylase enzyme has varying degree of α-amylase inhibition activity ranging from mild to high dose dependent activity correlated by the presence of bioactive phytochemical constituents. The results of screening study suggest that Cassia *siamea* Lam medicinal plant leaves has promising α-amylase inhibition activity and could serve as potential source of natural α-amylase inhibitor as an alternative medicine to treat disorders of diabetes mellitus.

Key words: *Cassia siamea* Lam, aqua-ethanol extract, phytochemical, LC-MS/MS, α-amylase enzyme, diabetes mellitus

1.INTRODUCTION

Cassia siamea Lam widely distributed plant. Its leaves have been traditionally used as a folkloric medicine for the treatments of diabetes mellitus related disorders. Diabetes mellitus disease is a metabolic disorder of irregular secretary action of hyperglycemia regulating organ in the human beings and becomes a serious threat to mankind health. Recently many therapeutic treatments are exist for the maintain diabetes related disorders.

In the treatment of diabetes mellitus metabolic disorder especially in the developing countries medicinal plants has been plays significant roles due to their cost effectiveness. Plant found drugs are generally considered safe, easily available and are much effective [1]. For the control and treatment of many diseases enzyme activity inhibitors have been plays potential roles. The reviews of literature found that the traditionally used medicinal plants materials were possessing outstanding anti-diabetic property, which could be possibly investigated further for the presence of α-amylase inhibitor constituents [2].

Artificially synthesized enzyme activity inhibitory agents can produce serious side effects and are not suitable for use in pregnancy [3]. Therefore, more safer and effective enzyme activity inhibitor agents has been searching of new area to active research, and after the recommendations made by WHO on diabetes mellitus [4] research on hypoglycemic agents from medicinal plants has become an important aspect of the recent study.

Cassia siamea Lam plant parts has been shown various pharmacological activities like antimalarial [5], antimicrobial, anti-diabetic, anticancer, anti-inflammatory, hypotensive, diuretic, antioxidant, analgesic, laxative, anxiolytic, antipyretic, antidepressant and sedatives. The constituents were reported in this plant parts as chromone, chromone alkaloids, bianthraquinones, anthraquinones, flavonoids and phenolics constituents are barakol was identified as the major chemical constituents of flowers and leaves [6].

Cassia siamea Lam plant roots extract showed pancreatic lipase enzyme inhibitory activity and its bioassay guided fractionation provided important information of cassiamin-A and a bianthraquinone, as most active constituent of pancreatic lipase inhibition [7]. This inhibitory activity of plant extensively used for the screening of potency of natural products as antiobesity agents [8].

The various species of the genus *Cassia* has been also reported rich contents of bioactive phytochemical constituents; which have remarkable pharmacological activities useful for the treatment of various disorders of health [9]. The review of literature not more information was provide on the *in vitro* α-amylase inhibitory activity of the *Cassia siamea* Lam plant leaves aqua-ethanol extract screened [10].

Therefore, we consider potency of *Cassia siamea* Lam plant leaves and rising demands as a source of α-amylase inhibitor study for screening their anti-diabetic activity and content of phytochemical constituents.

2.MATERIALS AND APPARATUS

2.1. Collection of plant leaves material: *Cassia siamea* Lam plant Leaves were collected from local area and identified with the help of our institute botanists.

2.2. Extraction of plant leaves material: The leaves of *Cassia siamea* Lam plant were dried under shade and then grinded. 5 g of grind leaves material was poured out in 100 mL of aqua-ethanol solvent and kept on a magnetic stirrer for 1 hrs. Thereafter, mixture material was extracted sequentially using a soxhlet apparatus in ethanol solvent. The extract fractions were collected and the remaining solvent was evaporated out to dryness. The obtained material from fractions was stored at 4^0C in airtight bottles for assessment study.

2.3. Screening of α-Amylase inhibitory activity: α-Amylase inhibitory activity screening study was adopted by using a modified 3,5-dinitrosalicylic acid (DNS) *in vitro* α-amylase inhibition assay method to quantify reducing sugar maltose liberated under the assay conditions. The enzyme inhibitory activity was expressed as a decrease in units of maltose liberated in the course mixture [11-13].

2.4. Phytochemical constituent's analysis: The fractioned material of extract was qualitatively analysed for the bioactive phytochemical constituents such as phenols, protein and amino acids, glycoside, steroids, carbohydrates, tannins, flavonoids, alkaloids, saponins, triterpenoids etc. according to the standard protocols of analysis [14-15].

2.5.LC-MS/MS analysis: LC-MS/MS analysis technique was used for identification of phytochemical constituents separated by liquid chromatography. It provides separation of constituents and detection by MS provides molecular weight of compounds. LC-MS analysis of aqua-ethanol solvent extracted material was carried out on Waters UPLC-TQD Mass spectrometer. The constituents were identified by comparison of mass spectra with the inbuilt Metlin, Lipid and Mass Bank databases.

2.6. Statistical analysis: The Screening experimental study was performed out in triplicate and the results were expressed in mean ± SD.

3.RESULTS AND DISCUSION

The experimental result of screening study showed that the *Cassia siamea* Lam plant leaves aqua-ethanol extract exposed dose dependent α-amylase inhibitory activity by *in vitro* assay method using

potato starch as a substrate. The detected phytochemical constituents in the leaves of *Cassia siamea* Lam find themselves in the traditional preparation with several pharmacological activities.

3.1. Screening of α-Amylase inhibitory activity: The α-Amylase inhibitory activity was screened through the inhibition of α-amylase enzyme inhibitory assay that made the digestion of starch and so reduced the glucose absorption. Acarbose is used as a standard reference drug at a concentration range of 20-100µg/mL **(Table 1)** and *Cassia siamea* Lam leaves aqua-ethanol extract (20-100 µg/mL) expressed α-amylase inhibitory activity in a dose dependent manner **(Table 2).**

Table 1: α-Amylase inhibitory Activity of Acarbose (Standard Reference Drug)

Absorbance of the sample at 540nm *Absorbance of Control = 0.513*

Sr. No.	Concentration In (µg/mL)	Absorbance	% Inhibition	IC_{50} Value (µg/mL)
1	20	0.267	47.95	26.19
2	40	0.231	54.97	
3	60	0.206	59.84	
4	80	0.173	66.27	
5	100	0.158	69.20	

Table 2: α-Amylase inhibitory activity of *Cassia siamea* Lam leaves extract

Absorbance of the sample at 540nm *Absorbance of Control = 0.513*

Sr. No.	Concentration In (µg/ml)	Absorbance	% Inhibition	IC_{50} Value (µg/ml)
1	20	0.278	45.80	32.12
2	40	0.242	52.82	
3	60	0.215	58.08	
4	80	0.203	60.42	
5	100	0.179	65.10	

The experimental study data of leaves aqua-ethanol extract and acarbose as a standard reference were represents inhibition activity at higher concentration tested. Leaves of *Cassia siamea* Lam. plant exhibited higher activity i.e. it inhibits α-amylase enzyme activity by about IC_{50} values of aqua-ethanol extract 32.12 µg/mL and acarbose as a standard reference 26.19 µg/mL at concentrations ranging from 20 µg/mL to 100µg/mL as shown in **fig. 1**.

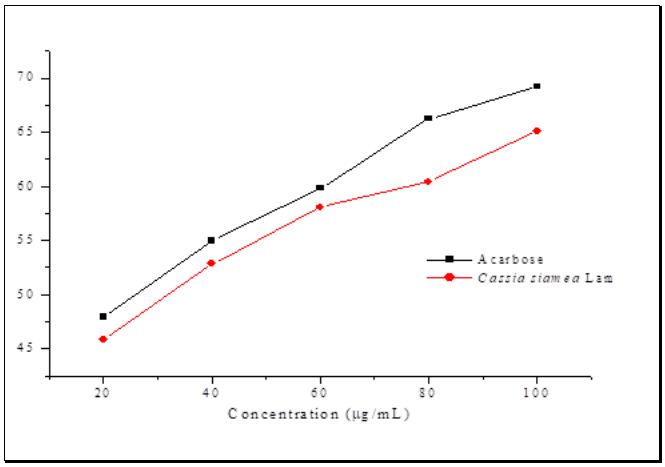

Fig.1.: α-Amylase inhibitory activity of *Cassia siamea* Lam leaves extract

3.2. Phytochemical Constituents Screening of Extract: The aqua-ethanol extract of *Cassia siamea* Lam leaves were screened qualitatively for the bioactive phytochemical constituents by using standard protocols used in reference literature. The screening result of the aqua-ethanol extract were reported the presence of carbohydrate, protein, amino acids, glycoside, tannins, flavonoids, terpenoids and phenolic constituents [16] as shown in **table 3**.

Table 3: Phytochemical Tests Performed for *Cassia siamea* Lam leaves extract

Phytochemicals	**Result**
1. Alkaloid	-
2. Carbohydrate	+
3. Protein and amino acids	+
4. Glycoside	+
5. Tannin	+
6. Saponin	-
7. Flavonoids	+
8. Steroids	-
9. Triterpenoids	+
10. Phenolic compounds	+

(+) for present and (-) for absent

DOI:10.24214/jcbps.A.13.2.23545.]

3.3. LC-MS/MS screening of aqua-ethanol extract: The LC-MS screening of leaves aqua-ethanol extract of *Cassia siamea* Lam. plant was detected phytochemical constituents' intensity peaks chromatogram (TIC and EIC) as shown in **fig. 2**

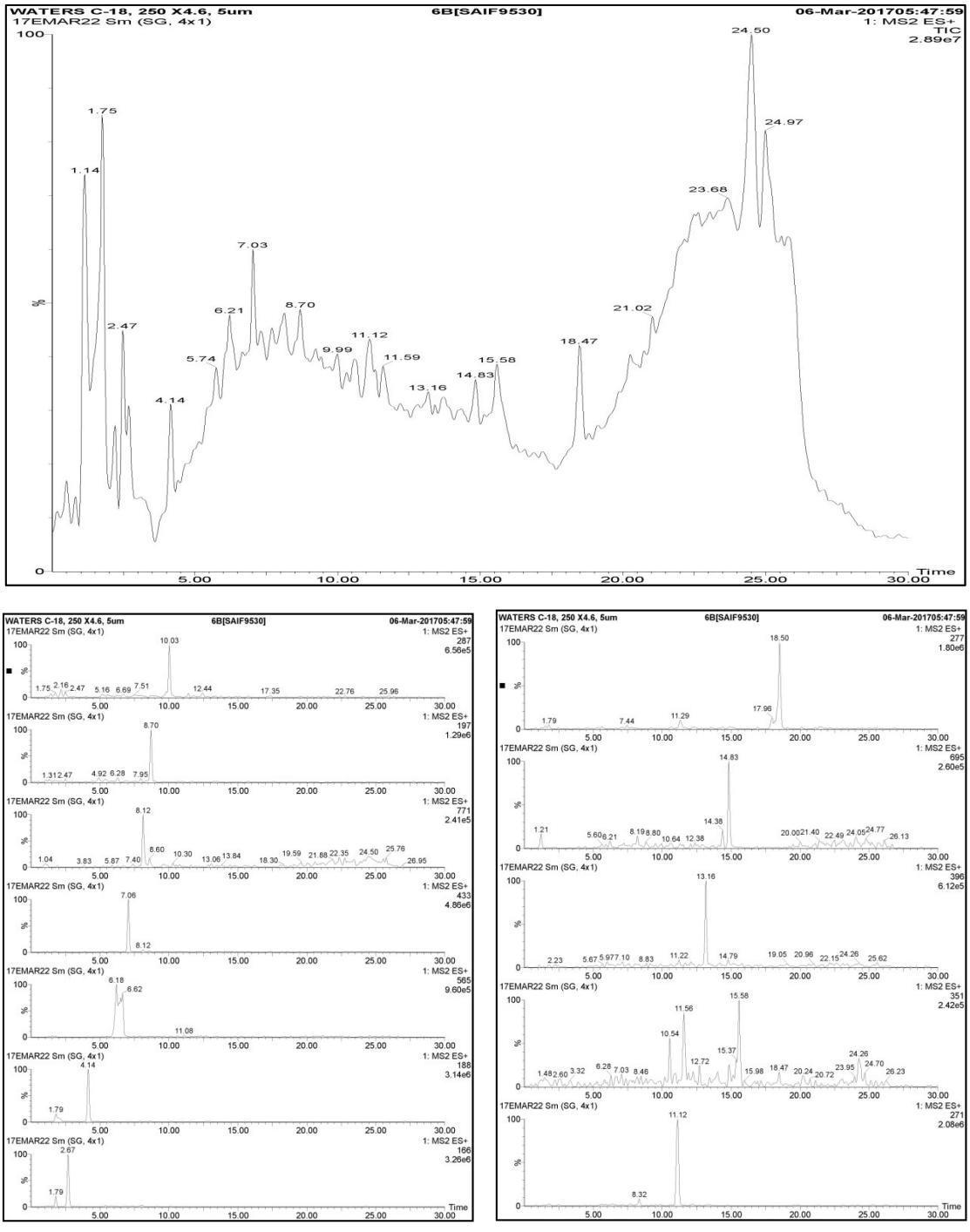

Fig.2 LC-MS/MS chromatogram (TIC and EIC) of aqua-ethanol extract

Table 4 Chemical constituents detected in leaves aqua-ethanol extract

Peak	R. Time	Name	Base m/z
1	2.47	(R)-(-)-Phenylephrine	166
2	4.14	Atrazine-desethyl /(4-amino-6-chloro-s-triazin-2-yl)-isopropyl-amine	188
3	6.21	kaempferol-3-O-(6""-p-coumaroyl)-glucoside	595
4	7.03	17-β-Estradiol-3,17-β-sulfate	433
5	8.15	apigenin 6- *C*-glucosyl 8-*C*-(2"-*O*-dihydroferuloyl)-glucoside	771
6	8.70	2-methyl-4,6-dinitro-phenol	197
7	9.99	2'-Hydroxy-a-naphthoflavone	287
8	11.12	3-(5-Acetyl-2-furyl)-5-methoxy-2- benzofuran-1(3H)-one	271
9	11.59	estra-1,3,5(10)-triene-3,17β-diol 3-sulfate	351
10	13.16	1,2-dibutyryl-sn-glycero-3-phosphocholine	396
11	14.83	tricaffeoyl-hydroxyferulic acid	695
12	15.58	4-Methylumbelliferyl glucuronide	351
13	18.47	2-(4-chlorophenyl)-1-(2,4,6-trihydroxyphenyl) ethanone	277

The chemical constituents [17] tentatively reported in leaves aqua-ethanol extract of *Cassia siamea* Lam. which contribute to α-amylase inhibitory activity as shown in above table 4. The naturally occurring health products contains bioactive phytochemical constituents from plant origin were clearly indicates as a promising avenue for the prevention and treatments of metabolic chronic disorders.

The extracts of *Cassia siamea* Lam. leaves were tested for anti-diabetic activity in alloxan induced diabetes of diabetic rats; various extract doses produced significantly decreased the plasma blood glucose level as well as improving lipid metabolism and body weight in rats with induced diabetes problems [18, 19]. Good docking score has shown by in silico molecular docking studies, emodin and chrysophanol are present in *Cassia siamea* Lam leaves to be good inhibitors of angiotensin II receptor type 2 and possess good antidiabetic property [20].

The C*assia siamea* Lam. plant leaves are rich source of minerals [21] and contains numerous phytochemical compounds like cassiamin, siameadin, lupeol, lupeone, chrysophanol, cassiamin A, chrysophanol-antrone, rhein, barakol, cassia chromone (5-acetonyl-7-hydroxy-2-methylchromone), p-coumaric acid, apigenin-7-o-galactoside, β-sitosterol, cassia chromonone and cassiadinine [22-25]; whereas cassiarin A [26], chrobisiamone-A, bischromone [27], were isolated from the *Cassia siamea* Lam plant leaves and denoted promising antiplasmodial activity.

The LC-MS/MS screening was detected 13 bioactive phytochemical constituents. Qualitative phytochemical screening of leaves aqua-ethanol extract also confirmed the presence of secondary metabolites like carbohydrate, protein, amino acids, glycoside, tannins, flavonoids, terpenoids and phenolic constituents [28]. All the chemical constituents identified a wide range of phychemical constituents in the leaves of *Cassia siamea* Lam plant find themselves in the traditional and pharmaceutical importance's [29-31]. *Cassia siamea* Lam plant different parts also reported significantly pharmacological activities and uses [32]. Thus, our screening study also suggested that the aqua-ethanol extract of leaves showed significant α-amylase inhibitory activity at higher concentration tested due to the rich contents of bioactive phytochemical constituents. The dose dependent inhibition of α-amylase enzyme reported by leaves extract than standard reference used in vitro assay [33]. Therefore, *Cassia siamea* Lam medicinal plant leaves have been used as potent α-amylase inhibitor to treat and prevent metabolic chronic disorders.

CONCLUSION

The aqua-ethanol leaves extract of *Cassia siamea* Lam plant has remarkably reported effective α-amylase inhibitory activity. The overall activity depends on contribution of bioactive phytochemical constituents were present in the extract of leaves. It could be a main source of natural inhibitory agents, which have more significant role as therapeutic agent for prevention and management of type-II diabetes related complications. Therefore, it was concluded that aqua-ethanol leaves extract of *Cassia siamea* Lam plant showed potent α-amylase inhibitory activity and more investigations are proposed to validate these claims by identifying bioactive phytochemical constituents with potential therapeutic benefits for diabetes mellitus disorders.

ACKNOWLEDGMENT

We wish to gratefully acknowledge the enabling facilities provided by the Director, CDRI, Lucknow KFRI, for LC-MS/MS facility, Research Institute, Maulana Azad College, Aurangabad, Head of Department and Principal of our institute.

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On line publication Date: 20. 03.2023

E-ISSN: 2709-9423
P-ISSN: 2709-9415
JRC 2023; 4(2): 85-90

www.chemistryjournal.net
Received: 02-05-2023
Accepted: 14-06-2023

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LC-MS/MS investigation of phytochemical ingredients and alpha amylase inhibition activity of *Cassia siamea* Lam leaves aqueous extracts

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DOI: https://doi.org/10.22271/reschem.2023.v4.i2b.98

Abstract
The main objective of the present investigation study was to analyze the phytochemical ingredients and alpha amylase inhibition activity of aqueous extract of *Cassia siamea* Lam plant leaves. Phytochemical ingredients analysis was performed by using LC-MS/MS analysis spectral technique and qualitative analysis through the well-known standard tests protocol available in the literature. Also study was aimed to investigate alpha amylase inhibition activity of leaves aqueous extract of *Cassia siamea* Lam as well established bioactive phytochemical ingredients responsible for such activity by porcine pancreatic alpha amylase enzyme inhibition *in vitro* assay. The LC-MS/MS analysis of aqueous extract reported the presence of a total 9 phytochemical ingredients in the leaves of *Cassia siamea* Lam, while phytochemical qualitative analysis of leaves aqueous extract also noted the presence of secondary metabolites like carbohydrates, proteins, amino acids, flavonoids, tannins, glycosides, steroids and phenolic compounds. IC_{50} values obtained by alpha amylase inhibition activity for *Cassia siamea* Lam aqueous extract was found to be 30.38 ± 0.03 µg/mL and acarbose as a standard reference was found to be 27.62 ± 0.02 µg/mL. The extract showed promising alpha amylase inhibition activity against tested porcine pancreatic alpha amylase enzyme has varying degree of alpha amylase inhibition activity ranging from lower to higher dose dependent activity correlated by the presence of bioactive phytochemical ingredients. The results of investigation study suggest that Cassia *siamea* Lam medicinal plant leaves has promising alpha amylase inhibition activity and could serve as potential source of natural alpha amylase inhibitor as an alternative medicine to treat disorders of diabetes mellitus.

Keywords: *Cassia siamea* Lam, aqueous extract, phytochemical ingredients, LC-MS/MS, alpha amylase enzyme, diabetes mellitus

1. Introduction
Cassia siamea Lam widely distributed plant and traditionally its leaves have been used as a folkloric medicine for the treatments of diabetes mellitus related disorders. Diabetes mellitus disease is a metabolic disorder of irregular secretary action of hyper glycaemia regulating organ in the human beings and becomes a serious threat to human being health. Currently exists many therapeutic treatments are control diabetes related disorders. In the treatment of metabolic disorders of diabetes mellitus especially in the developing countries medicinal plants has been plays significant roles due to their cost effectiveness. Naturally Plant found drugs are generally considered safe, easily available and are much effective [1].
For the control and treatment of many diseases enzyme activity inhibitors have been plays potential roles. The reviews of literature found that the traditionally used medicinal plants parts materials were possessing outstanding anti-diabetic potential, which could be possibly investigated further for the presence of alpha amylase inhibitor phytochemical ingredients [2]. Artificially synthesized enzyme activity inhibitory agents can be produce serious side effects on body and are unsuitable for use in pregnancy [3]. Therefore, more safer and effective enzyme activity inhibitor agents has been searching of new areas to active research, and after the recommendations made by WHO on diabetes mellitus [4] further research on hypoglycaemic agents from medicinal plants has been become an important aspect of the recent study.

Different parts of *Cassia siamea* Lam plant have been shown various pharmacological activities like antimalarial [5], antimicrobial, anti-diabetic, anticancer, anti-inflammatory, hypotensive, diuretic, antioxidant, analgesic, laxative, anxiolytic, antipyretic, antidepressant and sedatives. The phytochemical ingredients were reported in this plant parts as chromone, chromone alkaloids, bianthraquinones, anthraquinones, flavonoids and phenolics constituents are barakol was identified as the major phytochemical ingredients of flowers and leaves [6].

Root extracts of *Cassia siamea* Lam plant showed pancreatic lipase enzyme inhibition activity and its bioassay guided fractionation provided important information of cassiamin-A and a bianthraquinone, as most active ingredient of pancreatic lipase inhibition [7]. This inhibition activity of plant has been extensively used for the investigating the potency of natural phytochemical ingredients as an antiobesity agents [8].

The species of the genus *Cassia* has been also reported rich contents of bioactive phytochemical ingredients; which have remarkable pharmacological activities useful for the treatment of various health related disorders [9]. The review of literature survey were not more provided information on the *in vitro* alpha amylase inhibitory activity of the *Cassia siamea* Lam plant leaves aqueous extracts investigated [10]. Therefore, consider leaves potency of *Cassia siamea* Lam plant and growing demands as a source of alpha amylase inhibitor study for investigating their anti-diabetic property and appearance of phytochemical ingredients.

2. Materials and Methods

2.1 Collection of plant leaves material

Cassia siamea Lam plant Leaves were collected from local area and identified with the help of our institute botanists.

2.2 Extraction of plant leaves material

The leaves of *Cassia siamea* Lam plant were dried under shade and then grinded. 5 g of grind leaves material was poured out in 100 mL of aqueous solvent and kept on a magnetic stirrer for 1 hrs. Thereafter, mixture material was extracted sequentially using a soxhlet apparatus in aqueous solvent. The extract fractions were collected and the remaining solvent was evaporated out to dryness. The obtained material from fractions was stored at 4ºC in airtight bottles for investigation study.

2.3 Investigation of Alpha Amylase inhibitory activity

Alpha amylase inhibitory activity investigation study was adopted by using a modified 3,5-dinitrosalicylic acid (DNS) *in vitro* alpha amylase inhibition assay method to quantify reducing sugar maltose liberated under the assay conditions. The enzyme inhibitory activity was expressed as a decrease in units of maltose liberated in the course mixture [11-13].

2.4 Phytochemical ingredients investigation

The fractioned material of aqueous extract was qualitatively analysed for the bioactive phytochemical ingredients such as phenols, protein, amino acids, glycoside, steroids, carbohydrates, tannins, flavonoids, alkaloids, saponins, triterpenoids etc. according to the standard protocols of qualitative analysis [14-15].

2.5 LC-MS/MS analysis

LC-MS/MS analysis technique was used for identification of phytochemical ingredients separated by liquid chromatography. It provides separation of ingredients and detection by MS provides molecular weight of compounds. LC-MS analysis of aqueous solvent extracted material was carried out on Waters UPLC-TQD Mass spectrometer. The ingredients were identified by comparison of mass spectra with the inbuilt Metlin, Lipid and Mass Bank databases.

2.6 Statistical analysis

The investigation experimental study was performed out in triplicate and the results were expressed in mean ± SD.

3. Results and Discussion

The result of experimental investigation study showed that the *Cassia siamea* Lam plant leaves aqueous extract exposed dose dependent alpha amylase inhibitory activity by *in vitro* assay method using potato starch as a substrate. The detected phytochemical ingredients in the leaves extract of *Cassia siamea* Lam plant find themselves in the traditional preparation with several pharmacological active properties.

3.1 Investigation of Alpha Amylase inhibitory activity

The alpha amylase inhibitory activity was investigated through the inhibition of alpha amylase enzyme inhibitory assay that made the digestion of starch and so reduced the glucose absorption. Acarbose is used as a standard reference drug at a concentration range of 20-100µg/mL (Table 1) and *Cassia siamea* Lam leaves aqueous extract (20-100 µg/mL) expressed alpha amylase inhibitory activity in a dose dependent manner (Table 2).

Table 1: Alpha Amylase inhibitory activity of Acarbose (Standard Reference Drug) Absorbance of the sample at 540nm Absorbance of Control = 0.513

Sr. No.	Concentration in (µg/mL)	Absorbance	% Inhibition	IC_{50} value (µg/mL)
1	20	0.271	47.17 ± 0.02	27.62 ± 0.02
2	40	0.234	54.38 ± 0.01	
3	60	0.209	59.25 ± 0.04	
4	80	0.177	65.49 ± 0.03	
5	100	0.156	69.59 ± 0.02	

Table 2: Alpha Amylase inhibitory activity of Cassia siamea Lam leaves extract Absorbance of the sample at 540 nm Absorbance of Control = 0.513

Sr. No.	Concentration in (µg/mL)	Absorbance	% Inhibition	IC_{50} Value (µg/mL)
1	20	0.268	47.75 ± 0.04	30.38 ± 0.03
2	40	0.245	52.24 ± 0.01	
3	60	0.217	57.69 ± 0.02	
4	80	0.196	61.79 ± 0.05	
5	100	0.173	66.27 ± 0.03	

The data of experimental study leaves aqueous extract and acarbose as a standard reference were represents inhibition activity at higher concentration tested. Leaves of *Cassia siamea* Lam. plant exhibited significant activity i.e. it inhibits alpha amylase enzyme activity by about IC_{50} values of aqueous extract 30.38 ± 0.03 µg/mL and acarbose as a standard reference 27.62 ± 0.02 µg/mL at concentrations rising from 20 µg/mL to 100µg/mL as shown in fig. 1.

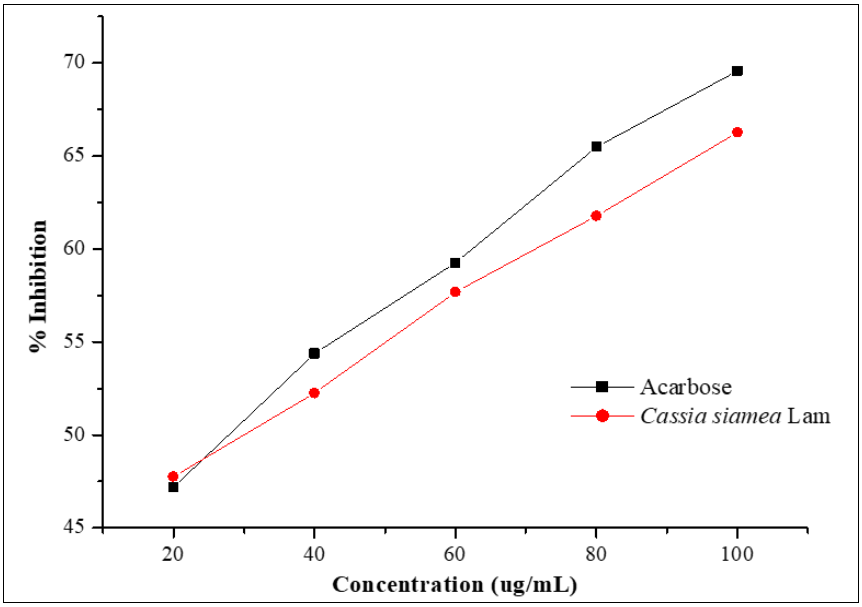


Fig 1: Alpha amylase inhibitory activity of Cassia siamea Lam leaves extract

3.2 Phytochemical Ingredients Investigation of Extract

The aqueous extract of *Cassia siamea* Lam leaves were investigated qualitatively for the bioactive phytochemical ingredients by using standard protocols used in reference literature. The investigation study result of the aqueous extract were reported the presence of carbohydrate, protein, amino acids, glycoside, tannins, flavonoids, steroids and phenolic constituents [16] as shown in table 3.

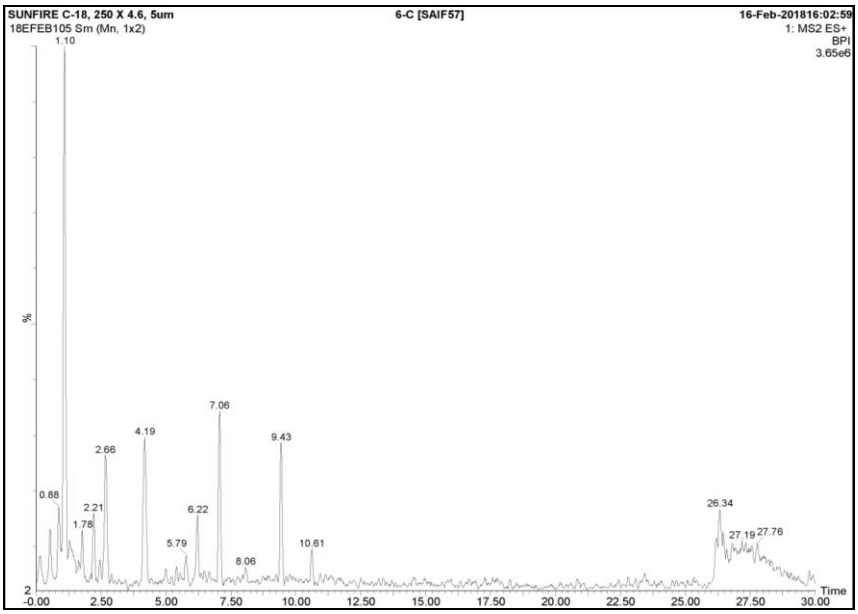
Table 3: Phytochemical Tests Performed for *Cassia siamea* Lam leaves extract

Phytochemicals	Result
Alkaloid	-
Carbohydrate	+
Protein and amino acids	+
Glycoside	+
Tannin	+
Saponin	-
Flavonoids	+
Steroids	+
Triterpenoids	-
Phenolic compounds	+

(+) for present and (-) for absent

3.3 LC-MS/MS investigation of aqueous extract

The LC-MS investigation of leaves aqueous extract of *Cassia siamea* Lam. plant was detected phytochemical ingredients intensity peaks chromatogram (BPI and EIC) as shown in fig. 2



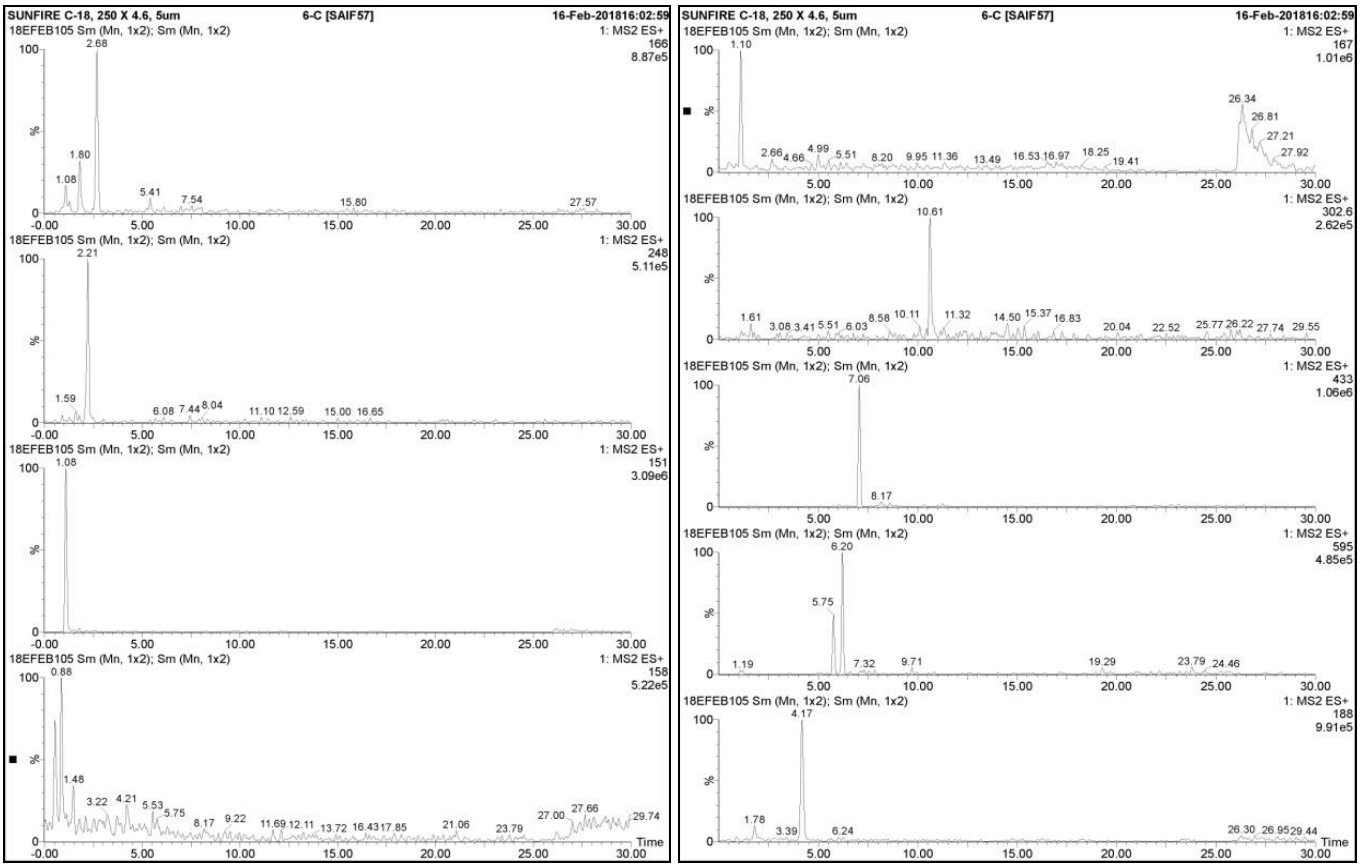


Fig 2: LC-MS/MS chromatogram (BPI and EIC) of aqueous extract

Table 4: Chemical constituents detected in leaves aqueous extract

Peak	R. Time	Name	Base m/z
1	0.88	N,N-diethyl-3-hydroxybut-2-enamide	158.2
2	1.10	(S)-2-Hydroxy-2-phenylacetic acid	151.3
3	2.21	β-sanshool (2E,6E,8E,10E)-N-(2-methylpropyl) dodeca-2,6,8,10-tetraenamide	248.3
4	2.66	Pyridoxal	166.3
5	4.19	N8-Acetylspermidine	188.3
6	6.22	1-(9Z-octadecenoyl)-2-(4-oxobutryl)-sn-glycero-3-phospho-(1'-sn-glycerol)	595.3
7	7.06	(5Z,7E)-(1S,3R)-1,3,25-trihydroxy-22-oxa-9,10-seco-5,7,10(19)-cholestatrien-24-one	433.3
8	10.61	Dobutamine	302.5
9	26.34	4-Hydroxy-3-methoxybenzoic acid	167.3

The phytochemical ingredients [17] tentatively reported in leaves aqueous extract of *Cassia siamea* Lam. plant which contributes to alpha amylase inhibitory activity as shown in above table 4. The naturally occurring health products contains bioactive phytochemical ingredients from plant origin were clearly indicates as a promising avenue for the prevention and treatments of metabolic chronic disorders. The aqueous extract of *Cassia siamea* Lam. leaves were tested for anti-diabetic activity in alloxan induced diabetes of diabetic rats; various extract doses produced significantly decreased the plasma blood glucose level as well as improving lipid metabolism and body weight in rats with induced diabetes problems [18, 19]. Good docking score has shown by in silico molecular docking studies, emodin and chrysophanol are present in *Cassia siamea* Lam leaves to be good inhibitors of angiotensin II receptor type 2 and possess good anti-diabetic property [20].

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leaves extract than standard reference used *in vitro* assay [33-35]. Therefore, *Cassia siamea* Lam medicinal plant leaves have been used as potent alpha amylase inhibitor to treat and prevent diabetes mellitus complementary metabolic disorders.

4. Conclusion

The aqueous leaves extract of *Cassia siamea* Lam plant has remarkably reported effective alpha amylase inhibitory activity. The overall activity depends on contribution of bioactive phytochemical ingredients were present in the extract of leaves. It could be a main source of natural inhibitory agents, which have more significant role as therapeutic agent for prevention and management of type-II diabetes related complications. Therefore, it was concluded that aqueous leaves extract of *Cassia siamea* Lam plant showed potent alpha amylase inhibitory activity and more investigations are proposed to validate these claims by identifying bioactive phytochemical ingredients with potential therapeutic benefits for diabetes mellitus disorders.

5. Acknowledgment

We wish to gratefully acknowledge the enabling facilities provided by the Director, CDRI, Lucknow for LC-MS/MS facility, Research Institute, Maulana Azad College, Aurangabad, Head of Department and Principal of our institute.

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Cosmos Multidisciplinary Research E-Journal

Recognized International Indexed & Peer Reviewed Journal

ISSN 2456-1665

IMPACT FACTOR 4.94

VOLUME VII | ISSUE IX | SEPTEMBER 2022

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VOLUME VII | ISSUE IX | SEPTEMBER 2022

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Cosmos Multidisciplinary Research E-Journal
Online Available at www.cmrj.in
Recognized International Peer Reviewed Journal
Impact Factor 4.94
ISSN No. 2456-1665

बीड जिल्ह्यातील पाणलोट क्षेत्र विकास कामावर झालेला खर्च: एक अध्ययन

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कडा, ता. आष्टी, जि. बीड

प्रस्तावना:

पाणलोट क्षेत्र विकासाचे तत्व मान्य करुन महाराष्ट्र शासनाने जमीन आणि पाणी व्यवस्थापनासाठी आवश्यक असलेल्या सुधारणा पाणलोट क्षेत्राअंतर्गत शेतकऱ्यांना करुन देण्याचा निर्णय घेतला आहे. महाराष्ट्रात भविष्यकाळात ३० टक्के क्षेत्र सिंचनासाठी आणण्याचा प्रयत्न महाराष्ट्र शासनाकडून केला जात आहे. प्रस्तुत प्रकरणात महाराष्ट्र शासनाने पाणलोट विषयक ज्या विविध योजना राबविलेल्या आहेत. त्याचा सविस्तर व विश्लेषणात्मक अभ्यास करण्यात आलेला आहे. महाराष्ट्र पाणलोट विकास कार्यक्रम राज्याच्या निर्मितीनंतर शासनाने राज्याच्या विकासासाठी कृषी विषयक विविध योजना राबवल्या आहेत. त्यापैकी पाणलोट विकास कार्यक्रम ही एक महत्वपूर्ण योजना आहे. राज्याच्या सिंचन क्षमतेचा विचार करता राज्यातील बहुतांशी शेती पर्जन्यधारीत असल्यामुळे शेतीसाठी संरक्षीत जलसिंचनाची साधने निर्माण करणे, जमिनीची होणारी धूप थांबविणे, पडित जमिनीचा वापर करुन ग्रामीण भागातील उत्पन्नाची साधने वाढविणे यासाठी जलसंधारणाचा कार्यक्रम राज्यात अनेक योजनाद्वारे राबविण्यात येत आहे.

बीड जिल्ह्यातील पाणलोट क्षेत्र विकास कामावर झालेला खर्च:

महाराष्ट्र शासनाने महाराष्ट्र राज्य व बीड जिल्ह्यातील जमिनीतील पाण्याची पातळी वाढविण्यासाठी व जमीन कायम स्वरुपी सिंचनाखाली आणण्यासाठी वेगवेगळ्या योजनेअंतर्गत पाणलोट क्षेत्राची कामे केलेली आहेत. त्या कामावर केलेल्या खर्चाचा आढावा खाली तक्ता क्र. १ मध्ये दर्शविलेला आहे.

तक्ता क्र. १

बीड जिल्ह्यातील पाणलोट क्षेत्रावर झालेला खर्च १९९२-२०११

(खर्च लाख रुपयात)

अ.क्र.	वर्षे	बीड जिल्हा	महाराष्ट् राज्य	जिल्ह्याचे राज्याच्या खर्चाशी शेकडा प्रमाणे
१	१९९१-९२	८८९.५५	१४३९४.४५	६.१७
२	१९९२-९३	३२९६.५२	२४८०७.२०	१३.२८

अ.क्र.	वर्षे	बीड जिल्हा	महाराष्ट् राज्य	जिल्ह्याचे राज्याच्या खर्चाशी शेकडा प्रमाणे
३	१९९३-९४	३६३०.१६	३४२८५.९६	१०.५८
४	१९९४-९५	७७१३.२३	६८८०९.९०	११.२०
५	१९९५-९६	६१२४.९१	५९४७९.४३	१०.२९
६	१९९६-९७	१४७१.१४	४४३५०.९१	०३.३१
७	१९९७-९८	८३९.१०	४९१४४.६३	१.७०
८	१९९८-९९	१७०८.०७	७६६२१.९५	२.८४
९	१९९९-२०००	१८९७.०१	५२९५५.५८	२.४७
१०	२०००-०१	१८३१.१८	६६२२२.१४	३.४५

स्त्रोत - जिल्हा कृषी अधिक्षक कार्यालय, बीड

तक्ता क्र. १ मध्ये बीड जिल्ह्यात व महाराष्ट्र राज्यात पाणलोट क्षेत्रावर सन २०००-०१ ते २०१२ या कालावधीमध्ये झालेला खर्च दर्शविलेला आहे. त्यानुसार महाराष्ट्र राज्याचा एकूण खर्च ६२६०८६.४९ लाख रुपये दिसून येतो. तर बीड जिल्ह्याचा ३१९८१.३२ लाख रुपये आहे. राज्याच्या तुलनेत तो खर्च (५.१०) टक्के खर्च २००१-०२ या साली ३२९६.५२ लाख रुपये त्याचे राज्याच्या खर्चाशी शेकडा प्रमाण (१३.२८) टक्के एवढा आहे. तर सर्वात कमी सन २०११-१२ या साली १९९२.११ लाख रुपये तो एकूण राज्याच्या खर्चाशी शेकडा (१.५९) टक्के एवढे दिसून येते. तसेच सन २००३-०४ या साली ७७१३.२३ लाख रुपये (११.२०) टकके, २००२-०३ या साली ३६३०.१६ लाख रुपये (१०५८) टक्के, २००४-०५ या साली ६१२४.९१ लाख रुपये (१०.२९) टक्के, सन २००६-०७ या साली ८३९.१० लाख रुपये (१.७०) टक्के, २००९-१० या साली १८३१.१९ लाख रुपये (३.४५) टक्के, सन २००५-०६ मध्ये १४७१.१४ लाख रुपये (.३१) टक्के, २००७-०८ या साली १७०८.०७ लाख रुपये (२.८४) टक्के, २००८-०९ च्या साली १८९७.०१ लाख रुपये (२.४७) टक्के व सन २०१०-११ या साली १३८८.३४ लाख रुपये (२.०९) टक्के एवढा आहे.

तक्ता क्र. १ वरील अभ्यासावरून स्पष्ट होते की, बीड जिल्ह्यातील पाणलोट क्षेत्रावर २००१-०२ या वर्षासाठीच राज्याच्या तुलनेत सर्वात जास्त खर्च १३.२८ टक्के एवढा खर्च केल्याचे दिसून येते. या तुलनेत २००५-०६ पासून ते २०११-२०१२ (१० वर्षात) सदरील खर्चाची टक्केवारी कमी होत गेल्याचे स्पष्ट दिसून येते. बीड जिल्ह्यातील पाणलोट क्षेत्र विकास वाढवण्यासाठी व शेतीला पाणी पुरवठा

करण्यासाठी जमिनीतील पाण्याची पातळी वाढविण्यासाठी, जमिनीची धूप थांबवण्यासाठी बीड जिल्ह्यात पाणलोट क्षेत्र विकासावर आणखीन खर्च करण्याची आवश्यकता आहे असे मला वाटते.

सन २००१-०२ या साली झलोला खर्च सर्वात जास्त १३.२८ टक्के तर सर्वात कमी २०११-१२ या साली १.५९ टक्के झालेला आहे. तसेच अनुक्रमे २००३-०४ साली ११.२० टक्के, २००२-०३ साली १०.५८ टक्के, २००४-०५ साली १०.२९ टक्के, २०००-०१ साली ६.१७ टक्के, २००६-०७ साली १.७० टक्के, २००९-१० साली ३.४५ टक्के, २००५-०६ साली ३.३१ टक्के, २००७-०८ साली २.८४ टक्के, २००८-०९ साली २.४७ टक्के व २०१०-११ साली २.०९ टक्के एवढा खर्च झाल्याचे दिसून येते.

बीड जिल्ह्यात पाणलोट क्षेत्र उपचारित कामे अनुदानाच्या स्वरुपात विविध योजनाच्या माध्यमातून केली गेली. जिल्ह्यात पाणलोट क्षेत्र विषयक राबवलेल्या १९९१-९२ ते २०१०-११ पर्यंत जिल्ह्यात राबवलेल्या सर्व योजनावरील झालेला खर्च तक्ता क्रमांक २ मध्ये दाखविण्यात आलेला आहे.

तक्ता क्र. २

बीड जिल्ह्यात पाणलोट क्षेत्र विकासाच्या विविध योजनेवर झालेल्या खर्च

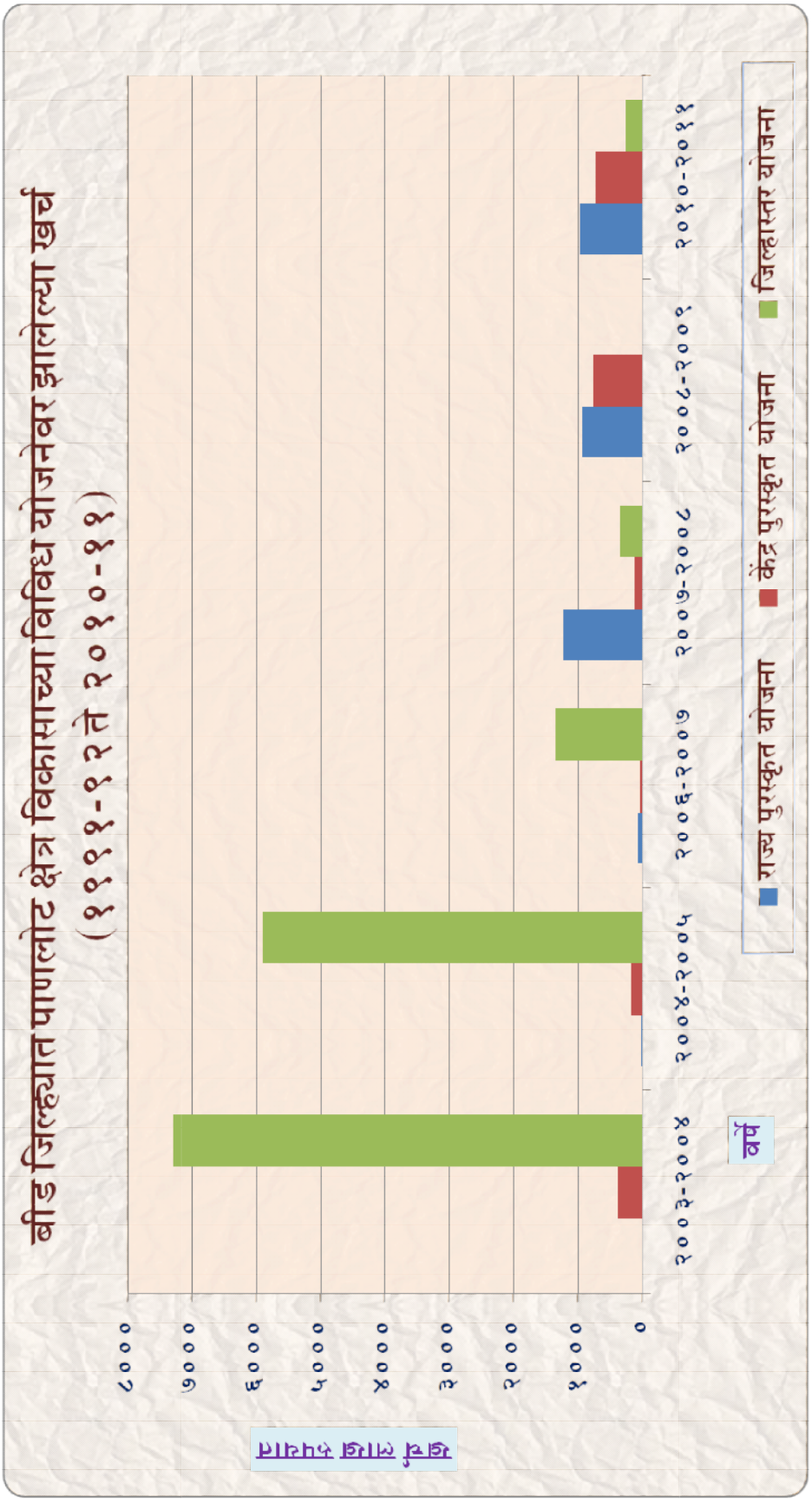
(१९९१-९२ ते २०१०-११)

(खर्च लाख रुपयात)

अ. क्र.	योजना	२००१-२००२	२००३-२००४	२००४-२००५	२००६-२००७	२००७-२००८	२००८-२००९	२०१०-२०११
१	राज्य पुरस्कृत योजना	उ.ना.	१२.४४ (०.१६)	३३.४८ (०.५४)	७५.२९ (५.११)	१२३६.६५ (७२.८०)	९३०.९५ (५४.६१)	९८३.०५ (४९.७६)
२	केंद्र पुरस्कृत योजना	उ.ना.	३९६.४१ (५.१३)	१८९.७ (३.०९)	४७.५७ (३.२३)	१२३.२९ (७.२६)	७७१.२८ (४५.२४)	७२८.०९ (३६.८५)
३	जिल्हास्तर योजना	उ.ना.	७३०५.०३ (९४.६९)	५९०१.०६ (९६.३५)	१३४८.५७ (९१.६५)	३३८.१३ (१९.९१)	२.४९ (०.१४)	२६४.२६ (१३.३७)
	एकूण	-	७७१३.८८ (१००)	६१२४.२३ (१००)	१४७१.४३ (१००)	१६९८.०७ (१००)	१७०४.७२ (१००)	१९७५.४० (१००)

स्त्रोत : बीड जिल्हा मृद संधारण कामावरील खर्चाचा अहवाल सन १९९१-९२-२०१०-११
टीप : १) कंसातील आकडे ऐकोणाशी टक्केवारी दर्शवितात. २) उ.ना.=उपलब्ध नाही.

तक्ता क्र. २ मध्ये बीड जिल्ह्यातील पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेल्या खर्चाचा तपशील दर्शविलेला असुन त्यामध्ये राज्यपुरस्कृत योजना, केंद्र पुरस्कृत योजना व जिल्हास्तर योजना याची २००१-०२ ते २०१०-११ या कालावधीमध्ये केलेल्या खर्चाची माहिती दर्शविलेली आहे.


बीड जिल्ह्यात पाणलोट क्षेत्र विकासाच्या विविध योजनेवर झालेल्या खर्च
(२००१-०२ ते २०१०-११)
राज्य पुरस्कृत योजना
केंद्र पुरस्कृत योजना
जिल्हास्तर योजना
वर्ष
२००३-२००४
२००४-२००५
२००६-२००७
२००७-२००८
२००८-२००९
२०१०-२०११
0
१०००
२०००
३०००
४०००
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६०००
७०००

तक्त्यात दर्शविल्याप्रमाणे सन २००१-०२ या वर्षी जिल्ह्यात सर्व योजनेवर केलेला एकुण खर्च ३३८३.२० लाख रुपये आहे. सन २००३-०४ या कालावधीमध्ये बीड जिल्ह्यात पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेला एकूण खर्च ७७१३.८९ लाख रुपये आहे. त्यामध्ये सर्वात जास्त जिल्हास्तर योजनावर ७३०५.०३ लाख रुपये (९४.६९) टक्के एवढा आहे. सर्वात कमी राज्यपुरस्कृत योजना यावर १२.४४ लाख रुपये (०.१६) टक्के व केंद्रपुरस्कृत योजना यावर ३९६.४१ लाख रुपये (५.१३) टकके एवढा झाल्याचे दिसून येते.

तक्ता क्र.२ मध्ये दर्शविल्या प्रमाणे सन २००४-२००५ या वर्षात बीड जिल्ह्यात पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेला एकूण खर्च ६१२४.२३ लाख रुपये आहे. त्यामध्ये सर्वात जास्त जिल्हास्तर योजना ५९०१.०६ लाख रुपये (९६.३५) टक्के तर सर्वात कमी राज्य पुरस्कृत योजना ३३.४८ लाख रुपये (०.५४) टक्के एवढा आहे व केंद्र पुरस्कृत योजना १८९.७ लाख रुपये (३.०९) टक्के एवढा झाल्याचे दिसून येते.

सन २००६-०७ या वर्षात बीड जिल्ह्यात पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेला एकूण खर्च १४७१.४३ लाख रुपये यामध्ये सर्वात जास्त जिल्हा स्तर योजना १३४८.५७ लाख रुपये (९१.६५) टक्के तर सर्वात कमी केंद्रपुरस्कृत योजना ४७.५७ लाख रुपये (३.२३) टक्के एवढा आहे. तर राज्य पुरस्कृत योजना ७५.२९ लाख रुपये (५.११) टक्के एवढा झाल्याचे आढळून येते. सन २००७-०८ या वर्षात बीड जिल्ह्यातील पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेला एकूण खर्च १६९८.०७ लाख रुपये एवढा आहे. त्यामध्ये सर्वात जास्त राज्य पुरस्कृत योजना १२३६.६५ लाख रुपये (७२.८०) टक्के एवढा आहे. तर सर्वांत कमी केंद्रपुरस्कृत योजना १२३.२९ लाख रुपये (७.२६) टक्के एवढा आहे व जिल्हा स्तर योजना ३३८.१३ लाख रुपय (१९.९१) टक्के एवढा झाल्याचे दिसून येते.

सन २००८-२००९ या वर्षात बीड जिल्ह्यातील पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेल्या एकूण खर्च १७०४.७२ लाख रुपये एवढा आहे. त्यामध्ये सर्वात जास्त राज्य पुरस्कृत योजना ९३०.९५ लाख रुपये (५४.६१) टक्के एवढा आहे. तर सर्वात कमी जिल्हास्तर योजना २.४९ लाख रुपये (०.१४) टक्के एवढा आहे. तर केंद्र पुरस्कृत योजना ७७१.२८ लाख रुपये (४५.२४) टक्के एवढा झाल्याचे दिसून येते. तसेच तक्त्यामध्ये दर्शविल्याप्रमाणे सन २०१०-११ या वर्षात बीड जिल्ह्यातील पाणलोट क्षेत्र विकासाच्या विविध योजनावर झालेला एकूण खर्च १९७५.४० लाख रुपये एवढा आहे. त्यामध्ये सर्वात जास्त राज्य पुरस्कृत योजना ९८३.०५ लाख रुपये (४९.७६) टक्के एवढा आहे. तर

सर्वात कमी जिल्हास्तर योजना २६४.२६ लाख रुपये (१३.३७) टक्के एवढा आहे. तर केंद्र पुरस्कृत योजना ७२८.०९ लाख रुपये (३६.८५) टक्के एवढा झाल्याचे दिसून येते.

तक्ता क्र. २ वरून असे दिसून येते की, पाणलोट क्षेत्र विकास कामांवर सन २००३-०४, २००४-०५ व २००६-०७ या वर्षात सर्वात अधिक खर्च जिल्हास्तर योजनावर अनुक्रमे ९४.६९ टक्के, ९६.३५ टक्के, ९१.६५ टक्के झालेला आहे. केंद्र व राज्य पुरस्कर योजनेत या कालावधीत केलेल्या खर्चाचे प्रमाण कमी दिसून येते. १९९१-२००८ ते २०१०-२०११ या काळात राज्यापुरस्कृत योजनेत केलेल्या खर्चाचे प्रमाणे वाढले असून ते एकूण खर्चाच्या अनुक्रमे ७२.८०, ५४.६१ व ४९.७६% दिसून येते. २००३-०४ ते २००७-०८ या काळात तुलनात्मक खर्चाच्या टक्केवारीचा विचार केल्यास सर्वात कमी खर्च केंद्र पुरस्कृत योजनेचा ३.२३% एवढा दिसून येतो.

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Cosmos Multidisciplinary Research E-Journal

Recognized International Indexed & Peer Reviewed Journal

ISSN 2456-1665

IMPACT FACTOR 5.3

VOLUME VIII | ISSUE III | MARCH 2023

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Cosmos Multidisciplinary Research E-Journal

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IMPACT FACTOR 5.3

VOLUME VIII | ISSUE III | March 2023

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Cosmos Multidisciplinary Research E-Journal
Online Available at www.cmrj.in
Recognized International Peer Review Journal
IMPACT FACTOR 5.3
ISSN No. 2456-1665

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Impact Factor 5.3
ISSN No. 2456-1665

बीड जिल्ह्यातील हवामान: एक भौगोलिक अभ्यास

प्रा. डॉ. राजपंगे एम.जी.
विभागप्रमुख, भूगोल विभाग,
आनंदराव धोंडे महाविद्यालय, कडा
ता. आष्टी, जि. बीड

प्रस्तावना:

हवामान ही भौगोलिक संकल्पना पृथ्वीच्या पृष्ठभागाजवळील वातावरणाच्या सरासरी स्थितीचे विशेष वितरण दर्शवते. तापमान, आर्द्रता, हवेचा दाब, पर्जन्य, वाऱ्याची दिशा व वेग, सुर्यप्रकाश इत्यादी घटकाचा हवामानात समावेश होतो. कोणत्याही ठिकाणी दैनंदिन हवेचे अनेक वर्षे सतत निरीक्षण करुन वातावरणाच्या दीर्घकालीन परिस्थितीत जी सरासरी काढलेली असते ती सरासरी म्हणजे हवामान होय. एखाद्या ठिकाणी तापमान आणि पर्जन्य आणि पर्जन्य दीर्घ काळासाठी जास्त आढळल्यास तेथील हवामान उष्ण व दमट आहे, असे म्हणतात. एखाद्या ठिकाणचे हवामान निश्चित करण्यासाठी तेथे साधारणपणे ३० ते ३५ वर्षे हवेचे सतत निरीक्षण केलेले असणे आवश्यक आहे. हवेच्या तुलनेत हवामान हे अधिक स्थायी स्वरुपाचे असते.

पृथ्वीवर सर्व ठिकाणी एका प्रकारचे हवामान आढळत नाही. त्यातील फरकांवरून वेगवेगळे प्रकार मानले जातात. काही ठिकाणी हवामान उष्ण व दमट असते तर काही ठिकाणी हवामान उष्ण व कोरडे असते. हवामानावर अक्षांश, समुद्रसपाटीपासून उंची, भूमी व पाणी यांचे वितरण, प्रचलित वारे, समुद्रप्रवाह आदी घटकांचा प्रभाव पाडतो.

बीड जिल्ह्यातील हवामानाच्या घटकांचा अभ्यास:

बीड जिल्ह्यातील हवामानाच्या घटकांचा अभ्यास पुढीलप्रमाण करण्यात आला आहे.

तापमान:

कोणत्याही प्रकारच्या पिकासाठी विशिष्ट तापमानाची आवश्यकता असते. किंबहुना प्रत्येक पिकासाठी असे विशिष्ट किमान तापमान आवश्यक असते. त्यापेक्षा कमी तापमान असल्यास पिकाची वाढ होऊच शकत नाही. सर्व रासायनिक व भौतिक प्रक्रिया चालु ठेवण्याचे कार्य तापमान करते. बीड जिल्ह्याचे स्थान उष्णकटीबंधीय प्रदेशातील अवर्षण ग्रस्त क्षेत्रात आहे. त्यामुळे अभ्यासक्षेत्रात तापमान जास्त आहे.

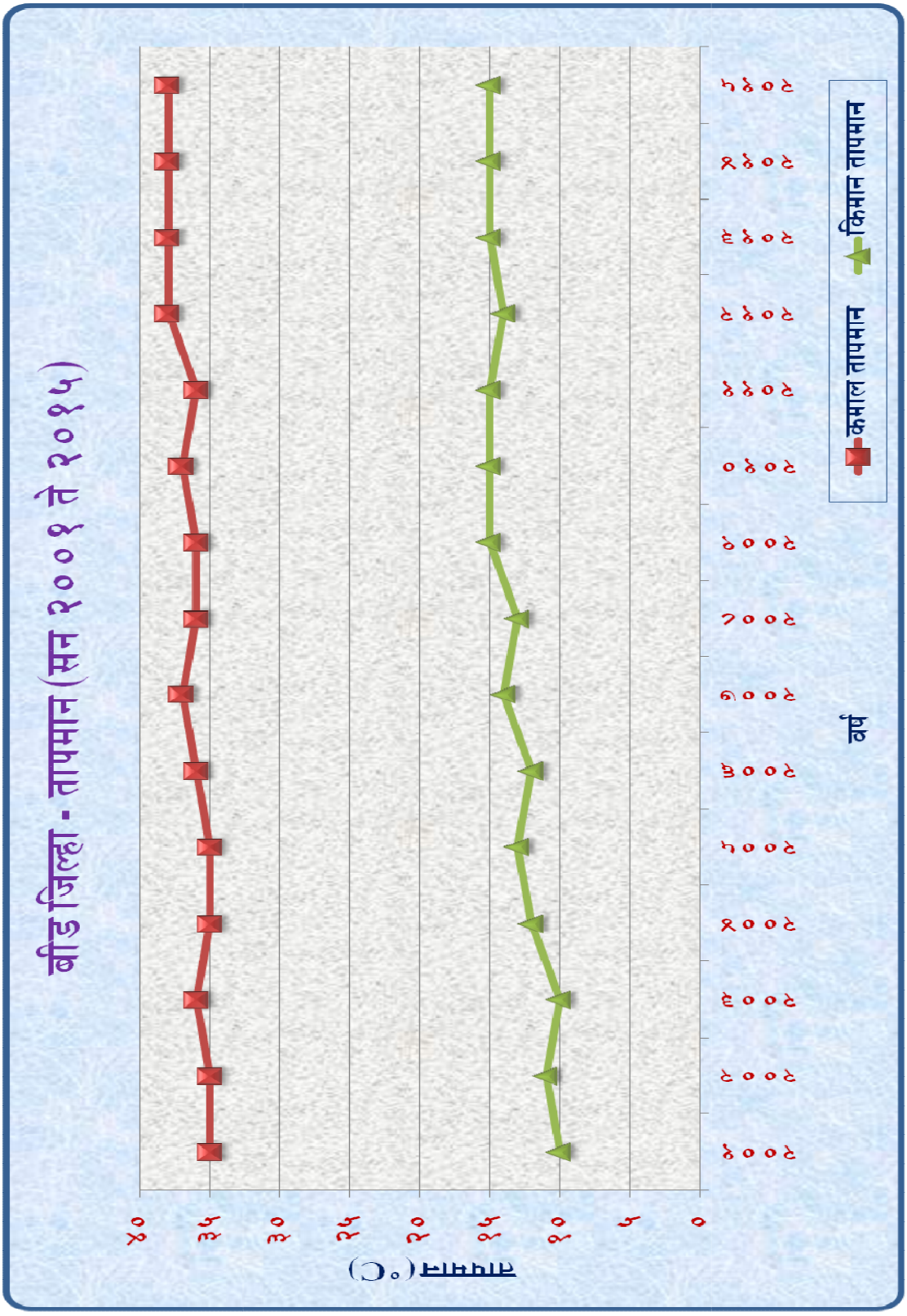
तक्ता क्र. १ मध्ये बीड जिल्ह्याच्या तापमानाची सन २००१ ते २०१५ पर्यंतची आकडेवारी जमा करुन दर्शविण्यात आली आहे.

तक्ता क्र. १

बीड जिल्हा - तापमान (सन २००१ ते २०१५)

वर्ष	कमाल तापमान (°C)	किमान तापमान (°C)
२००१	३५	१०
२००२	३५	११
२००३	३६	१०
२००४	३५	१२
२००५	३५	१३
२००६	३६	१२
२००७	३७	१४
२००८	३६	१३
२००९	३६	१५
२०१०	३७	१५
२०११	३६	१५
२०१२	३८	१४
२०१३	३८	१५
२०१४	३८	१५
२०१५	३८	१५

स्त्रोत: जिल्हा आर्थिक व सामाजिक समालोचन, बीड जिल्हा (२००१ ते २०१५)


बीड जिल्हा - तापमान (सन २००१ ते २०१५)
किमान तापमान
कमाल तापमान
वर्ष
तापमान (°C)
०
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१०
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२०१४
२०१५

तक्ता क्र. १ मधील तापमानाच्या आकडेवारीवरून असे लक्षात येते की, बीड जिल्ह्याच्या सरासरी तापमानात सातत्याने वाढ होत आहे. सन २००१ मध्ये जिल्ह्यामध्ये सरासरी ३५ डिग्री से. तापमान होते ते २०१५ पर्यंत ३८ डिग्री से. तापमानापर्यंत वाढलेले दिसते. वनांचे प्रमाण हे तापमानावर नियंत्रण ठेवण्यासाठी महत्वाची भूमिका बजावते परंतु बीड जिल्ह्याच्या विचार करता जिल्ह्यात वनांचे प्रमाण क़मी आहे. त्यामुळे जिल्ह्यात तापमान वाढतच आहे.

३) पर्जन्य / पाऊस:

पावसाची निर्मिती होण्यासाठी बाष्पुयुक्त हवा पुरेशी थंड होणे आवश्यक असते. बाष्पयुक्त हवा पुरेशी थंड झाल्यावर तिची बाष्पधारणशक्ती कमी होऊन तिच्यातील बाष्पामुळे ती संपृक्त होते. बाष्पसंपृक्त हवेचे तापमान आणखी कमी झाल्यास संपृक्ततेस आवश्यक असलेल्या बाष्पाचे सांद्रीभवन होते. या क्रियेत हवेतील बाष्पाचे सुक्ष्म जलकण साधारणपणे ०.५ मि.मी. व्यासाचे एकुण ते वातावरणात ढग किंवा धुके या स्वरुपात तरंगत असतात. तरंगत असणारे हे जलकण एकत्र होऊन त्यांचे रुपांतर पाण्याच्या थेंबात होते. त्याचा व्यास वाढला म्हणजे ०.५ मिमी. व्यासापेक्षा अधिक झाला तर ते वातावरणात राहू शकत नाहीत. ते शेवटी पावसाच्या रुपाने भुपृष्ठावर पडतात. अशा प्रकारे पावसाची निर्मिती होते.

अभ्यासक्षेत्रातील जवळपास ८०% पर्जन्य हे दक्षिण-पश्चिम मान्सुन वाऱ्यापासून मिळते. जूलै हा येथील सर्वात जास्त पाऊस असणारा महिना असतो. स्थानिक अर्थव्यवस्था ही कृषी आधारित असल्याने दक्षिण-पश्चिम मान्सुन वाऱ्यापासून मिळणारा पाऊस महत्वाचा ठरतो. पाऊसाचे प्रमाणावरच सामान्य व कृषी भूमीउपयोग अवलंबून असते.

बीड जिल्ह्याचे पर्जन्याचे वितरण व प्रमाणाचा अभ्यास करण्यासाठी संशोधकाने २००१ ते २०१५ या काळातील पर्जन्याचा अभ्यास केला आहे. उपलब्ध आकडेवारीवर सांख्यिकीय प्रक्रिया करुन आलेले निष्कर्ष हे तक्ता क्र. २ मध्ये दर्शविण्यात आले आहे.

तक्ता क्र. २
बीड जिल्हा - सरासरी पर्जन्य व पर्जन्याचा सहसंबंध गुणांक
(सन २००१ ते २०१५)

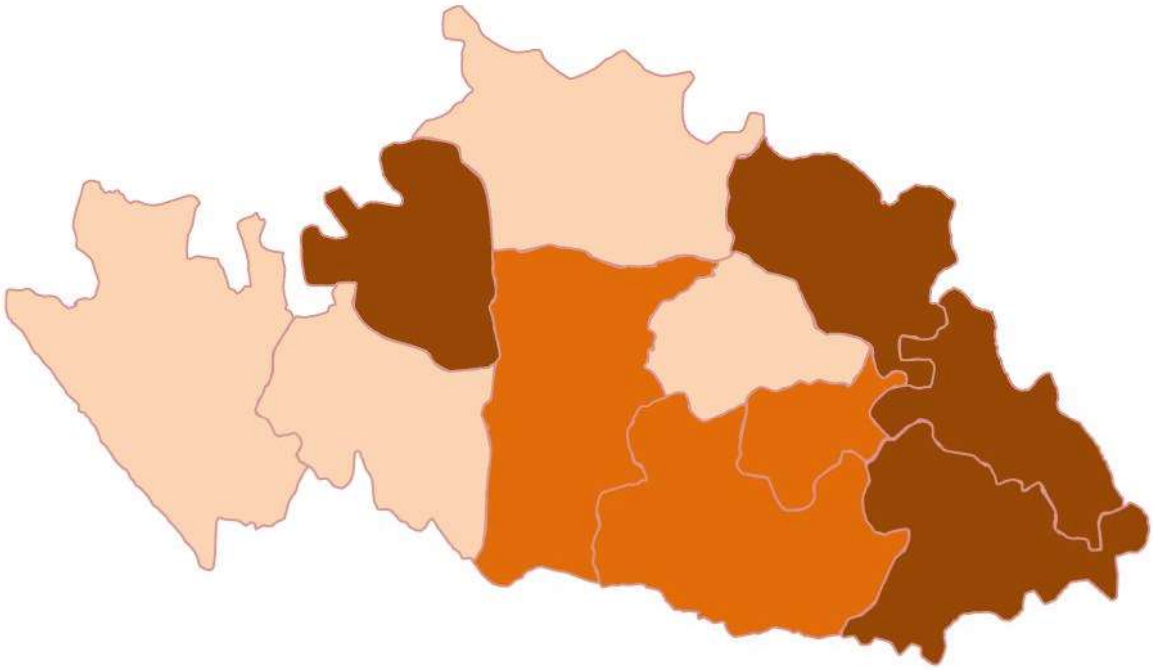
अ. क्र.	तालुका	सरासरी वार्षिक पर्जन्य (मिमि मध्ये)	सहसंबंध गुणांक (टक्केवारीत)
१	आष्टी	६९६	५९.४३
२	पाटोदा	७०४	५९.२२
३	शिरुर (का)	६७५	६९.००
४	गेवराई	६५६	६०.१३
५	माजलगांव	७०१	६९.७५
६	वडवणी	६४८	६१.५४
७	बीड	७१०	६३.३०
८	केज	६८९	६५.९३
९	धारुर	६८५	६३.५३
१०	परळी	७०२	६८.४७
११	अंबाजोगाई	६९०	७१.२८

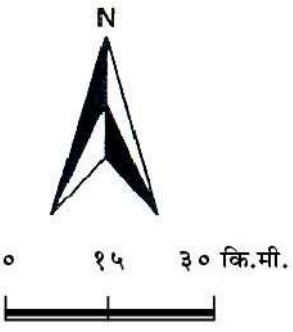
स्त्रोत: संशोधकाव्दारा पूर्ण

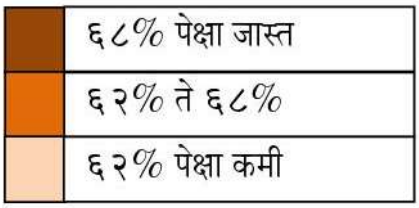
बीड जिल्ह्यातील सरासरी वार्षिक पर्जन्य हे ६४८ ते ७१० मि.मि. दरम्यान आढळून येते. यातील सर्वात जास्त पर्जन्य बीड तालुक्यात आढळून येते (७१० मि.मि) तर सर्वात कमी पर्जन्य ६४८ मि.मि हे वडवणी तालुक्यात दिसून येते. ७०० मिमि पेक्षा जास्त सरासरी वार्षिक पर्जन्य हे बीड, परळी, माजलगाव व बीड तालुक्यात आढळून येते तर ६८० ते ७०० मि.मि. सरासरी वार्षिक पर्जन्य हे आष्टी, अंबाजोगाई, केज व धारुर तालुक्यात आढळून येते. ६८० मि.मि. पेक्षा कमी सरासरी वार्षिक पर्जन्य हे शिरुर, वडवणी व ग़ेवराई तालुक्यात आढळून येते.

बीड जिल्हा

पर्जन्य सहसंबंध गुणांक (२००१ ते २०१५)







नकाशा क्र. १

पर्जन्याचा सहसंबंध गुणांक हा ५९.२२% ते ७१.२८% इतक्या दरम्यान आढळून येते. सर्वात जास्त पर्जन्याचा सहसंबंध गुणांक हा अंबाजोगाई तालुक्यात (७१.२८%) तर सर्वात कमी पर्जन्याचा सहसंबंध गुणांक हा पाटोदा तालुक्यात (५९.२२%) इतका आहे. ६८% पेक्षा जास्त पर्जन्याचा सहसंबंध गुणांक हा अंबाज़ोगाई, शिरुर, माजलगाव व परळी येथे आढळून आले आहे याशिवाय ६२% ते ६८% पर्जन्य सहसंबंध गुणांक हा क़ेज, धारुर व बीड येथे आढळून आले आहे. ६२% पेक्षा कमी पर्जन्य सहबंध गुणांक हा वडवणी, गेवराई, आष्टी व पाटोदा येथे आढळून आले आहे.

हवामानाची इतर अंगे

बाष्प हा वातावरणाचा एक महत्वाचा घटक आहे. यावर हवेची आर्द्रता अवलंबून असते. वाफेचे प्रमाण जितके जास्त असेल त्याप्रमाणे हवेची आर्द्रता जास्त असते. आर्द्रतेचे प्रमाण तापमानावर अवलंबून असते. कारण तापमान वाढल्यास हवेची बाष्पग्रहणशक्ती वाढते. सापेक्ष आर्द्रता जितकी जास्त तितकी हवा अधिक दमट असते. दक्षिण पश्चिम मान्सुनचा कालावधी वगळता ज्यात सापेक्ष आर्द्रता ही सर्वात जास्त असते इतर वेळेस आर्द्रता ही सामान्य असते व हवा ही सामान्य असते. उन्हाळ्यात हवा ही कोरड्या स्वरुपाची असते ज्यावेळेस दुपारनंतर २०% ते २५% सापेक्षा आर्द्रता आढळून येते. दक्षिण पश्चिम पर्जन्याच्या कालावधीत ढगाळ वातावरण दिसून येतात. हा कालावधी सोडून वर्षभर आकाश हे निरभ्र असते. उन्हाळ्याच्या कालावधीत वारे हे मे व जूनच्या पहिल्या आठवड्यात वाऱ्यांची गती वाढते. उन्हाळ्यात वारे हे सर्वसाधारणपणे पश्चिम व उत्तर दिशेने वाहतात. उन्हाळा वगळता या वाऱ्यांची स्थिती दक्षिण-पश्चिम व उत्तर-पश्चिम अशी असते. वर्षाच्या इतर कालावधीत हे वारे उत्तर-पूर्व व दक्षिण-पूर्व यामध्ये वाहतात. कधी-कधी एप्रिल ते जून व सप्टेंबर-ऑक्टोबर मध्ये वादळे / धुळीची वादळे येतात.

संदर्भः

१) बीड जिल्हा - सामाजिक व आर्थिक समालोचन, १९९१, २००१, २०१५.
२) बीड जिल्हा - गॅझेटिअर, महाराष्ट्र शासन, मुंबई
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४) डॉ. व्ही. टी. घारपुरे (२००४): लोकसंख्या भूगोल पिंपळापुरे प्रकाशन, नागपूर
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६) प्रा. डॉ. जगदिश सिंह (२००१): संसाधन भूगोल, राधा पब्लिकेशन, नवी दिल्ली.

UGC-CARE LISTED

ISSN: 0974 - 8946

अनुसन्धान-प्रकाशन-विभागीया त्रैमासिकी शोध-पत्रिका

शोध-प्रभा

(A Refereed & Peer-Reviewed Quarterly Research Journal)

Year 48, Issue-2 (January-March) 2023

श्रीलालबहादुरशास्त्रीराष्ट्रियसंस्कृतविश्वविद्यालयः
(केन्द्रीयविश्वविद्यालयः)
नवदेहली-16

ROLE OF ARTIFICIAL INTELLIGENCE IN LANGUAGE TEACHING

Dr. Kuchekar Shailaja Baburao, Assistant Professor Department of English Anandrao Dhonde Alias Babaji Mahavidyalaya, Kada
Suhas Pandurang Shinde, Assistant Professor Shri Jain Vidya Prasarak Mandal's College of Education, Chinchwad, Pune

Today's is the technology based world. Technology has entered in every field. No person is unaware of the technology. It has accupied every part of human life. Technology has made human life much easier.

Since the birth of a chield technology is needed. Education is one of the fields where technology is used to enhance the process of educating learners. Coming generations are so advanced that they can't be able to learn things wirh traditional methods. They grasp things so fast that traditional methods become insufficient for them. It has become so necessary to provide new learning methods to the advanced learners. Technology based methods are being involved in the education nowadays.

Artificial Intelligence is one of the innovative products of advanced technology. Before turning towards its role in education it's important to know what is Artificial Intelligence. According to Oxford Dictionary Artificial Intelligence is "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages."

Wikipedia says, "Artificial Intelligence is intelligence—perceiving, synthesizing and inferring information—demonstrated by machines, as opposed to intelligence displayed by non-human animals and humans."

Burns Nicole Laskowski defines Artificial Intelligence as "the simulation of human intelligence processes by machines, especially computer systems. Specific applications of Artificial Intelligence include expert systems, natural language processing, speech recognition and machine vision. (Ed Burns Nicole Laskowski, Senior News DirectorLinda Tucci, Industry Editor -- CIO/IT Strategy 09 Feb 2023)

In simple words Artificial Intelligence is making machines perform in speech recongnision, decision making, language processing, etc. using human intelligence. Machines like computers are used to make things easier in various fields. Using Artificial Intelligence human beings are achieving remarkable success. Use of Artificial Intelligence has become boon for humans.

Education is the field which deals with the next generation. Children's performance is amazing in grasping things, understanding new concepts and participating in the process of learning. Human efforts are being insufficient for the overall performance of the learners. So new methods of teaching and learning are entering in this area. Teacher's are using innovative teaching aids, Government is forming new policies in education. Still there is missing something and learners are getting incomplete knowledge due to insufficient tools of teaching and learning process.

Use of technology in education has fulfilled the need of learners. Various technical devices are being used in this area. Broadened horisons are made available for the learners. Technology makes learning easier, entertaining and enjoyable. Artificial Intelligence helps learners involve and participate in the teaching-learning process. Learners can learn with experience and understand new concepts. This will help enhance their imagination and creativity.

Virtual Reality is one of the examples of Artificial Intelligence. It is three-dimensional computer-generated environments that can help learners have experimental learning. They can have experience that they have never find in their real life. They can explore new dimentions with this opportunity. Learners can learn at their own speed. The topics can be repeated or difficult topics can be emphasized. They can spend more time with the topics they like.

Language translators translate large texts into other languages. While translating from one language to the other learners can comprehend the sentence composition and vocabulary of the target language.

Language bots are used to learn new languages by talking to a chatbot. The learner has to speak with a bot. He learns with experience. Learning with experience is a smarter way of learning.

ChatGPT is one of the Artificial Intelligence softwares which has conversational format. It gives all the information about the topic you want to know from it in a dialogue format. Though it is the third virsion, it is in initial satge right now. But can generate text format like email, biodata, poem, etc. in few seconds.

After using tools of Artificial Intelligence like Alexa dialogue system, robots, self-driving cars, language translators, drones, ChatGPT is the latest Artificial Intelligence tool. It has launched in November 2022 but has accupied various fields. It is being used by people with great excitement.

This tools of Atrificial Intelligence has changed human life. It has made life easier. The tools are being used at large. Students can perpare projects and homeworks with the help of Artificial Intelligence tools. Teaching and learning process has become enjoybale with the inclusion of these tools.

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UGC-CARE LISTED

ISSN: 0974 - 8946

अनुसन्धान-प्रकाशन-विभागीया त्रैमासिकी शोध-पत्रिका

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नवदेहली-16

शोध-प्रभा
ISSN: 0974-8946

ARTIFICIAL INTELLIGENCE IN EDUCATION

Dr. Sajjan D. Gaikwad, Anandrao Dhonde Alias Babaji Mahavidyalaya, Kada Tq. Ashti, Dist. Beed

ABSTRACT

`Human life changes with the changing world. Education is important element in successful human life. Artificial Intelligence is the simulation of human intelligence processes by machines, especially computer systems. AI in education has given a completely new perspective of looking at education to teachers, students, parents, and of course, the educational institutions too. Methodology of AI system- working capacity- its benefits and perils. With AI, it is possible to generate smart content in three ways- Digital Lessons, Information Visualization and Learning content updates. AI not only plan students' lessons and personalizes their learning courses but also recommends improvements in teacher plans. Benefits of AI- 1. Better Engagement, 2.Universal Assess 3. Less pressure, Future of AI in education is bright. It can stamp on Performance personalization; avoid Violation Bias and Combine Assistance in different sectors. To implement successfully AI in education one should keep in mind the certain things about data selection, students group and their interests, data analysis, data categorizations and visualizations, control over content and your reactions positive as well as negative must be mentioned.

Key words- Artificial intelligence, simulation, Digital Lessons, Information Visualization, personalization, ICT

Education is a vital part of human life, and a good education plays important role to have a successful life. Each era educational goes some certain changes. Artificial Intelligence in Education is developing new solutions for teaching and learning for different situations today. Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Nowadays, AI is being used by different schools and colleges in all over the world. Educational leaders, thinking of efficiency growth, may find that artificial intelligence (AI) could provide a personalized approach, and happier students, thus gaining more traction and better results. The pandemic proved that idea correct and brought AI in education as well as in many other fields to bloom.

AI in education has given a completely new perspective of looking at education to teachers, students, parents, and of course, the educational institutions too. AI in education is not just enhancing the teachers' jobs but also revolutionizing the way students learn. AI in education is not about humanoid robots as a teacher to replace human teachers, but it is about using computer intelligence to help teachers and students and making the education system much better and effective. In future, the education system will have lots of AI tools that will shape the educational experience. Artificial Intelligence AI is a simulation of human intelligence into a computer machine so that it can think and act likes a human. It is a technology that helps a computer machine to think like a human. Artificial Intelligence aims to mimic human behavior. AI has various uses and applications in different sectors, including education. In the education system, there are various academic activities which take lots of time of teachers such as grading, tests and home-works etc. These tasks require lots of time and effort, while this time could be used in interacting with students, letting them know their errors, teaching new things, and many more by using AI technology. AI is giving students more attention than teachers can provide. AI can adapt to each student's level of knowledge, preferred style of learning, speed of learning, and desired goals, so they're getting the most out of their education.

Artificial Intelligence can be used to save time. With AI tools, it is possible to automate the grading system for nearly all types of MCQ and fill-in-the-blank, and they are very close to being able to grade descriptive responses. However, AI is still not possible to truly replace human grading, but it's getting improving day by day. By using AI, teachers will get more time to fill the gap in their classroom rather than investing their time in tedious tasks. As it is obvious that teachers can't be present with students all the time while they study, as teachers in colleges have fixed timings. But each student is not smart enough to grasp all the things at once, and they need additional supports from someone to help them in the understanding study material. Additional support can be provided by the AI tutors. There are various AI-driven tutoring programs that can help students in learning the basics of mathematics, writing, and other subjects. With the help of AI programs, students can learn fundamentals. They are unable to learn high-level concepts of any subject. In order to learn such complex concepts, students still require teachers. However, in future, it is possible that AI might teach students with complex problems that requires analytical thinking and reasoning. AI is not only helping the students to learn the customized course as per their requirements, but it can also give feedback to both the teachers and students about the success level of the course.

AI not only plan students' lessons and personalizes their learning courses but also recommends improvements in teacher plans. Through this, teachers can expand their view on their subject using the best material from other tutors without additional efforts. In addition, each educator can also contribute with their best materials and provide unique expert knowledge to the network to help students for understanding the subject. These type of AI-driven systems enables the student to get the proper support, and professors can determine the areas of teaching where it requires improvement. Instant feedback to students helps understand where they are going wrong and how they can do it better. In the education system, it is very hard to find out the gaps in learning. Teachers have limited time to teach in the classroom, and they may not always know where the students are lacking and what concepts have confused the student. Artificial intelligence can assist the teacher's work in a classroom to identify some weaknesses or gaps. For example, artificial intelligence can detect when some students miss specific questions or topics. The teachers will be notified; thus, they will know which of their students need explanations and the subject of such explanations and can give them in a more personalized manner. AI analyze a big topic into smaller parts make study guides within the framework of digital learning.

A large number of students are found to submit the wrong answer to a homework assignment the system alerts the teacher and provides future students a costumed message that provides hint to right answer. Such type of programs helps in filling the gaps while learning that can occur in courses, and also ensures that each student understands the concepts successfully. With AI, instead of waiting for feedback from the professor, students get an immediate system generated response, which helps them to understand a concept and remember their mistakes, and also how to do it correctly the next time around. AI could change the role of the teacher as a facilitator. The main aim of Artificial Intelligence in education is not to completely replace teachers. Instead, it aims to act as helping hands for teachers as well as students.

As AI is developing day-by-day, it is possible that machines can identify the facial expressions of students while learning the concepts can understand if they are finding any difficulty in learning, and according to that make changes in the way of teaching. However, currently, such things are not possible, but they might be possible in the near future with AI-Powered machines and software we hope. With AI, it is possible to generate smart content in three ways- Digital Lessons, Information Visualization and Learning content updates.

Universal Assess:

One of the great benefits of Artificial Intelligence of digital learning in education is its universal access to study material. We know each student has his own grasping capability, and with

the use of universal access, they can learn anywhere and anytime. Students can explore things whenever they wish to learn without waiting for the tutor or mentor. Moreover, students get the facility of high-quality courses and material from all over the world at their place only without travelling away.

Better Engagement:

With personalized learning, custom tasks, and digital visualization, the study becomes more interactive and engaging. Personalized learning and great experience with AI-driven programs make students feel much confident and smarter as they can explore many things apart from their syllabus without any hesitation or fear. All these things and new AI technologies are increasing the interest of students in studies because of this benefit.

Less Pressure:

With AI-driven programs and personalized learning, students feel less pressure of studies. AI-enabled virtual assistants help the students whenever they ask a question, with a complete explanation. In the traditional learning methods, a student needs to ask queries in class in front of everyone, which hesitate some students, and these issues can be resolved with this assistance. However, all the questions can't be correctly answered by these virtual assistants. But for basic queries, they can be much helpful that can boost the confidence of each learner and reduce the pressure.

Future of AI in Education: In the near future, AI in education will step in three main ways, which are:

Performance personalization:

With day-by-day development in AI technology and computing power, it will be possible to create personalized curricula through collecting and generalizing the information. Various new AI solutions such as "Bright space insights" helps the instructor to track, measure, and monitor the progress of learners, and also help them in this learning journey. It provides a complete picture of the learning journey of a learner across the platform.

Violation Bias: Human bias has always remained a hindrance in the education system and also an issue in AI tools. In future, AI in education will find new solutions that can evaluate work and tests exams using established criteria in order to eliminate bias.

Combined Assistance: Professors/teachers in colleges usually have masters in their field and have a degree in specific areas of development. But the administrative work is often a frustrating attempt at rapprochement with students. AI in education can solve this problem in the future with smart classrooms with AI assistance which can provide necessary help to the teachers to give their best.

Perils:

The promise of AI applications lies partly in their efficiency and partly in their efficacy. AI systems can capture a much wider array of data, at more granularity, than can humans. And these systems can do so in real time. They can also analyze many students. These efficiencies will lead, we hope, to increased efficacy—to more effective teaching, learning, institutional decisions, and guidance. Given these possible benefits, the use of artificial intelligence is also being framed as a potential boom to equality. With the improved efficacy of systems that may or may not require as much assistance from humans or necessitate that students be in the same geographical location, more students will gain access to better-quality educational opportunities. Lastly is the promise of a more macro level use of artificial intelligence in education to make gains in pedagogy, to see what is most effective for a particular student and for learning in general.

The use of artificial intelligence in education involves perils. One is the peril of *adverse outcomes*. Despite the intention of the people who develop and use these systems, there will be unintended consequences that are negative or that can even backfire. AI system that was based on different Generations, students may not have the same efficacy for native digital learners. Another

data aspect concerns comprehensiveness. Does the data include information about a variety of students?

Next to consider are the models that are created using this data. Again we face the issue of accuracy. Models are based on correlation. Some correlations do seem to make intuitive sense. Algorithmic bias plays a role here. This is a real concern because it is something that can occur in the absence of discriminatory intent and even despite efforts to not have different impacts for different groups. An additional, often overlooked factor in adverse outcomes is output. Developers' decisions shape how the insights that AI systems offer are instructed and interpreted. Some provide detailed information on various elements of students' learning or behavior that instructors and administrators can act on. Other observations are not as useful in informing interventions. For example, one predictive analytics tool estimated that 80 percent of the students in an organic chemistry class would not complete the semester. This was not news to the professors, who still wondered what to do. So it is important to understand in advance what you want to do with the information these tools provide.

A final factor to consider in avoiding the peril of adverse outcomes is implementation, which is also not always covered in the AI system makers. To use these systems responsibly, teachers and staff must understand not only their benefits but also their limitations. At the same time, schools need to create very clear protocols for what employees should do when algorithmic evaluations or recommendations do not align with their professional judgment. They must have clear criteria about when it is appropriate to follow or override computer insights to prevent unfair inconsistencies. Consider the use of predictive analytics to support decisions about when caseworkers should investigate child welfare complaints. They will simply dismiss the tools out of hand, especially if they are worried that machines may replace them.

A second peril in the use of artificial intelligence in higher education consists of the various *legal considerations,* mostly involving different bodies of privacy and data-protection law. Family Educational Rights and Privacy Act (FERPA), which means an institution does not have to get explicit consent from students.

To implement successfully AI in education filed one should keep in mind the
What functions does the data perform? If you are implementing the systems you want to choose data responsibly. Keep in mind whose interests do we prioritize? Take care of data analysis. Decisions come out are not just about the computer processing but also about the categorization and the visualization involve. Who controls the content is most important in AI system. You or your machinery that is important. Your tutors must involve in this process completely. What is your reaction on outcomes is important that may be positive or negative.

Conclusion:

Artificial intelligence and its uses in our lives are growing in many aspects. In the field of education, AI has started showing its influences and working as a helping tool for the students and teachers and supporting entire teaching learning process. But still, the use of AI in education is not adapted by all the institutions. It is clear that in the near future, AI will have a good impact on the education sector. It is transforming the education industry slowly but is yet to show its potential in this field. Learning from ICT and Computer systems can be much helpful, but it is unlikely to fully replacing human teaching in schools and HEI's.

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22-23

SJIF Impact Factor - 5.67

E- ISSN 2582-5429

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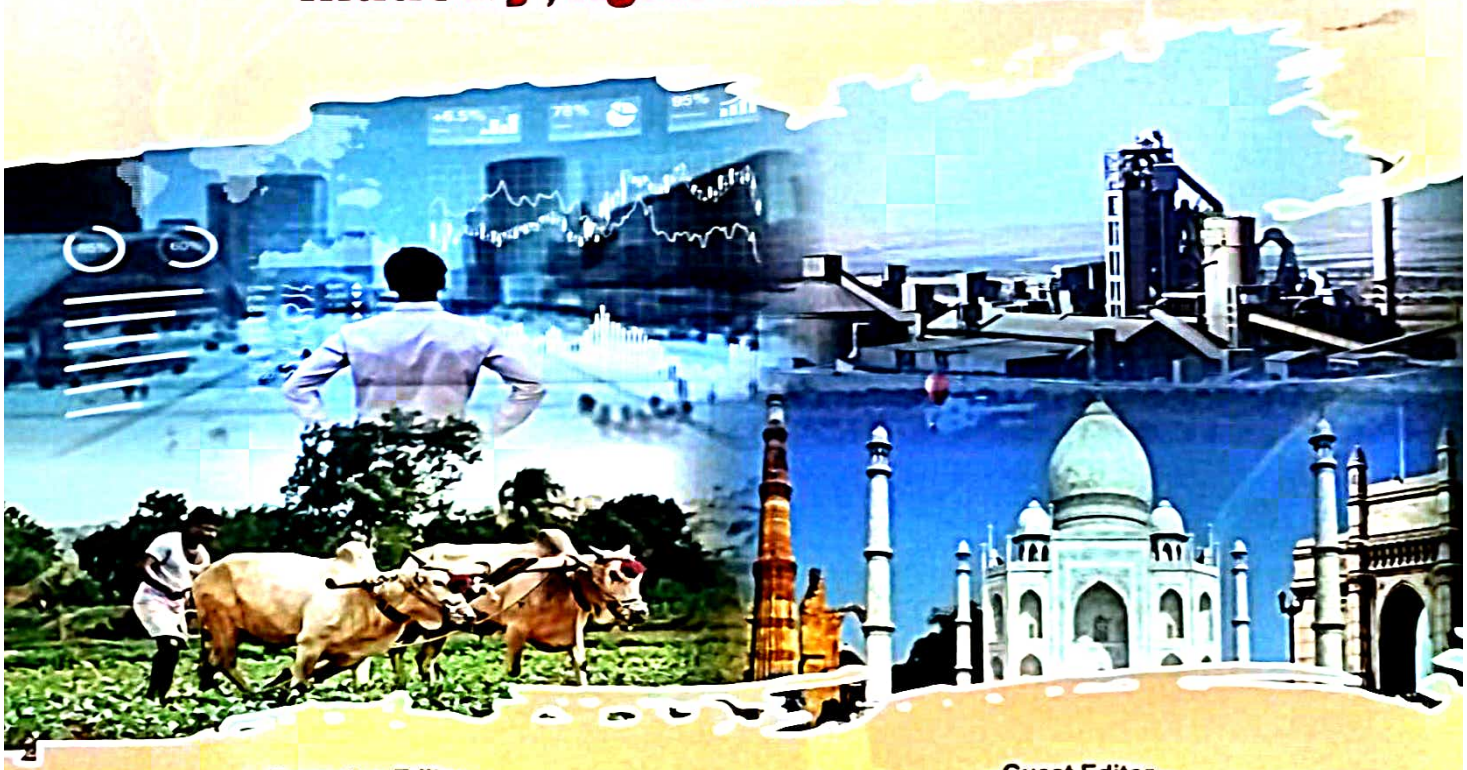

Akshara Publication

E- ISSN 2582-5429

AMRJ

Akshara Multidisciplinary Research Journal

Peer-Reviewed & Refereed International Research Journal

September 2022 Special Issue 06 Volume IV (A) SJIF Impact- 5.67

E- ISSN 2582-5429
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Peer-Reviewed & Refereed International Research Journal
September 2022 Special Issue 06 Volume IV (A) SJIF Impact- 5.67

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Rural Development Schemes in India – A Study

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Abstract
What is the role of the state in promoting sustainable rural communities? Only a few years ago any discussion of this question would have alluded to the concept of integrated rural development. Today the concept of governance is internationally used to address such questions, reflecting a recognition of the changing role of the state (at all levels) and the greater propensity for public, private and voluntary sectors to interact at multiple scales in diffused power contexts together with attempts to mobilize local actors. This article asks whether the concept, integrated rural development, still has any meaning in the context of the new rural governance and begins to link this to re-theorizations of concepts of spatial planning, place-shaping, capacity-building and neo-endogenous development, and offers illustrations from the north of Scotland. The article concludes by suggesting that initiatives such as the EU's LEADER programmed might be recast explicitly as a transnational experiment in doing 'disintegrated rural development', addressing the challenges of neo-endogenous rural development, multi-scalar governance, an enabling, generative state and the transformation of mainstream policies.

Key Words : Rural Development, road length, houses and employment etc.

Introduction

What is the role of the state in promoting sustainable rural communities – that is, the economic, social, cultural and environmental health of rural places? Only a few years ago any discussion of this would have alluded to the concept of integrated rural development (IRD), a model which emphasized coordinating at local level the various sectoral actions of the state. Changing economic functions and a diversity of rural experiences across Europe have been a catalyst for rethinking rural development at both European and national political levels. Many commentators have argued that for policies to meet diverse needs and circumstances there has to be a mobilization of local actors, supported by partnership structures and arrangements. Today the concept of governance is widely used to address such questions (for example, **Goodwin 1998; Cheshire 2006**), reflecting a recognition of the changing role of the state at all levels and the greater propensity for public, private and voluntary sectors to work together in diffused power contexts. In this article I ask whether the concept of IRD still has any meaning in the context of the new rural governance, and I begin to link this to re-theorizations of spatial planning and the emerging concept of 'place-shaping', and illustrate this with examples from the north of Scotland.

Introduction:

Rural Development in India is one of the most important factors for the growth of the Indian economy. Rural development focuses upon the development of the sections of rural economies, that experience serious poverty issues and effectively aims at developing their productivity. It also emphasizes the need to address various pressing issues of village economies that hinder growth and improve these areas. An agriculture sector is one of the most important primary activity in rural India and about two-third of India's population depends on agriculture, the problem lies in the fact that the share in GDP of agriculture sector in on a constant decline. Rural development in India has witnessed several changes over the years in its emphasis, approaches, strategies and programmes. It has assumed a new dimension and perspectives as a consequence. Rural development can be richer and more meaningful only through the participation of clienteles of development. Just as implementation is the touchstone for planning, people's participation is the centre-piece in rural development. People's participation is one of the foremost pre-requisites of development process both from procedural and philosophical perspectives. For the development planners and administrators it is important to solicit the participation of different groups of rural people, to make

E- ISSN 2582-5429
AMRJ
Akshara Multidisciplinary Research Journal
Peer-Reviewed & Refereed International Research Journal
September 2022 Special Issue 06 Volume IV (A) SJIF Impact- 5.67

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Special Issue 06 Vol. IV (A)

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ISSN 2278-9820

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Issue - XXI, Vol. - II
Year - XI (Half Yearly)
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Editorial Office :
'Gyandev-Parvati',
R-9/139/6-A-1,
Near Vishal School,
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Published by :
JYOTICHANDRA PUBLICATION
Latur, Dist. Latur - 413531 (M.S.)India

Price ₹ 200/-

Issue - XXI, Vol.- II
VRJFGG
IMPACT FACTOR 6.50
ISSN 2278-9820
Dec. 2021 To May 2022

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Issue - XXI, Vol. - II
VRJFGG
IMPACT FACTOR 6.50
ISSN 2278-9820
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मराठवाड्यातील तळी, सरोवरे व जलाशये प्रणालीला अनुसरुन मत्सेक्षेत्राचा भौगोलिक अभ्यास

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Research Paper - Geography

सारांश

नद्यानंतर जलसंपत्तीचा दुसरा भाग म्हणजे अडवलेले पाणी मानवाचे आपल्या दैनंदिन गरजेसाठी नद्याचे पाणी अडवून कृत्रीमरित्या तलाव जलाशाची निर्मिती केलेली आहे. आज संबंध जगामध्ये मानवाच्या दैनंदिन गरजाच्या पूर्ततेसाठी साठवण तलावाची निर्मिती केल्याचे दिसुन येते. या साठवण तलावाचा वापर मानवाने मत्स व्यवसायासाठी सुद्धा केलेला दिसून येतो. तलावामध्ये प्रामुख्याने दोन विभाग पडतात. एक साठवण तलाव आणि दुसरे पाझर तलाव पाझर तलावामध्ये हंगामी स्वरुपाचे पाणी आढळते तर साठवण तलावामध्ये दिर्घ कालीन पाणी अडवून ठेवल्याचे दिसून येते. पृथ्वी तलावर अस्तित्वात असलेल्या भुजलसाठ्याचे प्रमाण ४४.६ मिलीयन हेक्टर क्षेत्र हे गोड्या पाण्याचे जलक्षेत्र आहे. भारतासारख्या राष्ट्रात विशिष्ठ ऋतुत पर्जन्यवृष्ठी होते. या पावसाचे पाणी कृत्रीमरित्या अडवून मोठ्या प्रमाणात प्राचीन काळी नदी आणि समुद्रातून मत्स पालन केले जाते होते. परंतु आधुनिक काळात मोठ्या प्रमाणात तलावाची निर्मिती करण्यात आलेली आहे. प्राचीन काळी नदी आणि समुद्रातून मत्स पालन केले जात होते. परंतु आधुनिक काळात मोठ्या प्रमाणात गोड्या पाण्यातील मत्सव्यवसाय विकसित झालेला आढळून येतो.

बीजशब्द :मत्सव्यवसाय, मासेमारी, मत्सबिज, इ.

मत्सव्यवसाय अभ्यास क्षेत्र :

मत्सव्यवसाय अभ्यासासाठी मराठ्वाडा क्षेत्र निवडले आहे. मराठवाड्याचे स्थान प्राकृतिकदृष्ट्या दख्खनच्या पठारावर असून गोदावरी नदीच्या खोऱ्यात आहे.मराठवाड्याचा अक्षवृत्तीय विस्तार १७°३५' उत्तर अक्षवृत्त ते २०°४' उत्तर अक्षवृत्त व रेखावृत्तीय विस्तार ७४°४०' पूर्व रेखावृत्त ते ७८°१६' पूर्व रेखावृताच्या दरम्यान आहे.

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ISSN 2456-1665

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VOLUME VII | ISSUE VIII | AUGUST 2022

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VOLUME VII | ISSUE VIII| AUGUST 2022

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Online Available at www.cmrj.in
Recognized International Peer Reviewed Journal
Impact Factor 4.94
ISSN No. 2456-1665

बीड जिल्ह्यातील जलप्रणाली: एक भौगोलिक अध्ययन

डॉ. टेकाडे एम.एस.
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कडा, ता.आष्टी, जि.बीड

प्रस्तावना:

नद्यांचे प्रवाह म्हणजे कोणत्याही देशांच्या किंवा विभागाच्या धमन्या किंवा रक्तवाहिन्या असतात. तसेच पाणी म्हणजे जीवन असे अनेक ऋषीमुनींनी व शास्त्रज्ञांनी म्हटले आहे. नद्यांचा उपयोग जलसिंचन, औद्योगिकीकरण पिण्याच्या पाण्यासाठी, वीजनिर्मीती, वाहतूक तसेच खेडयातील लोकांचे जीवन समृद्ध करण्यासाठी होतो. बीड जिल्ह्यात गोदावरी मांजरा व सिना या मुख्य नद्या आहेत तर कुंडलिका, सिंदफणा, वाण, मिरघाटी, कांगळी, कडी, लेंडी, अमृता, बिंदूसरा, सरस्वती, गुणवती, रेना, केज, लिंबा, चौंसाळा, वांगी, होळ, चंदनसावरगांव, बोकडी, केळी, तलवार, इंचना, बाभती, येलबची इ. नद्या आहेत.

बीड जिल्ह्यातील जलप्रणाली:

१) गोदावरी जलप्रणाली :-

गोदावरी नदीचा उगम नाशिक जिल्ह्यातील त्र्यंबकेश्वर या ठिकाणी झालेला असून ती ईशान्येकडून आग्नेयकडे वाहते. या नदीचा बीड जिल्यात प्रवेश गेवराई तालुक्यातील कुरणपिंपरी या ठिकाणी होतो तर परळी तालुक्यातील वासनगांव या ठिकाणी नदी जिल्ह्याच्या बाहेर प्रवेश करते. गोदावरी बीड जिल्ह्यातील सर्वात मोठी व प्रमुख नदी आहे. ही नदी जिल्ह्याच्या उत्तर सिमेवरुन साधारणत: वायव्येकडून आग्नेयकडे वाहते. गोदावरी नदीने बीड-औरंगाबाद, बीड-जालना व बीड-परभणी या जिल्ह्याच्या सिमा निश्चीत केल्या आहेत.

गोदावरी नदी गेवराई, माजलगांव व परळी तालुक्यातून वाहते या नदीने वाहून आणलेल्या गाळाच्या संचयनामुळे नदी काठावर काही ठिकाणी १५ मी जाडीचा काळया मातीचा थर असुन या मातीच्या थराची सरसरी जाडी १० मी आहे. यामुळे या नदीकाठचा भाग सुपीक आहे. लेंडी, अमृता, सरस्वती, गुणवती व वाण या गोदावरी नदीच्या प्रमुख उपनद्या आहेत. या उपनद्यांची सर्वसाधारण दिशा वायव्य आग्नेय ईशान्य व नैऋत्य अशी आहे या उपनद्यामुळे गोदावरी जलप्रणाली जाळीदार स्वरुपाची तयार झाली असून या खोऱ्यातील लोकांचे जीवन सुखी व समृद्ध करण्यामध्ये या नदीचा वाटा मोठा आहे.

उपनद्या :

लेंडी नदी :

लेंडी नदीचा उगम गेवराई तालुक्यातील चकलंबा गावाच्या नैऋत्येला डोंगर रांगातून झाला आहे. ही नदी उगमापासून उत्तरेकडे व नंतर पूर्वेकडे वाहत पूढे ही नदी बीड जिल्ह्याच्या सीमेपासून २ किलोमीटर अंतरावरुन वाहते व नंतर ती गोदावरी नदीला मिळते.

JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

SYNTHESIS OF GOLD NANOPARTICLES: EXPLORING SUSTAINABLE APPROACHES

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Abstract: This study has been undertaken to investigate the determinants The synthesis of gold nanoparticles (AuNPs) has attracted significant attention in diverse scientific disciplines due to their unique properties and wide-ranging applications. This article provides an overview of sustainable synthesis methods for AuNPs, encompassing green synthesis, chemical synthesis, and the sol-gel method. These approaches offer precise control over nanoparticle size, shape, and surface properties while addressing environmental concerns and ensuring sustainable development. The utilization of plant extracts, microorganisms, and biomolecules as reducing and stabilizing agents in green synthesis minimizes the ecological footprint. Chemical synthesis methods employ reducing agents to control gold ion reduction, allowing for tailored nanoparticle characteristics. The sol-gel method, on the other hand, offers controlled growth and stabilization of AuNPs through hydrolysis, condensation, and gelation processes. The synthesized AuNPs find applications in medicine, electronics, catalysis, and environmental remediation. By embracing sustainable synthesis approaches, researchers are advancing nanotechnology in a greener and more harmonious manner.

IndexTerms **– Gold Nanoparticles, Green synthesis, Sol-gel method, Environmental remediation.**

I. INTRODUCTION

Gold nanoparticles (AuNPs) have gained immense attention across scientific disciplines due to their versatile properties and wide-ranging applications. Traditional methods of synthesizing AuNPs using hazardous chemicals pose environmental and health risks, necessitating the exploration of greener alternatives. Sustainable synthesis methods, including green synthesis, chemical synthesis, and the sol-gel method, have emerged as promising approaches for controlled AuNP formation while addressing environmental concerns and promoting sustainable development. The field of nanotechnology has witnessed remarkable advancements in recent years, and gold nanoparticles (AuNPs) have emerged as a promising material with a wide range of applications in medicine, electronics, catalysis, and environmental science. However, traditional methods of synthesizing AuNPs often involve the use of hazardous chemicals and generate harmful waste, posing significant environmental and health risks. In response to this concern, researchers have been actively exploring greener alternatives for the synthesis of gold nanoparticles, utilizing eco-friendly approaches that minimize the ecological footprint and ensure sustainable development.

II. BIOLOGICAL AND GREEN SYNTHESIS:

Biological and green synthesis methods have gained significant interest due to their eco-friendly and sustainable nature. Green synthesis of gold nanoparticles involves the utilization of natural products, plant extracts, or environmentally benign materials as reducing and stabilizing agents. Biological approaches utilize organisms such as bacteria, fungi, plants, and algae, which possess inherent reducing capabilities through enzymatic action. These organisms provide a biocompatible and environmentally friendly platform for the synthesis of AuNPs. Green synthesis involves the use of plant extracts rich in bioactive compounds that act as reducing and stabilizing agents. This method offers advantages such as cost-effectiveness, scalability, and reduced toxicity, making it an attractive choice for large-scale production.

2.1. PLANT EXTRACTS:

Plant extracts, rich in bioactive compounds, have gained attention as an excellent source for synthesizing AuNPs. Various plants, including green tea, turmeric, aloe vera, and neem, contain phytochemicals such as flavonoids, phenols, and terpenoids that exhibit inherent reducing and stabilizing properties. These compounds can effectively reduce gold ions to AuNPs and also provide stability to the resulting nanoparticles. Because they are readily available, inexpensive, environmentally friendly, and non-toxic, plants are increasingly being used in nanoparticle production. Plants including Azadirachta indica (Shankar et al. 2004), Medicago sativa (Gardea et al. 2002), Aloe vera (Chandran et al.), Cinnamomum camphora (Huang et al.), Coriandrum

sativum (Narayanan et al. 2008), and Terminalia catappa (Ankamwar et al. 2010) have all been used to biosynthesize AuNPs in recent years. Several papers published, reporting the synthesis of AuNPs using plant extracts (Vadlapudi Kaladhar et al. 2014), such as Macrotyloma uniflorum (Aromal et al. 2012), Citrus limon, Citrus reticulata and Citrus sinensis(Sujitha et al. 2013), Piper pedicellatum (Tamuly et al. 2013), Terminalia chebula (Kumar et al. 2012), Mangifera indica (Philip et al. 2010), Banana peel (Bankar et al. 2010), Cinnamomum zeylanicum (Smitha et al. 2009). Using the extract of Zingiber officinale, which serves as both a reducing and stabilising agent, Kumar et al. created AuNPs with particle sizes between 5 and 15 nm (Kumar et al. 2011).

1.2. MICROORGANISMS:

Microorganisms, including bacteria, fungi, and algae, have shown remarkable potential in the green synthesis of AuNPs. These microorganisms possess enzymes that can efficiently convert gold ions into nanoparticles. The process is cost-effective, requires minimal resources, and offers control over nanoparticle size and shape. Moreover, the use of microorganisms as catalysts in AuNP synthesis promotes the utilization of waste materials and facilitates the development of sustainable bio-refinery concepts.

1.3. BIOMOLECULES:

Bioactive molecules such as proteins, enzymes, and polysaccharides can be derived from various biological sources and employed in the green synthesis of AuNPs. For instance, proteins present in egg white, silk fibroin, and gelatin act as reducing agents, while polysaccharides derived from starch or chitosan can stabilize the nanoparticles. These biomolecules not only enable nanoparticle synthesis but also provide an environmentally friendly and renewable platform.

III. ADVANTAGES OF GREEN SYNTHESIS:

The green synthesis of gold nanoparticles offers several advantages over conventional methods:

1. ENVIRONMENTALLY FRIENDLY:

By utilizing natural sources and eco-friendly materials, green synthesis significantly reduces the use of toxic chemicals and eliminates hazardous waste generation. This approach contributes to the overall sustainability of nanotechnology and minimizes potential harm to the environment.

2. COST-EFFECTIVE:

Green synthesis methods are often more economical compared to traditional techniques, as they require fewer chemicals and expensive equipment. Additionally, the use of readily available plant extracts or microorganisms eliminates the need for expensive reagents.

3. BIOCOMPATIBILITY AND BIOMEDICAL APPLICATIONS:

AuNPs synthesized through green methods exhibit excellent biocompatibility, making them suitable for various biomedical applications, including drug delivery, cancer therapy, and diagnostic imaging. The absence of toxic by-products ensures their safe use in biological systems.

IV. CHEMICAL SYNTHESIS:

Chemical synthesis methods have been extensively employed for the production of AuNPs due to their versatility and ability to achieve precise control over nanoparticle parameters. The most commonly used technique is the reduction of gold salts, such as gold chloride ($AuCl_3$), using a reducing agent such as sodium borohydride ($NaBH_4$) or trisodium citrate. This method allows for the production of AuNPs with a range of sizes by adjusting the reactant concentrations and reaction conditions. Additionally, seed-mediated growth, where pre-formed gold nanoparticles act as seeds for further growth, enables the synthesis of AuNPs with well-defined shapes, such as nanorods, nanospheres, or nanostars (fig.1).

4.1. SOL-GEL METHOD FOR AUNP SYNTHESIS:

The sol-gel method offers several advantages for AuNP synthesis, including the ability to control nanoparticle size and morphology, uniform particle distribution, and the incorporation of functional materials into the gel matrix. The process typically begins with the hydrolysis and condensation of a metal precursor, such as gold chloride ($AuCl_3$), in the presence of a solvent and a stabilizing agent. The resulting sol, a colloidal suspension of nanoparticles, undergoes gelation to form a three-dimensional network. Subsequent drying and calcination steps lead to the formation of a stable gel, where the AuNPs are immobilized.

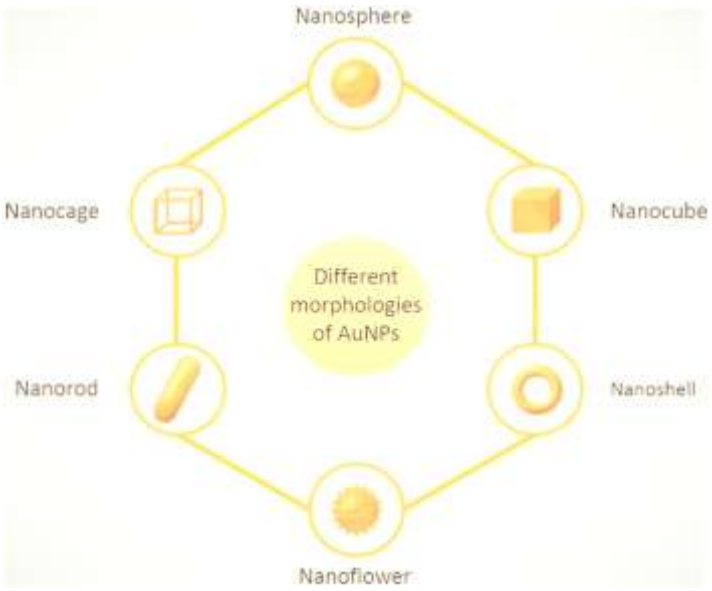

Fig:1. Different morphologies of AuNPs

4.1.1. CONTROLLED GROWTH AND STABILIZATION:

The sol-gel method allows for precise control over the growth and stabilization of AuNPs by adjusting various parameters, such as precursor concentration, pH, temperature, and time. By carefully manipulating these factors, researchers can tailor the size, shape, and distribution of the nanoparticles to meet specific application requirements. Additionally, the choice of stabilizing agents, such as surfactants or polymers, influences the stability and dispersibility of the AuNPs within the gel matrix.

4.1.2. ADVANTAGES AND CHALLENGES:

The sol-gel method offers several advantages for AuNP synthesis. It enables the production of nanoparticles with controlled properties, such as size, shape, and surface chemistry, crucial for applications in catalysis, sensing, and nanomedicine. The versatility of the sol-gel process allows for the incorporation of functional materials, such as dopants or nanoparticles, into the gel matrix, leading to composite materials with enhanced properties. However, challenges associated with the sol-gel method include the need for precise control of reaction parameters, potential agglomeration of nanoparticles, and the requirement for post-synthesis purification steps.

4.1.3. APPLICATIONS OF SOL-GEL SYNTHESIZED AUNPS:

The AuNPs synthesized by the sol-gel method find applications in various fields. In catalysis, they exhibit excellent activity as catalysts due to their high surface area and unique electronic properties. In nanomedicine, sol-gel synthesized AuNPs are utilized for drug delivery, photothermal therapy, and bioimaging. Their ability to be incorporated into hybrid materials makes them attractive for sensor development, optical devices, and energy storage applications.

V. PHYSICAL METHODS:

Physical methods for AuNP synthesis involve utilizing external stimuli or energy sources to induce the reduction and nucleation of gold ions. One such technique is laser ablation, where a laser beam is directed at a gold target submerged in a liquid, resulting in the generation of AuNPs. This approach allows for the synthesis of nanoparticles in a solvent without the need for additional reducing agents or stabilizers. Another physical method is the use of plasma, where gold atoms are evaporated using high-temperature plasmas and subsequently condensed to form AuNPs. Physical methods offer unique opportunities for the production of AuNPs with tailored properties, but their application is often limited to specialized research settings.

VI. ADVANTAGES AND APPLICATIONS OF GOLD NANOPARTICLES:

The unique properties of AuNPs make them highly sought-after for a wide array of applications. In medicine, AuNPs show promise in drug delivery, cancer therapy, and diagnostic imaging due to their biocompatibility and tuneable surface properties. In electronics, they are used in sensors, conductive inks, and electronic devices. Catalysis and environmental remediation benefit from the exceptional catalytic activity of AuNPs, facilitating the development of efficient and sustainable processes. Sustainable synthesis approaches for AuNPs offer numerous advantages. Green synthesis significantly reduces the use of toxic chemicals and eliminates hazardous waste generation, ensuring environmental sustainability. These methods are cost-effective and exhibit biocompatibility, making them suitable for biomedical applications. Chemical synthesis provides precise control over nanoparticle characteristics, while the sol-gel method offers versatility and controllability for tailoring AuNP properties. The synthesized AuNPs find applications in medicine, electronics, catalysis, and environmental remediation, among others(fig.2).

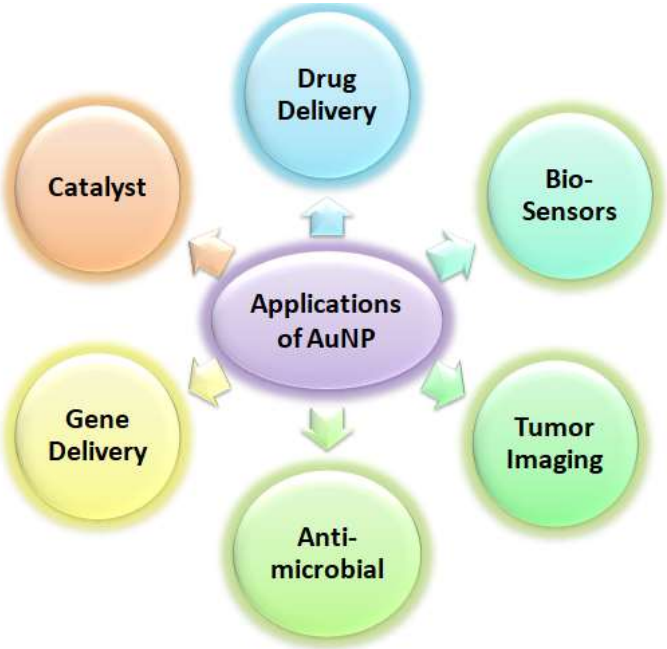

Fig:2: Applications of AuNPs

VII. CONCLUSION:

The synthesis of gold nanoparticles through sustainable approaches paves the way for a greener and more harmonious integration of nanomaterials with the environment and human well-being. Green synthesis, chemical synthesis, and the sol-gel method offer controlled nanoparticle formation while addressing environmental concerns and ensuring sustainable development. By harnessing the reducing and stabilizing properties of natural sources, researchers are advancing nanotechnology in a more sustainable and eco-friendly manner. The synthesized AuNPs exhibit promising applications in diverse fields, contributing to technological advancements and addressing multifaceted challenges across industries.

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Journal of Science and Technology
ISSN: 2456-5660 Volume 7, Special Issue 03 (MAY 2022)

www.jst.org.in *DOI:https://doi.org/10.46243/jst.2022.v7.i03.pp69-72*

Biochemical Profile of Zooplankton, *Daphnia galeata*

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To Cite this Article
S. D. Ovhal Bapu Khaire "**Biochemical Profile of Zooplankton, *Daphnia galeata***", *Journal of Science and Technology, Vol. 07, Special Issue 03, May 2022.*

Article Info
Received: 17-04-2022 *Revised: 8-05-2022* *Accepted: 10-05-2022* *Published: 20-05-2022*

Abstract:
Zooplankton with good source of protein, amino acid, lipids, fatty acid, minerals, carbohydrate and enzymes could be an inexpensive ingredient to replace expensive fishmeal. Few studies have been made on the chemical composition of zooplankton although such information is vital to evaluate a species and its suitability as feed, in aquaculture. The present study also deals with analysis of biochemical composition of Daphnia galeata (Cladocera), which cultured in laboratory. In present study Daphnia galeata contended 14.1 % total lipid; 63.3 % protein and 15.68 % glycogen.

Key Word*:Zooplankton, Daphnia galeata, Biochemical composition.*

Introduction

The production of planktonic organisms in good nutritional condition to feed fish larvae and fingerlings is a basic requirement in fish culture. In a vast majority of fish farms in India, it is a common practice to add organic and chemical fertilizers into the hatchery ponds (Sá-Junior, 1994). Although this procedure ensures a quick response in terms of algal biomass increase, both zooplankton composition and nutritional condition change abruptly, causing low fish larvae survival rates, due to the bad quality of food (Santeiro and Pinto-Coelho, 2000). An adequate plankton biochemical composition ensures the nutritional requirements for fish larvae, especially during their initial developmental stages. The living food improvement may decrease the high fish larvae mortality rate, a common problem in fish farms (Coutteau and Sorgeloos, 1997).

Zooplankton are considered to be ''living capsules of nutrition'' for commercially important cultivable and ornamental species, as they are valuable sources of proteins, lipids, carbohydrates, vitamins, minerals, amino acids, fatty acids and carotenoids (New, 1998; Hernandez Molejon and Alvarez- Lajonchere, 2003; Rajkumar et al., 2008; Pronob*et al.,* 2012). In the natural food web, they play a major role as diet for several invertebrates and vertebrate organisms and it is generally believed that the calorific value of zooplankton can meet the nutritional requirements of fish (Evjemo Ove *et al.,* 2003). In aquaculture practices, live food is difficult to sustain and requires considerable space and expense, on the other hand micro diets are easier to maintain and usually have lower
production costs (Jones *et al.,* 1993; Person *et al.,* 1993). In spite of the difficulties found in practicing live feed culture, Wang *et al.* (2005) found that the survival was significantly higher in larvae fed with live food than in larvae fed the three formulated diets. Introduction of live zooplankton is therefore being investigated as an alternate to pond fertilization for increasing fish yields while avoiding water quality deterioration (Jha *et al.,* 2007).

Studies on the biochemical composition and energy content of zooplankton are important to assess the energy available to plankton feeders (Bhat and Wagh, 1992). Such information is of much importance in estimating the energy available to higher tropic levels which in turn can be used to estimate harvestable fishery resources. Much of the available information about the biochemical composition and nutritive value of zooplankton is from estuarine, coastal, inshore and off share waters of India (Krishna Kumari and Goswami, 1993; Nageswara and Ratna Kumari, 2002; Jagadeesan*et al*., 2009).

www.jst.org.in *DOI:https://doi.org/10.46243/jst.2022.v7.i03.pp69-72*

Proteins are the most abundant macromolecules and constitute over half of the dry weight of most organisms. Proteins are extremely complex nitrogen containing molecules, which play important role in nearly all biological processes as structural components, biocatalysts, hormones and repositories of genetic information. They also help in storage, transport, mechanical support, control of growth and differentiation (Kale, 2002). Carbohydrates play vital and central role in cellular biochemistry, in addition to their functions as structural units and food reserves (Rao and Murthy, 1980). Carbohydrate metabolism in the animal is to meet the energy demands by the organs and systems for proper functioning. In the animal the chief carbohydrate of the tissue is glycogen, while glucose is of the haemocoelomic (blood) and other body fluids (Holden, 1972). Glycogen, a storage polysaccharide is reversibly converted to glucose. The equilibrium between the glycogen and glucose conversion tends to maintain blood glucose in a steady state. The equilibrium between glycogenesis and glycogenolysis is governed by the extrinsic and intrinsic environmental factor that governs the physiology of organs (Pickering *et al.*, 1983). Lipids are heterogeneous group of water insoluble (hydrophobic) organic molecules are not only a major source of energy but also provide the hydrophobic barrier that Live feed Culture, nutritional potential and biochemical composition permits partitioning of the aqueous contents of cells and sub cellular structures (Villalan*et al.*, 1990).

Zooplanktons are an important food source for many species of fish and flavour texture of fish is also improved with zooplankton as feed. Goswami *et al.*, (1981) studied biochemical contents of marine copepods. Bhat and Wagh (1983) reported biochemical composition and calorific value of marine rotifers. Sreepada*et al.*, (1992) observed biochemical composition of zooplankton from Arabian Sea. Tiwari and Nair, (1993) studied protein composition of rotifers. Kumari *et al.*, (1993) studied biochemical composition of zooplankton from the offshore oil field of Bombay. Nageshwara and Rathnakumari (2002) studied biochemical composition of zooplankton from east coast of India. Aman and Altaff, (2004) studied the biochemical profile of copepod *Heliodiaptomusviduus, Sinodiaptomus (Rhinediaptomus) indicus, and Mesocyclopsaspericornis*and their dietary evaluation for postlarvae of *Macrobachiumkistnensis.* Ishizaki (1968) studied the ostracod, *Xestoleberishanaii*by culturing it under controlled laboratory conditions for five generations, its life history including oogenesis, ovulation, oviposition, embryogenesis mating behaviour and ontogeny.

This work deals with laboratory culture of *Daphnia galeata (Cladocera)*, using *Chlorella* algae as supplement. The present study also deals with analysis of biochemical composition of *Daphnia galeata (*Cladocera).

Material And Methods

Biochemical analysis:

The samples of *Daphnia galeata were* collected from laboratory monoculture circular glass tank with the help of plankton net (60 µm mesh size) as well as dropper in 25 ml beaker. The collected samples were washed with distilled water. The partially wet sample was kept on filter paper for surface drying. After the weight of sample is measured it was transferred into glass petridish and kept into oven at 700c for drying. The dried sample was used for estimation of protein, lipid and carbohydrate. Water content was determined by determining difference between initial wet weight and final dry weight.

Estimation of lipid (Lehtonen 1996):

The analysis was performed following the method described by Lehtonen (1996). Approximately 15 mg of dried material was weighed and homogenized in 0.5 ml of chloroform: methanol (2:1) solution, and then centrifuged for 30 minutes. The precipitate was washed with 0.5 ml chloroform: methanol (2:1) and centrifuged again for 30 seconds. Twenty per cent volumes (0.02 ml) of 0.9 % NaCl solution were added to the chloroform: methanol (2:1) solution for both washes, and centrifuged. The chloroform phase containing the dissolved lipids was placed into tarred cups, and the solvent evaporated. The cups were then weighed, and the weight of the lipids calculated from triplicate sub samples.

Estimation of total proteins (Lowry *et al.* 1951):

Oven dried material was homogenized in the proportion of 0.5 mg to 3 ml of pure water (Micropur) into 10 ml test tubes. The water-soluble protein content was analysed (n = 5-6 sub samples) using the method described by Lowry *et al*. (1951), as modified by Fernandes *et al*. (1994). 0.1ml of the aliquot was transferred into a test tube and 4 ml of alkaline copper sulphate reagent was added, followed by 0.4 ml of diluted commercial Folins reagent. The optical density of the blue colour developed was read at 540 µm after 30 minutes of addition of the Folins reagent using

UV-VIS spectrophotometer (Model Digispec 200 GL). Bovine serum albumin was used as a standard. The protein content was expressed as mg/100 mg wet weight of the tissue. Live feed Culture, nutritional potential and biochemical composition.

Estimation of glycogen (DeZwaan and Zandee 1972):

Samples were separated for analysis, following essentially the same procedure as for proteins. The homogenates were analyzed (n = 4-5 sub samples) with the method of DeZwaan and Zandee (1972). The homogenate mixture was kept in boiling water bath for 3 to 5 minute to dissolve the tissue and then cooled. Before centrifugation 2 ml of 96% ethyl alcohol was added and the mixture was kept overnight in refrigerator. Next day this mixture was centrifuged at 3000 rpm for 15 minutes. The glycogen cake settled down on the bottom was collected and 2 ml of distilled water was added to the cake and mixed well. This mixture was kept at 700C for 5 minutes in a hot water bath. 0.1 ml of the aliquot was mixed with 0.9 ml of distilled water and 5 ml of anthrone reagent was added. This mixture was kept in hot water bath for 10 minutes. The optical density was read at 610 µm against blank using UV-VIS spectrophotometer. Glycogen content is expressed in terms of mg glucose / 100 mg wet weight of tissue (Glycogen conversion is factor 0.927).

Statistical analysis:

The results of biochemical analysis were expressed as mean of three replicates and data were analyzed statistically by using student 't' test (Mungikar, 2003).

I. Result

Table1: Biochemical composition of live feed zooplankton *Daphnia galeata*

Parameters / **Zooplanton**	**Lipid %**	**Protein %**	**Glycogen%**	**Water %**
Daphnia galeata	14.1	63.3	15.68	89.7

II. Discussion

Live feeds are being utilized as nursery/weaning/maturation diets and they also improve energy balance which results in maturation, quick growth, coloration and physiological conditions (Mitchell, 1991; Munuswamy et al., 1997; Velu and Munuswamy, 2007). Estimation of biochemical composition of zooplankton is important in understanding their physiological function, metabolic rate, nutritive value and energy transfer (Jha et al., 2007). Assessments of biochemical constituents like lipid, protein and glycogen in *Daphnia galeata*is important for better understanding of the organic production, cycling of biogeochemical elements and its nutritive potential. In present study *Daphnia galeata*contentained 14.1 % total lipid. Earlier Watanabe *et al.* (1983) reported 23.1 % lipid in *Branchionusplicatilis. Moinamacracopa*contained 8.94 % total lipid. Earlier Krishnakumari*et al.* (1993) recorded 45.65 % lipid in another ostracod *Xestoleberis nitida*. Higher values of lipid in different zooplankton species have been reported earlier by many workers (Maruthanayagam and Subramanian, 1999; Goswami *et al.*, 2000; Prabhu *et.al.*, 2005; Rajkumar *et al.*, 2008).

In the present study *Daphnia galeata had* 63.3 % protein. Higher protein contents in copepods *Acartiaspinicuda*and *Acartiasimilis*from costal water of Parangipettai have been reported by Rajkumar *et al.*, (2008) and Rajkumar and Santhanad (2009). The protein may function as metabolic reserve in zooplankton. Guisande*et al.*, (2000) made Comparison between the amino acid composition of females, eggs and food to determine the relative importance of food quantity and food quality on copepod reproduction.

In the present study *Daphnia galeata contained* 15.68 % glycogen. Watanabe *et al.* (1983) recorded comparable quantity (16.68 %) of glycogen in *Branchionusplicatilis. Moinamacracopa*contained maximum glycogen (19.64 %). Lower values of glycogen have also been reported earlier by many workers (Maruthanayagan and Subramanian, 1999; Rao and Krupanidhi, 2001; Prabhu *et al*., 2005*;* Rajkumar *et al.*, 2008) in different group of zooplankton. Maruthanayagan and Subramanian, (1999) felt that the glycogen might be oxidized directly by zooplankton and that fats might be oxidized on need or stored as principal reserve food. In general, low glycogen content in zooplankton led to contemplation on the functional role of other biochemical fractions in their metabolism. The fluctuations in glycogen content of animals generally depend upon their feeding activities (Rao and Krupanidhi, 2001).The present observation of low glycogen content may be attributed to the fact that glycogen is the usual storage carbohydrate in many animals.

In present study the water content (89.7 %) was found in *Daphnia galeata* .Watanabe *et al.* (1983) also recorded 87.9 % water in *Branchionusplicatilis*confirming the present result. *Moinamacracopa*contained 86.8 % water. Blazka (1966) reported 92.9 % water in *Daphnia pulicaria.* Yurkowaski and Tabachek (1979) found 94% water in *Daphnia pulex*whereas Tay *et al* (1991) reported 87.9 % water in *Moinamicrura.* These findings support the present result. Earlier Krishnakumari*et al.* (1993) recorded 30 % water in another ostracod *Xestoleberis nitida*. Simhachalam*et al.* (2015) reported that zooplanktons are rich in protein, lipids, essential amino acids and fatty acids.

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ISSN 2349-5189

LangLit

An International Peer-Reviewed Open Access Journal

Volume 9 Issue 2 November 2022

Editor in Chief

Dr. Prashant Mothe

Indexed: ICI, Google Scholar, Research Gate, Academia.edu, IBI, IIFC, DRJI

IMPACT FACTOR – 5.61

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ISSN 2349-5189

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Volume 9 Issue 2

Part 3

IMPACT FACTOR – 5.61

LangLit

An International Peer-Reviewed Open Access Journal

ISSN 2349-5189

Langlit Latur (MS) India AIPROAJ

THE ROLE OF LITERATURE IN HAPPINESS EDUCATION

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ABSTRACT

Education is development. It deals with students' academic, mental and overall personality improvement. It is a process of overall development of student as a person. Students' abilities and interests form his personality. Education can not be given only in schools and classrooms. It is a large process. While going through the process of learning students have to deal with various factors like his family and society. So the education becomes the process of personal and social development. The generation next is intelligent but is becoming mentally weak due to a lot of pressure on them. So the cases of suicide and dipression have been seen at large. So it becomes very important to make the learners mentally strong. Happiness education is one of the necessary initiatives the government has recommended. Literature can be used one of the tools to make the learners understand themselves as well as the world around them.

Education is development. It deals with students' academic, mental and overall personality improvement. It is a process of overall development of student as a person. Students' abilities and interests form his personality. Education can not be given only in schools and classrooms. It is a large process. While going through the process of learning students have to deal with various factors like his family and society. So the education becomes the process of personal and social development.

There have been various changes in education system since the Guru-Shishya tradition. In this tradition students have to leave their parents and stay with their Guru. They learn different Vidya's by their Guru practically. They even learn to manage their own chores alone. Then the system kept on changing and schools and colleges are designed in order to make the process of learning more confortable. Students are given various facilities so that they can learn with fun and with interest.

Learner or student is the center of the education system. Learner is the most important factor in the process of learning. So it becomes very essential to understand his weaknesses and strengths. The teacher and the total education system has to serve every need of the the learner. As the learner is the center of the system he has been given importance. So the changes are being done in the system. Dropping of the exams till eighth standard, inclusion of technology, fun learning are the results of changing educational system.

New generations have been proving very intelligent and active. Their hunger for knowledge can not be confined in the classrooms, schools and colleges. They are ready to explore new things and so it is very necessary to provide them the proper way of getting

knowledge. As a result digital classrooms, flipped classrooms, online learning are included in the education system.

The process of teaching and learning depends on learners physical and mental ability. He has to be fit in order to understand new things. Many times the learners are forced to do things without knowing their interest. He can not understand if he is not interested in a particular area. His interest is very important. So the board of studies has decided to manage the learning process according to the learner's need. Mental health of the learner is to be taken care of as the mental disorders or mental illness caused by the burden given by the education system are seen at large in new generation.

The teenagers and even the younger children are seen ending their lives only because of insult they faced in the classrooms or get lower grade in examinations or even if they don't get admission to their chosen (decided) course. So the mental health of young generation has become very important issue nowadays.

Now the education system has to see that the learners are getting education properly, without harming their mental health. Mental health means the happy mind. The concept of Happiness Education emerged from the need of mental health. It deals with the learner's self-worth. The process of learning should be harmless specially to learner's self-respect. There should be pleasure in teaching as well as learning.

Teaching and learning both become pleasurable when it deals with the literary forms like poetry, fiction or drama. Literature is any written form that gives pleasure. Literature generally deals with imagination. Every human being has his own imaginary world. But the door of this world is always closed. Literature allows to open that door. Imagination always gives pleasure. Imaginary world and the world of literature are similar. Literature stirs every human feeling, which is necessary for mental health. Every emotion has to be recycled.

literary forms, like drama and novels there are interaction among characters. This interaction is similar to human life. Literature is said to be the mirror of human life. So it is very close to human feelings. Happiness education takes care of learner's psychological health. Literary form like poetry gives pleasure with rythem and rhymes. In the concept of happiness education psychology of the learner is taken into consideration, in the same way literature takes care of human emotions.

The aim of happiness education is to make the learner capable to realise his desires and fulfil them. Literature allows the human mind to be prepared for emotional ups and downs. The characters found in literary forms belong to society we live in. So the human relationships and interaction among society is taught to the learners. Relationship building is the other aim of happiness education, it is also understood by the learners as they deal with the interaction among human minds.

The complicated incidents shown through the stories of the novel and drama create a kind of emotional awareness. Emotions are also handled in the poetry with softness, so emotional awareness is supported with this literary form as well. Literature helps the learners understand human mind. They understand themselves, their family and society. Happiness

education aims to teach the learners understand their personal and social awareness at large. For that reflective stories are the tools to get those learning outcomes.

Happiness education particularly tries to answer the questions 'what makes me happy?' and 'how can I be an instrument in other people's happiness?' Answers of these two questions are found in literature. Realisation of self and of other human beings is handled in the various literary forms. Human mind and it's reactions to the emotional situations are seen in the literature. So literature helps to realise self and society and become confident.

The concept of happiness education has emerged due to the need of learner's mental happiness. It is very innovative idea and has its roots in emotional understanding of self and society. The government has recommended to teach reflective stories and interactive activities at school level. Literature can help to reach the aims of happiness education at school as well as college levels. Literary forms like dramas, novels and poetry can easily and in an interactive way help to fulfil the aims of happiness education.

The generation next is intelligent but is becoming mentally weak due to a lot of pressure on them. So the cases of suicide and dipression have been seen at large. So it becomes very important to make the learners mentally strong. Happiness education is one of the necessary initiatives the government has recommended. Literature can be used one of the tools to make the learners understand themselves as well as the world around them.

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ISSN 2277 - 7539 (Print)
Impact Factor - 5.631 (SJIF)

Excel's International Journal of Social Science & Humanities

An International Peer Reviewed Journal

JANUARY - 2023

Vol. III No. 28

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EXCEL'S INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & HUMANITIES
(An Peer Reviewed International Journal)
Vol. III No.28 - January. 2023
ISSN 2277-7539 (Print)
Impact Factor 5.631 (SJIF)

Self Esteem and Emotional Intelligence Among Library and Information Science Student

* *Ram Wajire* ** *Dr.Shym Sangle*

Abstract:

The aim of the present study was to measure self esteem and emotional intelligence among students for this purpose 140 students among them 70 male Library and information Science students and 70 female students were selected from Library and information Science, College, Aurangabad then two psychological test self esteem scale and emotional intelligence scale were used for data collection. data was analyses by using SPSS software .Result shows that there is significant difference between male and female on self esteem female has high self esteem then male students and also results indicate that female has high emotional intelligence then male students there is positive relationship between self esteem and emotional intelligence among male and female Library Sciencestudents.

Introduction

The self is something that we are aware of immediately; we consider it as the warm, central, and private region of our life. As such, it plays a crucial role in our consciousness, in our personality, and our body. Therefore, it is a kind of nucleus in our being. As it evolves in the end, it is composed of everything related to a person's thoughts and feelings, to effort and hope, to fears and fantasies, to their vision of what attitudes belong to their value. According to Hurlock (1974), "The concept of self has three

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significant components. The perceptual,the conceptual and the attitudinal. The perceptual part is the image the person has to the appearance of his body and of the impression he makes on others. It includes the image he has of the attractiveness and sex appropriateness of his body, the importance of the different parts of his body such as his muscles, to his behavior and the prestige they give him in the eyes of others. The perceptual component is often called the 'physical self-concept."

Confidence and Self-esteem are the two essential qualities which practically define a person and how they thank for a life. Those who lack these two qualities will, more often than not, fail to succeed in life and become what is commonly known as "losers" No one wants to be the loser, but they do exist in society today, just as they have always existed. People with low confidence and self-esteem often have a problem holding on to a job, have little ambition or drive and or generally Adrian upon a family, friend and colleges in both emotional and behavior terms if not financially. They spread negative energy, which affects everyone around them almost as much as the harm they do to themselves.

Emotional intelligence (EI) is a relatively new and growing area of behavioral investigation that has attracted increasing attention and enjoyed a robust resurgence across a wide range of disciplines including management, psychology and the health sciences. The usefulness of the EI construct is increasingly asserted in terms of bringing a more balanced view of the intertwined role of cognition and emotion in influencing life's outcomes. Paying attention to emotions, using them in human relationship, understanding one's self and others emotions, self-restraint, controlling instantaneous desires, sympathy with others, and using emotions in thinking and understanding are among subjects discussed in the field of emotional intelligence.

Methodology

Objectives

1) To measure gender differences between male and female Library and information Sciencestudents on self esteem.

2) To measure gender differences between male and female Library and information Sciencestudents on emotional intelligence.

3) To measure relationship between self esteem and emotional intelligence among Library and information Sciencestudents.

Hypotheses

1) There is significant difference between male and female Library and information Sciencestudents on self esteem.

2) There is significant difference between male and female Library and information Sciencestudents on emotional intelligence.

3) There is positive correlation between self esteem and emotional intelligence among Library and information Sciencestudents.

Sample

For the present study 140 students among them 70 male Library and information Sciencestudents and 70 female students were selected from Library and information Science, College, Aurangabad using simple random sampling method. All sample were equal on SES. the age range of present sample was 20-25 years.

Variables

Independent variable

Gender

a) Male

b) Female

Dependent variables

1) Self esteem

2) Emotional intelligence

Tools

Rosenberg self-Esteem scale – present test developed by Rosenberg M. In (1965) these are 10 sentence include in this test this test is highly reliable and valid .

Emotional intelligence scale This test was originally developed by Anukool Hyde Sanjyot pethe and Upinder Dhar. This test consists of 34 items and measures emotional intelligence through ten factors.The reliability of the scale was determined by calculating reliability coefficient of a sample of 200 subjects. The split half reliability coefficient was found to be 0.88.- Besides face validity, as all items were related to the variable under focus, the scale has high content validity. It is evident from the assessment of Judges/experts that items of the scale are directly related to the concept of emotional

intelligence. In order to find out the validity from the coefficient of reliability (Garrette, 1981), the reliability index was calculated, which indicated high validity on account of being 0.93.

Result and discussion

Hypotheses No.1 There is significant difference between male and female Library and information Science students on self esteem.

Gender	N	Mean	SD	t-value	Sig.level
Male	70	26.34	3.97	7.34	0.01
Female	70	32.17	5.32		

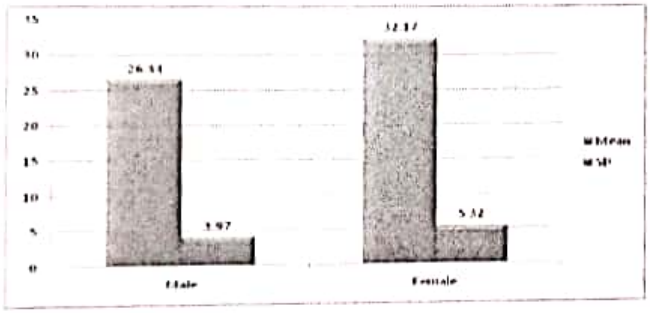

Table and graph showing mean and SD difference between male and female on self esteem male mean is 26.34 and SD is 3.97 female mean is 32.17 and SD is 5.32 and t-value is 7.34 which is significant on 0.01 level these values showing clear difference between male and female on self esteem. Female has high self esteem then male thus the Hypotheses No.1 there is significant difference between male and female Library and information Sciencestudents on self esteem is accepted. Self esteem comes from the inside out. It means that a woman is not dependent upon anyone else to make her feel good about herself, because she already knows she's fine just the way she is. She is confident and aware of her strengths and abilities. She wants to share them with others. This does not mean she is conceited. She is also aware of areas needing work and growth. But that's ok because she knows she's not perfect, and she doesn't have to be. No one is. She understands that we all have our strengths and weaknesses.

Hypotheses No.2 There is significant difference between male and female Library and information Science students on emotional intelligence.

Gender	N	Mean	SD	t-value	Sig.level
Male	70	34.44	9.36	4.20	0.01
Female	70	41.76	11.18		

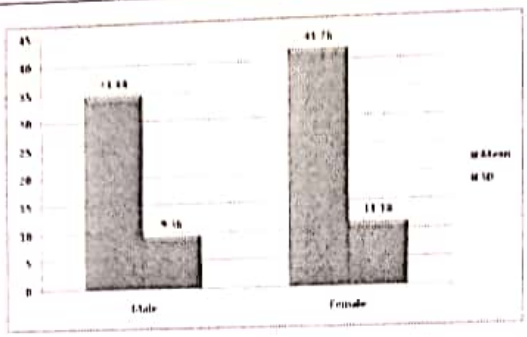

Table and graph showing mean and SD difference between male and female on emotional intelligence male mean is 34.44 and SD is 9.36 female mean is 41.76 and SD is 11.18 and t-value is 4.20 which is significant on 0.01 level these values showing clear difference between male and female on emotional intelligence. Female has high emotional intelligence then male thus the Hypotheses No.2 there is significant difference between male and female Library and information Sciencestudents on emotional intelligence is accepted.Women tend to be better at emotional empathy than men, in general. This kind of empathy fosters rapport and chemistry. People who excel in emotional empathy make good counselors, teachers, and group leaders because of this ability to sense in the moment how others are reacting.Here's where women differ from men. If the other person is upset, or the emotions are disturbing, women's brains tend to stay with those feelings. But men's brains do something else: They sense the feelings for a moment, then tune out of the emotions and switch to other brain areas that try to solve the problem that's creating the disturbance.

Hypotheses No.3 There is positive correlation between self esteem and emotional intelligence among Library and information Science students.

Gender	Factors	r value	Sig level	Type of correlation
Male	Self Esteem	08.12	0.05	Positive correlation
	Emotional Intelligence			
Female	Self Esteem	60.34	0.05	Positive correlation
	Emotional Intelligence			

Table no. 3 showing correlation between Self Esteem and Emotional Intelligence among male and femaleLibrary and information Science students correlation value among male 48.12 which is significant on 0.05 level and it is positive correlation as same female correlation value is 60.34 which significant on 0.05 level and it is also positive correlation .In general, it has also been agreed that persons with a high level of emotional intelligence tend to have more positive interpersonal behaviors befitting of the library profession (Kaplan Satterfield and Kington, 2012 & Lievens, 2013) and have more adaptive ways of coping (Mayer, Caruso and Salovey, 1999). Whereas, positive emotional intelligence is a strong predictor of better psychological adjustment, negative or low emotional intelligence is significantly related to depression, harmful and distressing behavior and this also the view of Petrides and Furnham, (2000). Researchers have also shown that sad mood can be attributed to low level of emotional intelligence (Schutte, Malouff, Hall, Hggerty, Cooper, Golden, and Dornheim, 1998 & MartinezPons, 1997). Self-esteem is another important tool for librarians during their interactions with readers and other library users. Koleoso, Osasona, and Ayorinde, (2016), reveal It that an individual with a high self-esteem has a better level of mental health and self-harmony while Peng, Cheng, Chen, and Hu, (2013), believe that one with high self esteem feels more confident and more competent, and exhibits optimistic attitudes. To Ghorbanshirodi, (2012). Such a person has strong personal strength and ability to solve problems and ability to control emotions. If one applies the view of Eremie and Chikweru, (2015) to librarianship, Librarians with good self-esteem have the potentials to stimulate, influence and induce a positive well-being both in service delivery and in users. Conversely, low self-esteem as asserted by Chris, Pais, Kumar, and Sisodia, (2012) is associated with desperation; inferiority; sadness, depression and high suicidal tendencies.

Conclusion

1) There is significant difference between genders on self esteem femaleLibrary and information Sciencestudents has high self esteem then male Library and information Sciencestudents.

2) There is significant difference between gender on emotional intelligence femaleLibrary and information Sciencestudents has high emotional intelligence then male Library and information Sciencestudents.

3) There is positive correlation between self esteem and emotional intelligence

among male and female Library and information Sciencestudents.

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