Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ) ISSN : 2278 – 5639 (IIFS Impact Factor : 6.125)
Volume - XIII, Special Issues – III, March 2024

ISSN : 2278 - 5639

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Global Online Electronic International Interdisciplinary Research Journal

(GOEIIRJ)

Peer Reviewed Refereed Journal {Bi-Monthly} Impact Factor : IIFS 6.125
Volume – XIII,
Special Issue – III,
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Editor
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www.goeiirj.com
Peer Reviewed Refereed Journal
{Bi-Monthly}

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Year
2024

GOEIIRJ EDITORIAL BOARD

PUBLISHED BY

GOEIIRJ

Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)

www.goeiirj.com

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Peer Reviewed Refereed Journal ISSN : 2278 – 5639
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} Volume – XIII Special Issue – III March – 2024

A STUDY ON THE EFFICACY OF THE INDIAN LEGISLATION IN PROTECTION OF WILDLIFE

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Abstract

Wildlife refers to all non-domesticated plants and animal species which live and grow in areas not inhabited by humans. They form an integral part of the ecosystem namely forests, deserts and plains. India is a country with rich and diverse forms of flora and fauna making it a hotspot of biodiversity in the world. This research paper focuses on the role, environmental laws play in India.

Keywords : Wildlife, wildlife protection, environment, law, biodiversity,

Objectives

1) To understand the connection betweenprotectionof environment and human beings
2) To identify the need for wildlife protection.|
3) To understand the role of various conventions and legislations in strengthening environment protection.
4) To examine the awareness of the wildlife preservation laws amongst the citizens and the usefulness of the current wildlife protection laws.

Introduction

"***If we can teach people about wildlife, they will be touched."– Steve Irwin***[1]

Wildlife is animals, not domesticated by humans; this doesn't mean that wild animals live without human interference. Wild animals are often looked at as threats due to their undomesticated behaviour which is only logical. Animals are targeted at providing food, clothing and a source of income thus making us dependent on them. Wildlife protection refers to protecting the wild species and their habitats by forming policies to govern the lands used for hunting, trapping, illegal trade of animals, reptiles, and birds; it also aims to protect species that are in danger of extinction, and enable restoration of the population at risk. Environmental laws seek to strike a balance between humans and the natural system they live in. The main objective of environmental law is to not only protect human health as well but also to preserve the environment. Humans for a long time have been exploiting the environment and never tried enough for a sustainable approach. Therefore, environmental law is an answer to these environmental degradations and adverse exploitation for a future towards sustainable growth and development.

Background Of The Study

The clamour for wildlife preservation in India has been observed throughout history. Every god and goddess of Hindu mythology have their favourite animal immortalized in the scriptures, sculptures and paintings. The earliest efforts for the protection of wildlife seem to have been limited only to the individual species rather than their habitats. Although Indian Forest Act, 1878 attempted to protect certain patches of government-owned forests by declaring them as reserved forests. It was only in the year 1972, about twenty-five years post-Independence where imposition of legal remedies were evident through enactment and enforcement of the The Wildlife Protection Act, 1972.[2]

International Conventions

(A) Convention on biological diversity

The Convention on biological diversity informally known as the Biodiversity Convention is a multilateral treaty. The convention has three main goals:

a) The conservation of biological diversity

b) The sustainable use of its components

c) The fair sharing of benefits arising from genetic resources.

Its objective is to develop national strategies for the sustainable use of biological diversity and it is often seen as the key document regarding sustainable development.[3]

(B) The Convention on Conservation of Migratory Species of wild animals.

Also commonly known as the Convention on Migratory Species (CMS) or the Bonn Convention, is an International Agreement to preserve migratory species throughout their ranges on a global scale. The CMS is the only global and United Nations based, an intergovernmental organization established exclusively for the conservation and management of terrestrial, aquatic and avian migratory species.[4]

(C) Convention on international trade in endangered species of wildlife fauna flora

CITES, also known as the Washington Convention is a multilateral treaty to protect endangered plants and animals. It aims for a sustainable international trade in specimens of wild animals and plants in the wild, and accords varying degrees of protection to more than 35,000 species of animals and plants[5]

Legal Framework In India

(A) Constitutional Provisions

Article 48 -A of the constitution says that "the state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". Article 51-A (g), says that "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures"[6]

(B) Legislative Provisions

(a) The Wildlife Protection Act, 1972

The wildlife protection act,1972 is an act of the parliament of India enacted for the protection of plants and animal species. The Act empowers the central and state government to declare any area a wildlife sanctuary, national park or closed area. It provides for authorities to administer and implement the act; regulate the hunting of wild animals; protect specified plants, sanctuaries, national parks, and closed areas; restrict trade or commerce in wild animals or animal articles; and miscellaneous matters.

(b) The Indian Forest Act ,1927

The Indian Forest Act, 1927 facilitates three categories of forests, namely reserved forest, village forest and protected forest and also explains the procedure to be followed for declaring an area as reserved forest, protected forest or a village forest. The law gives the government the power to create different classes of forests for effective usage for colonial purposes. It defines forest offences acts prohibited inside the Reserved Forest, and penalties leviable on the violation. The act aims to make the conservation of forests and wildlife more acceptable.

(c) The Forest Conservation Act, 1980

The Forest Protection Act, 1980 aims at protecting the forest along with its other diverse ecological components while preserving the integrity of the forest. It resists the state government and other authorities to take decisions without permission from the central government.

(d) The Environment Protection Act, 1986

The Act aims at protecting and improving the environmental conditions and implements the decisions made at the UN Conference on the human environment that was held in Stockholm in the year 1972. It promotes strict actions against all those who intend harm to the environment.

(e) The Biological Diversity Act, 2002

The Biological Diversity Act, 2002. The Act was enacted in 2002, aiming at conservation of biological resources, managing their sustainable use and enabling reasonable benefits by sharing and using knowledge of biological resources with the local communities.

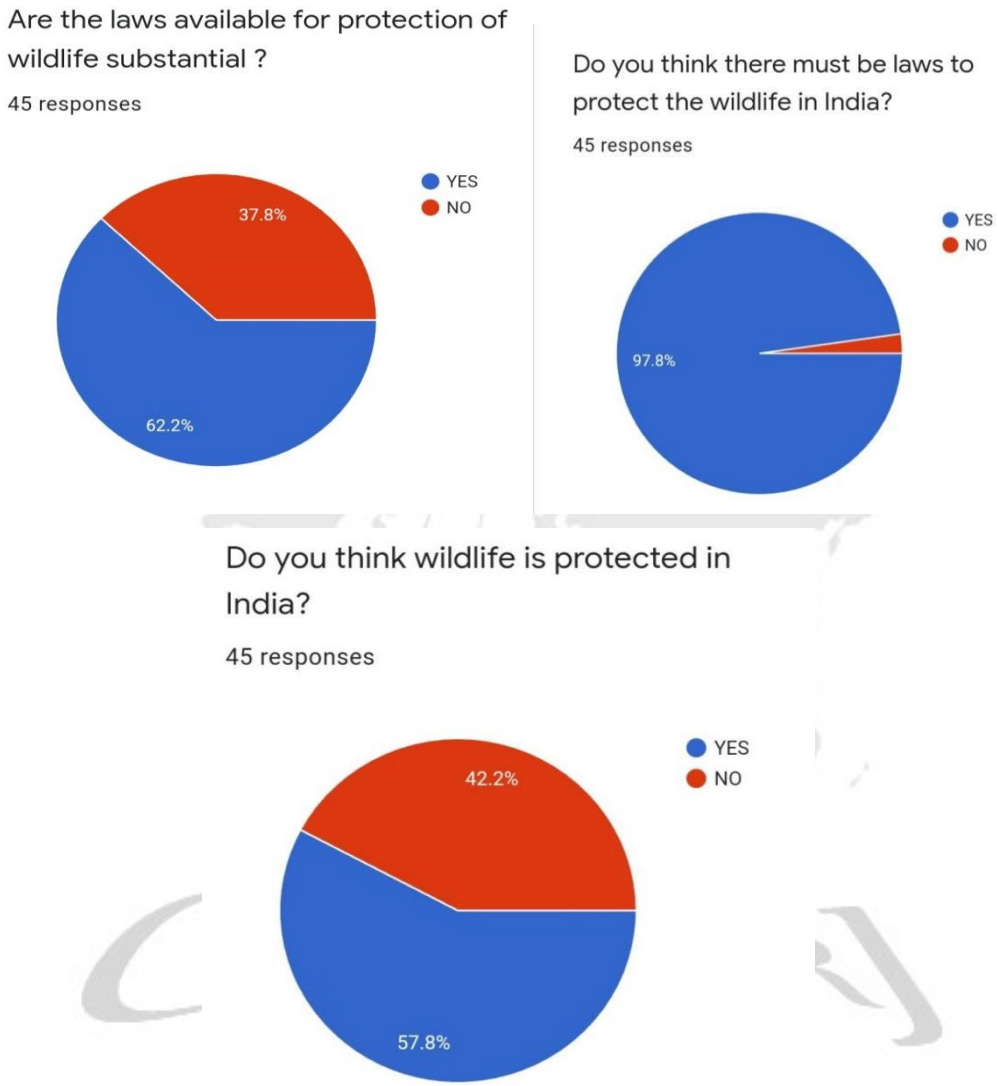
(f) National Forest Policy, 1998

National forest policy 1998 aims to increase forests and trees by involving the local communities in the protection, conservation and management of forests. The policy ensures environmental stability and the maintenance of ecological balance. It is an object of restoration of the ecological balance that has been adversely affected due to serious depletion of the forests. It also aims at conserving the natural heritage of the country.

Data Collection And Analysis

Many people are under the impression that India does not have strong wildlife conservation laws. To see if people have adequate knowledge about the wildlife and laws to protect the wildlife

a survey was conducted. Following are the outcomes of the survey.



Conclusion And Recommendations

Although the laws of the country pertaining to the protection of wildlife and environment have been implemented and enforced with the inclusion of stringent legal provisions for the protection and conservation of wildlife , the ground reality is different. It was observed that the aim to protect wildlife can be accomplished if the following recommendations are put to practice

i) Firstly at all the government levels , villagers and local citizens who live in and around protected areas, non-profit and non-governmental groups, law enforcement officers, and the general public work together and sincerely to achieve it.

ii) Secondly the central and state governments must work in tandem and enforce all effective applicable laws and adopt innovative and effective conservation strategies.

iii) Thirdly the research paper discusses a survey on the role of the Indian environmental laws in protecting wildlife and the responses suggest that there is a clamour for more efforts to be taken

in creating awareness amongst thecitizens of the nationabout the prevailingwildlife protection laws and the efficacy of the legal framework

iv) Fourthly the responses also suggest that there is a need to constitute a committeeto monitor the effectiveness and to adopt a mechanism for strict implementation of the laws.

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2) https://core.ac.uk/download/pdf/144879266.pdf
3) Convention_on_Biological_Diversity
4) Convention_on_the_Conservation_of_Migratory_Species_of_Wild_Animals
5) https://www.worldwildlife.org
6) https://pib.gov.in/newsite/printrelease.aspx?relid=105411

MEDICINAL PLANTS USED BY THE TRIBAL PEOPLE IN PIMPALNER REGION, SAKRI TALUKA, DHULE DIST, MAHARASHTRA, INDIA.

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Abstract

This study presents the of a field survey of the plants used medically by the tribal people of r in Khandesh region Maharashtra, India.Tribes like Pawra, Tadvi, Bhil and other various tribal communities present of the region. This is an effort to record the valuable ethno medical knowledge of these Pimpelner tribes. A total of 44 species, 26 families were included or recorded. These plants are used to treat various ailmentsand usefulto Ethnoedicinalhelpfulness in Dhule district to treat various human diseases. In present paper information on plant and part(s) used, local name, diseases and plants part has been provided. Thetechnicalassessment is desirable for these broadly used herbal medicines.

Keywords: Ethno medicine, Pimpelner, Tribes, Dhule, Maharashtra, India.

Introduction

Dhule district is located between Latitude 20 38' to 21 61' N and Longitude 73 50' to 75 11' E. The district is bounded by Satpuda hill ranges in the North. Crossing the ranges Gujarat and Madhya Pradesh states are located. The Pimpalner village is located in Sakri taluka of Dhule in Maharashtra, India. The total geographical area of Pimpalner village is 1684.22 Hect. Part of Sakri Taluka is in the Western Ghats, and 35.27% of the taluka is forested.In Khandesh region is known for its richness of medicinal flora. Plants, of immense medicinal value are abundantly found in these areas. The impartial was to assess the richness of medicinal plant species and traditional medical practices used by the Pawara, Bhil and Pardhi tribes in Satpuda forest region of Dhule, Nandurbar and Jalgaon districts of Maharashtra.

Out-datedtreatment and ethno botanical material show asignificant role in technicalin vestigation. Among the medicinal plants used in Ayurveda medicines for their therapeutic action, some of these have been thoroughly investigated. Preservation of organicproperties as well as their bearable use is momentous in defence of awareness. These groups remain isolated, living in remote forest and hilly areas far from civilization. Majority of them have poor health status, peculiar health needs and a wide prevalence of disorders that complicates their health problems further. Ninety-eight present of the tribal practice ethnic religions.

They need their private socio-cultural backgrounds and way of lifetime. The forests, forest

products and traditional crop plants are the main source of their lively hood. The tribal communities, over several years, have developed specialized set of practices using wild forest resources to fulfil their daily needs. The tribalpeople have shown requirement mainly on the rough plant classes for resolutions such as food, medicine, shelter, and so on. Some authors are reported the plant material like Kirtikar, K.R. and Basu, B.D. (1951), Agharkar, S.P. (1953), Santapau, H. (1958), Chopra, I.C. and Verma, B.S. (1968), Sharma BD, (1986), Sharma B.D., Karthikeyan S. and Singh N.P. (1996),Bhattacharjee, S.K. (1998.), Kurian, J.C. (1999), J.Thomas, S.S. Yadav, M.Varghise and b.d.garud (2004), Dutta B.K., Dutta P.K., (2005), Jeyaprakash K, Ayyanar M, Geetha KN, Sekar T., (2011), Bhosle S. V., Ghule V. P., Aundhe D. J. and Jagtap S. D. (2019), D.L. Jain, A.M. Baheti, S.R. Jain & K.R. Khandelwal (2010), and Jain DL, Baheti AM, Jain SR, (2010).

The hamlet doctors, nearby called as Vaidu, who are attentive of the medicinal possessions of the wild edibles, have been fruitful in given that medicines for numerous illnesses at the local level.

Resources And Approaches

The study area concentrates in and around Pimpalner and Sakri taluka of Dhule district forest areas there are number of hill ranges in the study area.The present study, therefore aimed to highlight 44 ethno medicinal plant species belonging to 26 families with their local name of plant parts used as medicine in this region.

Traditional technique of grounding, method of ingesting, shelf life and ethnic assessment of the beneficial plants were unruffled from olderpeople and old-stylenaturopaths of tribal societies. Material was composed complete tested feedback form and consultationsbetween the informers in their nativelinguistic and validatesbases also. Some of the places were re-examined for this perseverance to gather the new material from this Vaidus, Bhagats and Majaraj.

Results And Discussion:

The results of this study are given in Table 1, where in species are arranged. For each species are the botanical name with authority and flowering and fruiting months of specimen, local name, family, parts used and Habit.Ailments treated preparations a total of 44 plants from 26 different families have been documented for their healing properties.

These plants are used to treat various types of ailments and discomforts. Out of these plants were reportedly used to treat different type of Dysentery, Worm Blood Dysentery, Stomach ache, Mouth ulcer, Head lice, Night Blindness, Piles, Rheumatic pain, Asthma, Eye spot, Stomach pain & cough, Swellings, Dysentery, Stomach ache, Body heat, Urinary, complaints, Jaundice, Migraine, Leucoderma, Eye troubles, Earache, Constipation, Worms, Bloated Stomach Constipation and Chest pain in children, Joint Pains & Swellings, Loss of Semen, Malaria, Blood Pressure, Epilepsy, Toothache, Contraceptive etc., and other curing disease also treatment of and

infections. The use and acceptability of these plants, which are claimed to be effective remedies, is quite popular and high among these tribes that inhabit in Pimpalner area.

Sr. No.	Botanical Name	Local Name	Family	Disease Name	Parts used	Habit
1	*Aegle marmelos* (L.) Corr. Fl. & Fr.- April- Sept	Bael	Rutaceae	Dysentery, Worm Blood Dysentery, Stomach ache, Mouth ulcer	Fruit	Tree
2	*Annona squamosa* L. Fl. & Fr. Oct.- Dec.	Sitaphal	Annonaceae	Head lice	Seed	Tree
3	*Argemonemexicana* L. Fl. & Fr.- Throughout the year	PiwalaDhotra	Papaveraceae	Night Blindness	Seed	Herb
4	*Azadirachtaindica* A. Juss. Fl. & Fr.- April- June	Khadunimb	Meliaceae	Piles, Rheumatic pain	Seed	Tree
5	*Balanitesaegyptiaca* (L.) Del. Fl. & Fr.-	Hingan	Zygophyllaceae	Asthama, Eye spot, Stomach pain & cough	Seed Fruit	Tree
6	*Butea monosperma* (Lam.)Taub. Fl. & Fr.-	Palas	Fabaceae	Swellings, Dysentery, Stomach ache, Body heat, Urinary complaints	Flower	Tree
7	*Calotropis gigantia* (L.) R. Br. Fl. & Fr.- summer	Ruchkin/ Rui	Apocynaceae	Jaundice Migraine	Floral Stalk	Shrub
8	*Carica papaya* L. Fl. & Fr.- whole year	Papai	Caricaceae	Leucoderma	Latex of Fruit	Tree
9	*Cassia absus* L. Fl. & Fr.- Sept- Nov	Chakan Chimar	Caesalpiniaceae	Eye troubles	Seed	Herb
10	*Cassia fistula* L. Fl. & Fr.- April- Oct	Bahava	Caesalpiniaceae	Earache, Constipation Worms, Blosted Stomach Constipation	Fruit	Tree
11	*Celastruspaniculatus*Willd. Fl. & Fr.- March- Oct	Malkanganni	Celastraceae	Joint Pains & Swellings	Seed	Tree
12	*Cordia dichotomaForest.f* Fl. & Fr.- Feb.-April	Bhokar	Ehretiaceae	Loss of Semen	Fruit	Tree
13	*Cucumis melo* L. Fl. & Fr.- Jully- Dec	Indrafal	Cucurbitaceae	Malaria	Fruit	Climber Herb

14	*Cucumis setosus*Cogn. Fl. & Fr.- Aug- Sept	Chewat	Cucurbitaceae	Bloated stomach	Fruit	Herb
15	*Daucuscarota* L. var. *sativa* DC. Fl. & Fr.- May to Sept	Gajar	Apiaceae	Blood Pressure	Fruit	Herb
16	*Delonixregia* (Boj. ex HooK) Raf. Fl. & Fr.- Feb.- May	Gulmohar	Caesalpiniaceae	Stomachache, Epilepsy	Pods	Tree
17	*Diospyros melanoxylon*Roxb. Fl. & Fr.- March- Dec	Tembharu n	Ebenaceae	Toothache, Contraceptive	Fruit	Tree
18	*Diplocyclospalmatus* (L.) C. Jeffrey Fl. & Fr.- Sept- Oct	Shivalingi	Cucurbitaceae	Stomach disorder & Dysentery	Fruit	Climber Herb
19	*Emblica officinalis*Gaertn. Fl.- Feb- May Fr.- July –Aug.	Avla	Euphorbiaceae	Epilepsy, Scabies Indigestion, Diabetes, Acidity,	Fruit	Tree
20	*Enetesuperbum*(Roxb.) Cheesman Fl. & Fr.- July- Aug	Rankali / Kaundar	Musaceae	Dog bite, Stomachache, Insanity	Seed	Herbs (Tree like)
21	*Ficushispida* L. Receptacle- Mar- April	Bhuiumba r	Moraceae	Toothache	Seed	Shrub/s mall tree
22	*Gmelina arborea*Roxb. Fl. & Fr.- March - July	Shivan	Lamiaceae	Jaundice	Fruit	Tree
23	*Grewiatiliaefolia*Vahl.va r.tillifolia Fl. & Fr.- April- sept	Dhaman	Tiliaceae	Stomachache	Seed	Tree
24	*Helicteresisora* L. Fl. & Fr.- July- Nov	Ati	Sterculiaceae	Infant dysentery, Stomach pain	Fruit	Shrub
25	*Holarrhenapubescens* (Buch- Ham.) Wall. ex .G. Don Fl.- April Fr.- Sept- Feb	Kuda	Apocynaceae	Stomach pain & Worms	Seed	Shrub
26	*Leucas biginnata* (Roth) O. Kize Fl. & Fr.- Aug- Feb	Gavandi	Lamiaceae	Fever	Flower	Herb
27	*Limonlaacidissima* Linn. Fl. & Fr.- March- Aug	Kavath	Rutaceae	Stomach pain	Fruit	Tree
28	*Madhucalongifolia* (Roxb.) Macbr Fl. & Fr.- March- June	Moha	Sapotaceae	Scorpion bite, Snake bite, Asthma	Fruit	Tree
29	*Millettia extensa* (Bth.) Baker	Agrivel	Fabaceae	Cough	Seed	

30	*Momordica dioica*Roxb. ex. Willd. Fl. & Fr.- July- Oct	Kanturle	Cucurbitaceae	Blood impurities	Fruit	Herb/ Trailing / climber
31	*Morindapubescens* J. E. Sm Fl.- March- April	Aal	Rubiaceae	Dysentery	Fruit	Tree
32	*Mucunapruriens* (L.) DC. Fl. & Fr.- Sept- Dec	Kachkhohari/ Kulikuyari	Fabaceae	Gastric disorders, Heart bum, Indigestion & Asthma, Scorpion bite, weakness	Seed	Herb
33	*Pithecellobiumdulce* (Roxb.) Bth. Fl. & Fr.- Jan- June	Gorakh chinch	Caesalpiniaceae	Conception (Fertility)	Fruit	Tree
34	*Portulacapilosa* L. subsp. *grandiflora* (Hook.) Geesink Fl. & Fr.- July-Sept	Chini Gulab	Portulacaceae	Scorpion bite	Flower stalk	Herb
35	*Seshagiriaaphyadrica* A. & H. Fl. & Fr.- July to Dec	Khopdada	Apocynaceae	Lactation	Fruit	
36	*Solanum anguivi* Lam. Fl. & Fr.- July- Oct	JangaliWange (Dorli)	Solanaceae	Tooth infection	Seed	Shrub
37	*Solanum virgianum* L. Fl. & Fr.- Fruiting throughout the year	Bhui-Ringani	Solanaceae	Asthama, Toothache	Fruit	Herb
38	*Sterculiaurens*Roxb. Fl. & Fr.- Dec.-March	Kadhai	Sterculiaceae	Weakness	Seed	Tree
39	*Syzygiumcumini* (L) Skeels Fl. & Fr.- May- Sept	Jambhul	Myrtaceae	Vomiting, Leucorrhoea	Seed	Tree
40	*Tamarindusindica*L. Fl. & Fr.- April-June	Chinch	Caesalpiniaceae	Scorpion bite	Seed	Tree
41	*Terminalia bellerica* (Gaertn.) Roxb. Fl. & Fr.- May- Sept	Beheda	Combretaceae	Cough, Asthma, Grey hair	Fruit Seed	Tree
42	*Terminalia chebula* Retz. Fl. & Fr.- May- Dec	Hirda	Combretaceae	Toothache	Fruit	Tree
43	*Withaniasomnifera* (L.) Dunal Fl. & Fr.- Juli-March	Achkan	Solanaceae	Leucorrhoea	Fruit	Shrub
44	*Wrightiatinctoria*R.Br. Fl.-April- May Fe.- July-Feb	DudhKudi	Apocynaceae	Stomachache& Worms	Seed	Tree

Conclusion

The study concludes the role of plant medicine for the treatment of various diseases and disorders among the tribes is critical. They use many different forest plants, weeds, flowers, seeds, bark and roots in their traditional treatment. Beyond documented plants, these people use several other plants for non-medicinal purposes. The composed material not only shows that numerous arrangements are completed from solitary plant but rarely combination of several plants is used. Popular of the arrangements are occupied verbally and valuable on the peel. In the considered area, many persons quiet have trust in the herbal medicine which dramas a significant

role in the lifespan of these the tribal peoples.

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STUDIES ON MAJOR DISEASES OF TURMERIC (*Curcuma longa* L.) cv. SALEM AND THEIR MANAGEMENT

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Abstract:

Turmeric (Curcuma longa L.) is an important spice crop belongs to family zingiberaceae. Turmeric crop plant cultivated globally. The turmeric rhizome contains a variety of pigments in which curcumin is the major one responsible for colour. India is main turmeric producer in the world. Majority of farmers in Nanded, Parbhani and Hingoli district cultivated Turmeric crop plants. Turmeric is vulnerable to a number of fungal diseases of both soil and air borne nature. The important diseases affecting the crop are rhizome rot, leaf spot and leaf blotch. Among foliar diseases, leaf spot and leaf blotch are important and rhizome rot taken a heavy toll in majority of turmeric areas. Due to attack of these diseases the yield and quality of turmeric crop decreases.

The present study is aimed to exercise the details of leaf blotch, leaf spot and rhizome rot disease complex in turmeric and also to develop a management strategy to combat the disease using chemical, biological and integrated means.

Key words: - Turmeric, Leaf spot, Leaf blotch and Rhizome rot.

Introduction

Turmeric (*Curcuma longa L.*), known as 'Haridra' meaning yellow coloured wood in Sanskrit. Turmeric is belonging to the family zingiberaceae is an important spice crop of India known as "Indian Saffron". It is considered auspicious and used in several religious ceremonies. [1, 4]. India is the largest producer, consumer, and exporter of turmeric in the world and contains highest diversity (40 species) of C. longa. The crop is grown predominantly in Andhra Pradesh, Orissa, Tamil Nadu, Assam, Maharashtra and West Bengal [5, 8]. It is considered auspicious and used in several religious ceremonies. Turmeric crop is used for its medicinal, culinary and cosmetic properties.It is also reported to detoxify the liver, balance cholesterol levels, fight allergies, stimulate digestion, boost immunity and enhance the complexion [9,10].

Turmeric powder is used for antimicrobial and anticancer properties. Curcumin, the most

biologically active phytochemical compound is available up to 3% in Turmeric [11,12]. The disease usually appears in the field during August and September when there is high relative humidity in the atmosphere. The Turmeric rhizome contains a variety of pigments in which curcumin is the major one responsible for color. Apart from curcumin and volatile oil, it also contains appreciable quantities of proteins (6.30%), lipids (5.10%), carbohydrate (69.40%) and fibre (2.60%) [13,14].

Most of the farmers in Nanded, Hingoli and Parbhani District cultivated turmeric crop plants. Fungal diseases are more common in turmeric than bacterial and viruses. The main diseases on turmeric crop plants are categorized as Leaf spot, Leaf blotch and Rhizome rot. leaf spot caused by Colletotrichum capsici (Syd.) Buttler and Bisby, leaf blotch caused by Tapharina maculans (Fr.) Keissler and rhizome rot caused by Pythium aphanidermatum (Saikia and Roy, 1974). [15,16,17].

Material And Methods

Most of the Farmers in Nanded, Hingoli and Parbhani district cultivated turmeric. The symptoms and control measure of **Leaf Spot, Leaf Blotch and Rhizome Rot** of Turmeric are following:

1. LEAF SPOT

Leaf spot disease of turmeric caused by ***Colletotrichum capsica.***

SYMPTOMS:-

The infection is usually occurs to the leaf blades and may occasionally extend to leaf sheaths. If affected leaves, elliptic or oblong spots with yellow halo are seen. The centre of spots are greyish white and then with numerous black dots in centre. As the disease advances, the leaves dry up and gives a scorched appearance. The spots are about 4-5cm in length and 2-3 cm in width. In advanced stages of disease blackdots representing fungal acervuli occur in concentric rings on spot. The grey centres become thin and gets teared, severly effected leaves dry and wilt. They are surrounded by yellow halos. Indefinite number of spots may be found on a single leaf and cover a major portion of leaf blade. The disease is usually appears in October and November. Relative humidity of 80% and temperature of 21-23^{0}c favours the primary infection.

MANAGEMENT:-

Select seed material from disease free areas. Treat seed material with Mancozeb@ 3g/ litre of water or Carbendazim@ 1g/litre of water for 30 minutes and shade dry before sowing. Spray Mancozeb @ 2.5g/litre of water or Carbendazim @ 1g/litre ; 2-3 sprays at fortnightly intervals. The infected and dried leaves should be collected and burnt in order to reduce the inoculum source in the field. Spraying Blitox or Blue copper at 3g/litre of water was found effective leaf spot. Crop rotations should be followed whenever possible.

LEAF SPOT

2. LEAF BLOTCH

Leaf blotch of turmeric is caused by *Taphrina maculans*

SYMPTOMS

This disease usually appears on lower leaves in October and November. The individual spot are small 1-2mm in width and are mostly rectangular in shape. The disease is characterized by the appearance of several spots on both the surface of leaves, being generally in rows along the veins. The spots coalesce freely and form irregular lesions. The first appears as pale yellow discoloration and then become dirty yellow in colour. The infected leaves disort and have reddish brown appearance.

MANAGEMENT

Select seed material from disease free areas. Treat the seed material with Mancozeb @ 3g/litre of water or Carbendazim @ 1g/litre of water for 30 minutes and shade dry before sowing. Spray Mancozeb @ 2.5g/litre of water or Carbendzim @ 1g/litre; 2-3 sprays at fortnightly intervals. The infected and dried leaves should be collected and burnt in order to reduce the inoculum source in the field. Spraying copper oxychloride at 3g/litre of water was found effective against leaf blotch. Crop rotations should be followed whenever possible.

LEAF BLOTCH

3. RHIZOME ROT

Rhizome rot of turmeric is caused by *Pythium graminicolum* .

SYMPTOMS

The disease is seen on isolated plants or may involve several adjacent clumps resulting in diseased patches. The infected plants show gradual drying up leaves along margins; later the entire leaf dries. The symptoms appear at the base of the pseudostem as water soaked spots. The root system is adversely affected and it gets reduced to few decaying and rotten ones. In advanced stages, the infection progress into the rhizome which become soft and rotten. The colour of rhizome changes from bright orange to different shades of brown. The infection gradually spreads to all the fingers and mother rhizomes and eventually the plant die.

MANAGEMENT

Seed material should be selected from disease free areas. Avoid water stagnation in the field. Light soil may be preferred and drainage facility to be ensured. Grow tolerant varieties like Suguna and Sudarshan. Crop rotation to be followed. Deep plough in summer, planting is to be done in ridge and furrow method. Remove diseased plants to be drenched with Mancozeb (3g/litre) or Ridomil M.Z. Spray the crop with Mancozeb (2.5g/litre) or Carbendazim (1g/litre)+1ml Sandovit.

RHIZOME ROT

RESULT AND DISCUSSION

Integrated disease management strategies involving healthy seed material, crop rotation, need based chemical application, use of disease resistant varieties coupled with biocontrol agents needs to be evolved.

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STUDIES OF MACRONUTRIENTS AND MICRONUTRIENTS ON GROWTH OF TURMERIC (*Curcuma longa* L.)cv. SALEM.

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Abstract:

A field experiment is conducted to study the effect of macronutrients and micronutrients on morphological growth of Turmeric (Curcuma longa L.)cv. Salem. The nutritional requirement of this crop is quite high due to its shallow fibrous root system, long gestation period and potential to produce large quantities of dry matter per unit. Supplementation of macro and micro-nutrientsplays a major role in the growth and development of crop plants.

The experiment was carried out with treatment of N:P:K andB:Zn:Fe applied in the ratio of 100:75:75 kg/ha and 3:6:6 kg/ha. Results of thisexperiment revels that the application of N:P:K and micronutrients enhances the morphological growth of turmeric.

Keywords: Macronutrient, Micronutrients, N:P:K, B:Z:Fe, Fertilizer.

Introduction:

Turmeric (*Curcuma longa* L.) is an herbaceous perennial plant belongs to family Zingiberaceae andit is an ancient, most valuable, sacred spice of India and widely cultivated in tropical areas mainly Southeast Asia [1,3]. It also contains appreciable quantities of protein(6.3%), lipids (5.1%), carbohydrates (69.4%), mineral (3.5%) and other important element ondry weight basis [1,2]. India is also home to more than 30 different types of turmeric cultivars, all unique to their respective regions, (Karnataka, Andhra Pradesh, Tamil Nadu, Orissa and West Bengal this are the leading states involve in turmeric production.) known mostly by the name of locality where they are cultivated also several improved varieties of turmeric are released under the guidance of National Agricultural Research System(NARS) in India [2,3].

Globally India is the major producer of turmeric and 80% of its production is consumed domestically, it is also being produced in Latin American countries like Jamica, Peru andBrazil [3].Turmeric is a tall annual herb it requires considerable amount of rainfall and temperature between 20 and 30^0 C to thrive well, it develops as a large ovoid roots stock that bears stalkless cylindrical tubes with distinct orange colour andrhizomes can be considered as underground stem having roots below and leaves growing above the surface[4].

Dried rhizome is known as ‘Turmeric’, the dried rhizome powder and oil are antiseptic, anti-

inflammatory, anticarcinogenic, antidiabetic and antidepressant, also Curcumin reduces intestinal gas formation, curcumin has been used for the potential treatment of an array of diseases, including cancer, arthritis and other chronic illnesses [5].Turmeric is used incosmetics section also because it has antioxidant properties[6].To plant one hector of land about 2000-2500 Kg seed rhizome (settes) are required mother rhizomes and larger side rhizome are the commonly used planting material [7]. Theplant is mostly cultivated as intercropping in which the required nutrients for this plant [8]. It is general thatgrowth, yield and quality of crop species vary with the soil type and the balance of available nutrients [9]. The fertility of soil is maintained by adding extra fertilizers and different kinds of manure, macronutrients from chemical fertilizers [10]. The essential nutrients of turmeric are nitrogen, phosphorous and potassium also secondary nutrients [11].Nutrient utilisation and enables rapid correction of deficiency than soil application and enhances biological efficiency of crop plant and the quality of produce [12]. Turmeric is highly responsive to chemical fertilizers,inaddition micronutrients fertilizers and mostly liable to reduce diseases [13].There are six macronutrients: Nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulphur (S), NPK are classified as primary macronutrients similarly the micronutrients include boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni) and zinc (Zn) [14]. Recently, multi-nutrient deficiencies are reported widely in Indian soils, due to heavy depletion and continuous omission of micronutrient inputs in fertilizer schedule[15].Turmeric requires heavy nutrients for higher yields, especially higher nitrogen (N) application is effective for rhizome production [16]. The FYM acts as a supplementary role for additional contribution to support the nutrients because of decomposition in the soil [17]. In addition to N,P,K, zinc, iron, boron and manganese are required by most of the crop plants particularly in rhizomatous crop like turmeric for improving the yield and quality attributes [18].
Present studies show that application of macronutrients and micronutrientsenhance the growth and yield of turmeric.

Material And Method:

A field experiment conducted during 2023 to study the effect of macro and micro nutrients on growth of Turmeric (*Curcuma longa L.*) cv. Selam. The following combination of treatments (macronutrients NPK and micronutrients B: Zn: Fe) are used during experiment.

T_1- Control

T_2- N:P:Kapplied in the ratio of 75:50:50Kg/ha

T_3-N:P:Kapplied in the ratioof 125:100:100 Kg/ha

T_4- N:P:K and B:Zn:Fe applied in the ratioof 100:75:75 and 3:6:6 Kg/ha.

As mentioned above rhizome of turmeric was sown in agricultural plot and mineral fertilizers like macronutrients and micronutrients applied in different combination. Macronutrients N:P:K applied

in the form ofurea (nitrogen), P_2O_5 (phosphorous) and murate of potash (potassium). The Treatments (T_1,$T_2T_3$and T_4) of macronutrients and micro nutrientswas applied after 30,60,90 days after planting.

Table: 1 Effect 0f macronutrients and micronutrients on height of Turmeric (*Curcuma longa L.*).

Treatment	Plant Height (cm)			
	90 DAYS	120 DAYS	150 DAYS	180 DAYS
NPK 75+50+50	53.89	75.79	76.89	80.74
NPK 125+100+100	55.26	77.29	79.90	83.02
NPK 100+75+75+B:Zn:Fe 3+6+6	59.56	81.89	83.73	85.39
Control	44.43	69.49	69.77	73.23

Values are the mean of five replicates

Result And Discussion:

The data given in the table shows that the treatment given by combination of mineral nutrients they are NPK 100+75+75+ B:Zn:Fe3+6+6 gives more growth which is 56.26cm, 81.89cm, 83.73cm and 85.39cm at 90, 120, 150 and 180 DAYS respectively over N:P:K 125+100+100, N:P:K 75+50+50 and control. The rhizome size and height of the plant varies from mother rhizome and height of the mother plant. This experiment shows that application of combination of (fertilizer) macronutrients NPK100:75:75 and micronutrients B:Zn:Fe(3:6:6) gives more growth of the plant.

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INFLUENCE OF REACTION TEMPERATURE ON HYDROTHERMALLY GROWN SnO_2 NANOPARTICLES AND THEIR PERFORMANCE IN DYE-SENSITIZED SOLAR CELLS

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Abstract:

The study of dye-sensitized solar cells (DSCs) based on nano-crystalline films of high band gap semiconductors is a progressive field of research that is being carried out by scientists in a wide range of laboratories.The SnO2 nanoparticles were deposited on fluorine-doped tin oxide glass substrates by using the hydrothermal method at a different reaction temperature from 150 to 180 °C. The effects of reaction temperature on structural, morphological and optical properties of deposited SnO2 films have been investigated systematically. Further, the SnO2 films were used as a photoanode for efficient dye-sensitized solar cell (DSSC) application. The XRD patterns show the formation of the tetragonal rutile phase crystal structure. SEM images revealed the increase in length and diameter of SnO2 nanoparticles with respect to the reaction temperature. Current density-voltage characteristics of DSSC showed the correlation between the photo conversion efficiency and reaction temperature. The maximum photoelectric conversion efficiency reached 3.59% along with short-circuit current density of 9.67 mA/cm2 and open-circuit potential of 0.54 V for SnO2 film deposited at 180 °C.

Keywords: Nanoparticles, dye sensitized solar cell, N719 dye, titanium dioxide, heavy metal, remediation

Introduction:

Materials with a size of 1 to 100 nanometers are under the umbrella of the interdisciplinary field of nanotechnology. Materials can display novel features at these nanoscale length scales that are absent or weak in their bulk. Applications of nanotechnology for this purpose have been demonstrated in a wide range of fields, including physics, chemistry, biology, materials science, electronics, and energy sciences. Finding a new source of renewable, efficient, and biocompatible energy is a challenge facing scientists and researchers today since fossil fuel reserves are running out, their use has negative effects on the environment, and greenhouse gas emissions are rising and

warming the world [1]. Alternative energy sources like sun, wind, hydro, tides, biomass from fuel cells, and hydrogen are all of major interest in today's scientific and industrial societies [2]. The largest energy source in the world, solar energy plays a unique role in the supply of energy since it is cheap, emission-free, renewable, and economical. The amount of sunshine the Sun shines onto the planet every hour is higher than the sum of all the resources that the world's population consumes in a year [3]. Therefore, it is extremely important how this energy is produced. Many different types of solar power production systems have been established in various nations with the necessary capacity for solar radiation in order to transport their electricity to the national grid due to the current necessity to harvest sun energy [4]. About 178 GW of the world's electricity supply is produced with solar energy today [5]. With the removal of obstacles, it was predicted by this resource that built-in power plants' solar power potential would reach more than 500 GW by 2020 [6]. Since the fundamental nature of renewable energies, such as solar energy, is largely local and scattered, it makes sense that, in the absence of a global grid, the use of such resources would be decentralised, making dispersion rather than centralised production more justifiable. The global impact of solar energy is depicted in Fig 1. countries has a great chance of bringing this source of energy close to the equator. 3

Nanometer sized materials have recently attracted a considerable amount of attention due to their unique electrical, physical, chemical, and magnetic properties as well as their potential for technological applications [7]. Semiconductor nanoparticles have been extensively studied from both experimental and theoretical views points owing to their potential application in solar energy conversion, photocatalysis, and optoelectronic industry [8]. Tin oxide (SnO2), a n-type semiconductor with a wide band gap (3.6 eV at 300 K) is well known for its potential applications in gas sensors, dye sensitized solar cells, and transparent conducting electrodes and as a catalyst support [9, 10]. Therefore, many processes have been proposed to synthesize SnO2 nanostructures; some involve dry processes such as sputtering from tin oxide target [11] or from metallic target followed by oxidation [12] and chemical vapour deposition (CVD) [13], while others are based on wet processes, including spray pyrolysis [14] and sol-gel-related methods which have been used to prepare tin oxide coating, particles, and precipitates [15–17] Peng et al. [18] have recently reported a hydrothermal synthesis of SnO2 nanorods. However, organic reagents such as hexanol and sodium dodecyl sulfate used in the synthesis of SnO2 nanorods can lead to undesirable impact on human health and on the environment [19]. Zhang et al. [20] also reported a low-temperature fabrication (at 200ºC for 18 hrs via a hydrothermal process of crystalline SnO2 nanorods. Vayssieres et al. [21] reported SnO2 nanorods arrays grown on F-SnO2 4 glass substrates by aqueous thermo hydrolysis at 951ºC. Among the nanoparticles, tin(IV) oxide (SnO2) in particular has gained immense attention due to their versatile applications such as optoelectronic devices, solid-state gas sensors [22], electrodes for lithium-ion batteries [23], field emission displays [24],

light-emitting diodes [25], catalysis [26], dye-based solar cells [27], medicine [28], photo-sensors and antistatic coatings [29]. In material science, SnO2 is considered as an oxygen deficient n-type semiconductor, which crystallizes as the tetragonal rutile structure with lattice constants a=b=4.7374 Å and c=3.1864 Å. The unit cell consists of two six fold coordinated tin and four three-fold coordinated oxygen atoms [30]. A wide energy gap (3.6 to 3.8 eV), strong thermal stability (up to 500 °C), a high degree of transparency in the visible spectrum, strong chemical and physical interactions with the adsorbed species make SnO2 a promising candidate for a potential application in the lithium-ion batteries, sensors, 5 catalysis, energy storage, glass coatings, medicine and environmental remediation [31]. SnO2 is used as a sensor to improve the response time and sensitivity owing to its high specific area, high chemical stability, low electrical resistance, and low density. From the past few years, SnO2 was thoroughly explored for its applications in the solar cells and gas sensors to detect the combustible gases such as CO, NO, NO2, H2S, and C2H5OH [32]. Due to the unique physicochemical properties and potential applications of nanoparticles (NPs), the scientific community has been developing several methods for producing nanoparticles. However, the chemical and physical methods used for the synthesis of metal and metal oxide nanoparticles are quite expensive and use toxic substances that are hazardous to the environment and human health [33]. In recent years, most researchers have changed their research interest toward the green synthesis of NPs because it has many advantages such as cost-effective, simple manufacturing procedure, reproducibility in production, and often results in more stable nanoparticles. During the last decade, several studies on the green synthesis of SnO2 NPs were reported. However, no single review article is available in the literature that demonstrates the methodology of synthesis and mechanism of formation. Hence, this paper describes the green synthesis, mechanism of formation, characterization techniques, and potential applications of SnO2 NPs. SnO2 NPs are synthesized by various physical, chemical, and green methods. The chemical methods include sol–gel, hydrothermal, precipitation, mechanochemical method, microemulsion, and so forth [34]. Among the chemical methods, the most widely used technique is the sol–gel synthesis, which utilizes tin precursor salt and chemical reagents that regulate the formation of the tin-containing gel. After that, the gel is exposed to heat treatment under temperatures up to 800°C to obtain SnO2 NPs. Chemical stabilizers and capping agents, such as oxalic acid or ethylene glycols, can be added during the synthesis of SnO2 NPs to control the size and forbid agglomeration of the nanoparticles [35]. A solution pH, the 6 concentration of chemicals, reaction time, and calcination temperature can also influence the size and morphology of nanoparticles. The aforesaid methods of synthesizing SnO2 NPs utilize various perilous chemical reagents, solvents, and surfactants, which create a serious threat to the environment and human health. SnO2 NPs can also be synthesized by physical techniques such as spray pyrolysis, thermal oxidation, chemical vapor deposition, laser ablation, and ultrasonication [36]. Among these

methods, laser ablation is considered a cost-effective and simple method for synthesizing metal and metal oxide nanoparticles in liquid. In contrast to the other conventional methods, this method does not require capping/reducing agents, high temperature, or high pressure, and allows us to produce nanoparticles of high purity [37]. The variation in the parameters of the pulses applied from the laser beam and the ablation time are important parameters that define the particle size, morphology, and surface chemistry of the nanoparticles. However, most of the physical methods require complex equipment, high energy, and skilled man power [38]. Therefore, it is highly important to develop synthesis methods that are eco-friendly, cheap, efficient and that works at ambient conditions. One such solution is a green synthesis, and many researchers have developed a green chemistry approach for synthesizing tin oxide nanoparticles. In the green synthetic strategy, biological entities like plant extract, microorganisms or other green sources could be used as an alternative to the conventional physical and chemical methods [39]. These days, the biologically inspired methods of synthesis are also known as green synthesis because they go in agreement with the twelve principles of green chemistry [40]. Some of the distinct advantages that biological synthesis has over physical and chemical methods are (a) clean and environmentally friendly method, as nontoxic chemicals are used, (b) the use of renewable sources, (c) the active biological components like enzyme itself as well as phytochemicals acts as reducing and capping agent, thereby minimizing the overall cost of the synthesis process, (d) 7 external experimental conditions like high pressure and temperature are not required, causing significant energy savings [41,42].

In the presented work, nanocrystalline SnO2 powder was synthesized using hydrothermal route and possible growth mechanism was proposed. Tin chloride was used as precursor which is cheap as compared to the granulated tin and tin alkoxide. The synthesized SnO2 nano-crystalline were characterized using the XRD, UV, SEM and IV characteristics, which lay base for reaching the high conversion efficiency of the DSSCs. To the best of the author knowledge this is the first report on photoconversion efficiency of the hydrothermal synthesized nanocrystalline SnO2 powder, against reaction temperature.

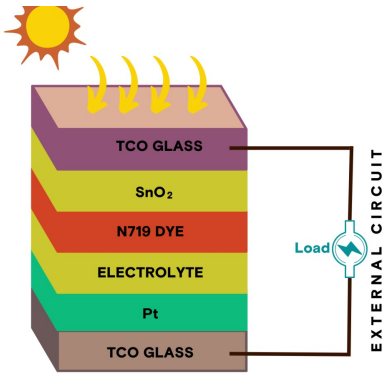

Fig. 1: An illustration of a dye-sensitized solar cell

2. Experimental:

2.1 Chemicals and materials:

Analytical reagent grade (AR) tin tetrachloride ($SnCl_4$),trisodium citrate dihydrate($Na_3C_6H_5O_7.2H_2O$)sodium hydroxide (NaOH),ethyl cellulose), terpinol and ethanol were acquired from S. D. Fine Chem. Ltd., located in Mumbai and used as received was purchased online from Amazon and carbon black used in this work were purchased from sigma aldrich

2.2 Synthesis of SnO_2:

For the synthesis of SnO_2 Nanostructures, 0.004 M of tin tetrachloride ($SnCl_4$) was dissolved completely in distilled water to make a solution of 60 ml. Another solution of 0.01 M was prepared by dissolving trisodium citrate dihydrate($Na_3C_6H_5O_7.2H_2O$) into a distilled water to make a solution with volume 60ml. Similarly Sodium hydroxide (NaOH) solution of 0.2 M was prepared by dissolving it in distilled water to make a solution with volume 60 ml. After sterling at 400 rpm three clear solutions were obtained of 60ml. After mixing all three solution clear solution were obtained of 180 ml. It was transferred into 250 ml Teflon-lined stainless steel autoclave and carried out under hydrothermal treatment at 180ºC for 12h and then autoclave was cooled down to room temperature. Then sample was taken out from the autoclave and poured into cleaned beaker. Clear solution was obtained in another beaker (almost useless). Then after scratching Teflon and by washing it by distilled water cloudy, turbid solution were obtained. Then solution was poured into a clean beaker and it was covered by aluminium foil and kept for 24 h to settle down and after that by drying process the grey powdered form SnO_2were obtained. This is the final product after hydrothermal synthesis.

2.3 SnO_2 synthesis as working electrode:

Using the drop-cast technique, the as-synthesized SnO_2 powder was used to create a thin layer of SnO_2 on a fluorine-doped tin oxide (FTO) glass substrate. To do this, 10 mg of SnO_2 and 1 mg of ethyl cellulose were sonicated for 40 min with a few drops of terpineol: ethanol solution. The film was then annealed at 450 °C for 2 h in an open air atmosphere to obtain the good-quality SnO_2 thin film needed as a working electrode

2.4 The DSSCs assembly:

Dye sensitization was carried out by immersing SnO_2photoelectrode in 0.5 mM N719 dye solution in ethanol for 24 h. A compact, sealed DSSC was fabricated by using two electrode configuration comprising Glass/FTO/SnO_2 (with an active surface area of 1 cm^2) as the photoanode and platinum coated FTO as a counter electrode. Just before the analysis, drops of electrolyte containing 0.5 M LiI, 0.05 M I_2 and 0.5 M tetrabutyl pyridine induced in sandwiched cell until no air bubble is present. The light falls on the back contact of FTO and penetrates the dye adsorbed onto the SnO_2 photoelectrode

2.6 Characterization and evaluation:

The proto-production X-ray diffractometer (XRD) with CuK_{α} radiation (λ= 1.540 Å) operating at a scan rate of 5^{O} min^{-1} and the 2Θ range from 10 to 80^{O} was used to obtain the X-ray diffraction patterns of materials. The morphology of the prepared product was examined using scanning electron microscopy (SEM; JEOL, JSM-IT300) attached with an energy dispersive X-ray spectroscopy (EDS) analyzer to determine elemental composition. The investigation using X-ray photoelectron spectroscopy was done using XPS and PHI Versa Probe-II photoelectron spectroscopy. With the aid of a UV-vis spectrophotometer, the absorbance spectra were acquired (PerkinElmer, Lambda 750). The specific surface areas and pore size distribution of composite were obtained by N2 adsorption–desorption measurement using a QuantamoreNOVAtouch 4LX analyzer at 77 K.Finally, the constructed DSSC was examined for I-V characteristics using a solar simulator (100 mW/cm^2) on an electrochemical workstation (CH-E109) in settings with an air mass of 1.5 g (AM 1.5 g). In an acetonitrile solution of 0.1 M $LiClO_4$, 10 mM LiI, and 1 mM I_2, cyclic voltammetry (CV) was performed at room temperature using a three-electrode system (the Sb_2S_3 thin film was used as a working electrode, the symmetrical platinum sheets were used as the counter electrode, and Ag/AgCl was used as the reference electrode).

3. Result and Discussion:

3.1 Structural Analysis:

The XRD patterns of all the samples of SnO_2 nanoparticles at different sintering temperatures from 373 K–1073 K are shown in Figure 6. The samples namely S1, S2 and S3, are referred with respect to their sintering temperatures of 140ºC, 160ºC and 180^{O}C, respectively. The formation of tetragonal rutile structural phase is confirmed and the peaks obtained are well matched with the JCPDS card no. 14-1445. The XRD plot of the powder samples sintered at different temperature shows increase in the peak intensity values with respect to temperature of sintering thereby showing an increasing crystallinity of the samples with an increasing sintering temperature. Further, it is observed that at lower temperature the peaks are not well resolved indicating the presence of amorphous phase, and secondly the sintering temperature increased indicating the removal of impurities and the formation of crystalline phase. The peak orientations in the planes (110), (101), (200), (211), (220), (002), (310), (301), and (320) clearly indicate the effective growth of the nanostructure in the X-direction. The peak with orientation (200) starts to split at the temperature of 180^{O}C, indicating that higher crystallinity of the material is obtained at high temperature. The width of reflection is considerably broadened, indicating a small crystalline domain size. The broadening decreases with an increase of heat treatment temperature in the range of 160ºC and 180 ^{o}C.

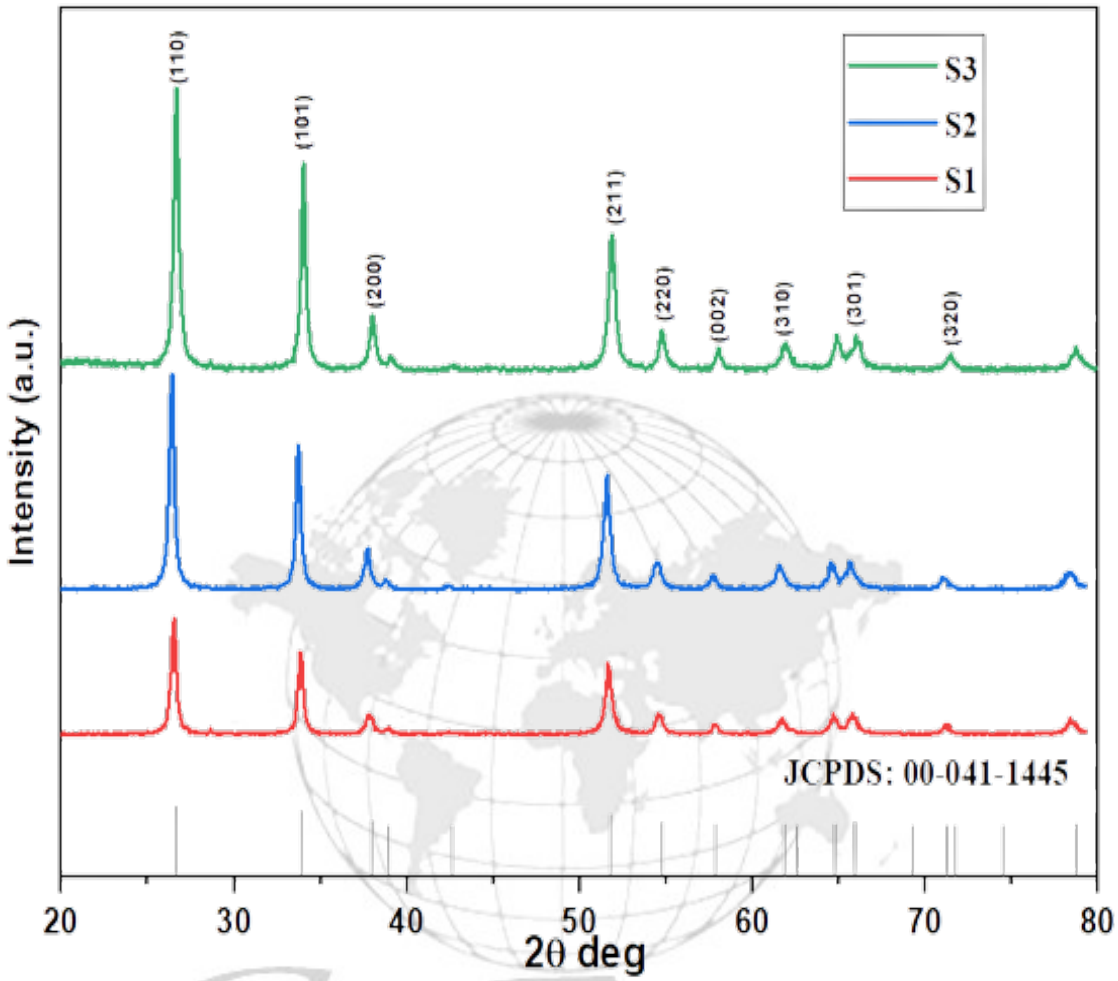

Fig. 2:XRD data of synthesizedSnO_2 sample at different temperature

3.2 Morphological Study

The scanning electron microscopy images of the SnO_2 nanoparticle prepared by hydrothermal method and the effect of reaction temperatures on the same are studied. Figure. 7 show microstructural homogeneities and remarkably different morphology for SnO_2 powder with different reaction temperatures. It is clearly seen that the crystal size of the nanoparticles goes on increasing as the reaction temperature increases. At the initial stages seen in samples S1 and S2, the crystalline size is of only few micrometers, whereas at higher temperatures the size of nanoparticles increases to around 0.92 µm. The grain size of the nanoparticles varied within a few nanometer ranges and is totally depending on the reaction temperatures with linearity

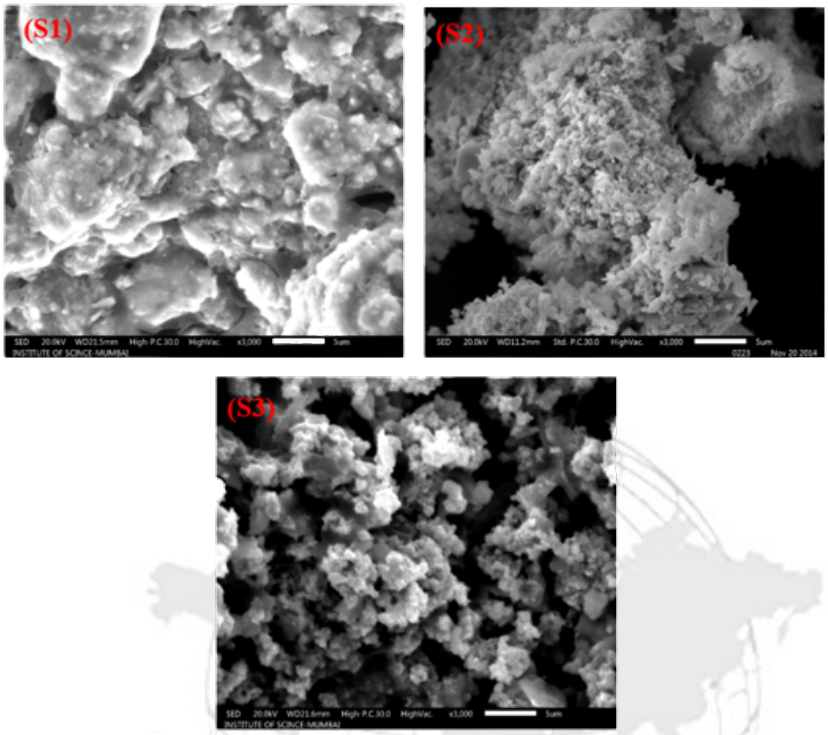

Fig. 3: SEM images of SnO2 nanoparticles at different magnification.

3.3 UV-vis spectroscopy:

In order to calculate the band-gap of the synthesized SnO_2 sample, the linear portion of the $(\alpha h\nu)^2$ versus hν (photon energy) curve is extrapolate the intercept of the hν axis. Fig. 8 (a-b) displaysthe SnO_2 UV-*vis* spectra for different reaction temperature. A small band gap narrowing was seen as reaction temperature was raised from 140 – 180 ^{O}C. The change in amorphous into crystallinity with reaction temperature increament may be what is causing the band gap to narrow. The band gap values range between 3.52 eV to 3.26 eV from 140 –180 ^{O}C.

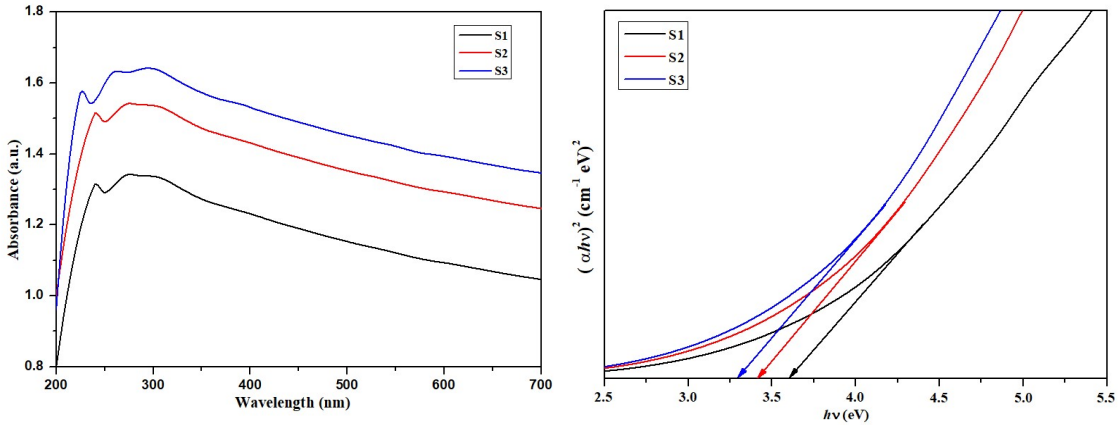

Fig.4:Absorptiom and tauc plot of synthesized SnO_2 nanopartcles.

3.4 Photoelectrochemical Analysis:

The performances of SnO_2 nanoparticles in DSSCs were investigated in this study. The dye sensitization time was 24 h for all cells. The resulting DSSCs were characterized by measuring the current−voltage (I−V) behavior under AM 1.5 simulated sunlight (100 mW/ cm^2). The photocurrent density−voltage (J−V) characteristics of DSSCs based on SnO_2 nanoparticles are shown in Fig. 9 and the detailed photovoltaic clearly shows that the power convention efficiency of DSSC based on high reaction temperature SnO_2 nanoparticles (3.59 %) exhibits a significant enhancement compared to that of DSSC based on low reaction temperature SnO_2 nanoparticles (2.91 %). with the improvement of Jsc from 8.38 to 9.67 $mA \cdot cm^{-2}$). The efficiency improvement could be attributed to the nanoparticle-assembled architecture, which provides a highly efficient electron channel and excellent ability of light scattering.

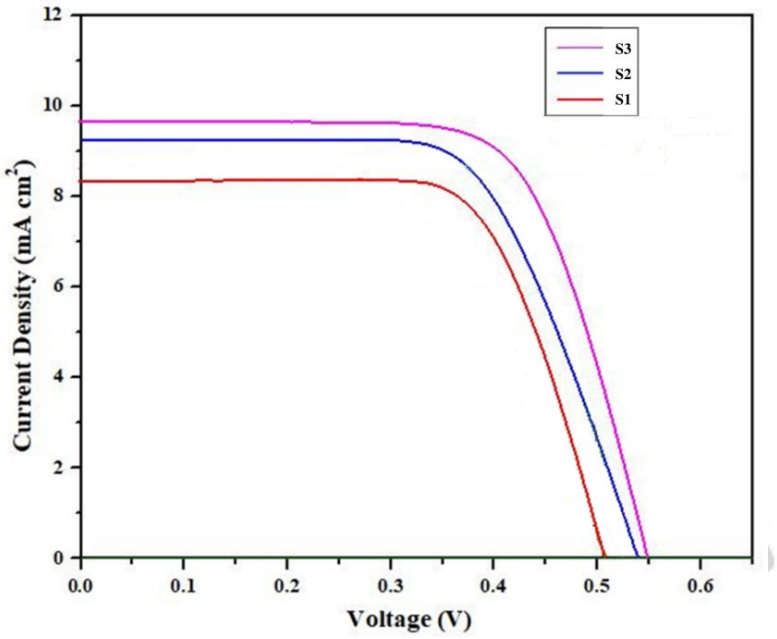

Fig. 6: (a-b) JV characteristic of the SnO_2

Sample code	Jsc	Voc	FF	ŋ
S1	8.38	0.50	0.62	2.91%
S2	9.29	0.53	0.64	3.15%
S3	9.67	0.54	0.64	3.59%

Table 1: Extracted performance parameter from DSSC devices produced with Sb_2S_3 and Sb_2S_3/carbon based material counter electrode.

4. Conclusion:

Using hydrothermal method nanocrystalline SnO_2 powder has been successfully synthesized. The synthesized SnO_2 nano-powder was analyzed at 140 – 180 ^{O}C reaction temperature. X-ray diffraction pattern confirms the tetragonal structure of SnO_2. Thus, this synthesis method is fast, simple, convenient and is feasible on industrial scale to synthesize SnO_2 nanomaterial. SnO_2 based photoanodes with Pt as counter electrode was successfully fabricated as DSSC. The DSSC based on high reaction temperature accomplishes a reasonably good overall conversion of 3.59% with V_{OC} of 0.64 V and JSC of 9.67 mA cm^{-2}. The relatively high performance of DSSC with high temperature SnO_2 is probably due to maximum light harvesting efficiency and direct path for electron-transport.

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PARTIAL PURIFICATION AND ASSESSMENT OF THERMO ALKALINE PROTEASES FROM *INONOTUS DRYADEUS* (Pers.: Fr.) MURR

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Abstract

Proteases have been identified for their important uses at industrial level. In present study we have detected and partial purified the thermo alkaline proteases from Inonotusdryadeustissue. The proteases activity was detected on X-ray film by dot blot assay and purification of proteases was performed by ammonium sulphate precipitation and gel filtration column chromatography. The X-ray film exposed the proteases activity is present in I. dryadeustissue. In final step of gel filtration chromatography proteases was purified with fold purification of 6.96 and specific activity of 40.06 U/mg. The optimum pH and temperature of proteases was detected at 8.0 and 60 ^{0}C respectively. In conclusion the thermo alkaline proteases of I. dryadeus could be beneficial for industrial applications.

Key words: Inonotusdryadeus, Thermoalkaline proteases, Gel filtration column chromatography, X-ray film.

Introduction

Proteases are a group of proteolytic enzymes that catalyze the hydrolysis of peptide bond of proteins. In view of their commercial utilization, they are comprised around 60% of the total worldwide market of enzymes (Singh et al., 2008). They are important in worldwide for their mode of action,vast diversity, specificity and industrial applications (Rao et al., 1998). Plant proteases are used for various biotechnological applications due to their good characteristics such as substrate specificity, activity in wide temperature and pH, good solubility and high stability in

extreme conditions. Due to such properties these proteases are used in various industries such as detergent, food, leather,textile, organic synthesis, silk, pharmaceutical and for recovery of silver from used X-ray films (Antao and Malcata, 2005; Bhaskar et al., 2007). Microorganisms degrade external environment proteins by the proteolytic action of secreted proteases and the products obtained from these circumstances are used as carbon and nitrogen sources for growth of cell (Van et al., 1997). Proteases from bacteria and fungi with stability in the high temperature and alkaline conditions are useful for bioengineering and biotechnological applications (Jellouli et al., 2009; Wang et al., 2009). Alkaline proteases are utilized in the detergent industry for preparation of detergent because the pH of detergent products is usually in the range of 9.0-12.0. The addition of these enzymes to detergents allow the combination of some toxic chemicals such as solvents and corrosive substances with declining their environmental effect (Castro et al., 2004). *Inonotus dryadeus* is an inedible species of fungus belonging to the order of *hymenochaetaceae*. It is a parasitic saprobic fungus, grows close to ground on trunk, hoarsely attached and either singly or in groups (Gary, 2008; Evans et al., 2004).It is found in North America and temperate northern Europe, appears as fruiting body in summer and autumn,the fruiting body persist for several years and turns into black and cracked (Swiecki et al., 2006). The presence of proteases activity and their characterization from *I. dryadeus* has not been reported in literature yet. Thus, in present study we took an efforts for purification and partial characterization of proteases from *I. dryadeus*tissue.

Material and method

Chemicals and reagents

Sephadex G-25-80 and azocasein was purchased from sigma Aldrich. Tris, Hydrochloric acid, Acetone, Folin-Ciocalteau reagent,Trichloroacetic acid, Sodium hydroxide, Sodium chloride, Sodium phosphate, Phosphoric acid, Sodium acetate, Acetic acid andX-ray films were purchased from SISCO research laboratory Pvt. Ltd. All the chemicals and substrate used in this study were of analytical grade

Method

Preparation of sample

Live fibrous fleshtissue of *Inonotus dryadeus* was excised from base of *Delonixregia*tree on ground of campus of Ahmednagar College, Ahmednagar Maharashtra, India and immediately transferred in working laboratory with keeping in ice cold bucket. The cold fibrous tissue was sliced into small pieces (approximately 3×3mm in size) with the help of knife. Pisces was soaked in chilled acetone (1:20 w/v)and kept for overnight in refrigerator at 4^0C to remove color pigments and fatty materials available in same tissue. Thereafter, acetone was decanted and small pieces were washed again twice with gently shaking in chilled acetone to remove traces of color pigments and fatty materials. The pieces were allowed at room temperature for an hour to evaporate acetone and homogenized in 100mM Tris-HCL buffer pH 7.5 (1:10 w/v) by mortar and pestle. The

suspension was centrifuged at 10000 rpm for 15 min at 4^0C and supernatant was collected. Chilled acetone was added in supernatant (1:1 v/v) for precipitation of proteins, precipitated proteins were separated out by centrifugation at 5000 rpm for 15 min at 4^0C and dissolved in same buffer solution. The same sample was preserved at 4^0C in refrigerator and used for proteases detection.

Photograph of*I. dryadeus growing* on *Delonixregia*plant

Protein Estimation

The total protein concentration in preserved sample was estimated by Folin-Ciocalteau assay using bovine serum albumin as a standard protein (Lowry et. al., 1951).

Detection of protease activity(Dlot assay/spot test)

The detection of protease activity in prepared sample was carried out by using dot blot assay/spot test on X-ray film using the method of Pichare andKachole(1994). The principle of this method based on the digestion of gelatin coated on X-ray film by proteases. The drop of sample if loaded on film it hydrolyses the gelatin and forms clear transparent spot against dark background, henceproteases present in sample. The sample (20 µl) was loaded on X-ray film and incubated at 37^0C for 30 min. After incubation X-ray film was washed with warm distilled water and filmwas scanned by using digital scanner. The presence of protease activity in sample was assessed by visual observation with confirming the formation of clear transparent spot against dark background.

Assay of protease activity

Protease activity was assessed by using azocasein as substrate. In a typical reaction mixture containing 250 µl 0.5%azo-casein (prepared in 0.1 M Tris-HCL pH 7.5), 250 µl buffer and 200 µl of crude enzymeextract was incubated for 60 min at 37 ^{0}C. Thereafter, enzymatic reaction was terminated by the addition of 300µl of trichloroacetic acid (TCA, 5% w/v) and centrifuged at 10,000 rpm for 10 min at 4^0C. Equal volume of 1 N NaOH was added to the supernatant and the absorbance was measured at 440 nm. The blank was prepared by mixing ofthe crude enzyme extract, and buffer for 30 min at 37 ^{0}C, followed by the addition of TCA and azocasein. One unit of enzyme activity was considered as the amount of enzyme that promotes a 0.01 increase of absorbance in one hour at 440nm.

Purification of Protease

The ammonium sulphate salt precipitation, desalting and Sephadex-G-25-80 gel gel filtrationChromatography was applied for the purification of protease enzyme from *Inonotus dryadeus* tissue.The crude extract was allowed to 30%, 60% and 90% saturation with slowly addition of ammonium sulphate at room temperature with gently stirring for 1 hr. The obtained precipitate from each step of saturation was removed by centrifugation centrifugation at 10,000 rpm for 30min and dissolved in 100mM Tris-HCL buffer (pH 7.5) and dialyzed against the same buffer for overnight with frequently changing the buffer. The protein concentration and protease activity was measured from each dialyzed suspension and highest protease activity showing dialyzed suspension was subjected to gel filtration chromatography on a Sephadex-G-25-80 column preequilibrated with 25 mMTris-HCL at pH 7.5 containing 0.5 M NaCl. The column was eluted by 100mMTris-HCL buffer (pH 7.5) to wash the unbound proteins and bound proteins were eluted by applying linear salt gradients of 1%, 2%, 3%, 4%, and 5% NaCl in the same buffer. The flow rate of 1.5ml/min was sustained and 30 fractions of 1.5 mL each were collected. All fractions were analyzed for protein concentration and protease activity and preserved at 4^0C for further analysis.

Determination of optimum Temperature of the protease enzyme

The effect of different temperature on protease activity was determined by incubation of reaction mixture (azocasein and crude enzyme) at temperature ranging from 20 to 100^0C (at 10^0C intervals). The protease activity of incubated enzyme was determined by standard assay procedure as described in above section. The residual activity of protease enzyme was determined by treating incubated enzyme with azocasein substrate at same pH.

Determination of optimum pH

The optimum pH of crude enzyme was determined by incubating the reaction mixture (azocasein and crude enzyme) in different pH solutions ranging from 3.0 to 11.0 at the optimum temperature.Different pH buffers were prepared as 100mM sodium acetate buffer (pH 3.0-5.0), 100mM phosphate buffer (pH 6.0-7.0), 100mM Tris-HCl buffer pH (7.0-9.0), and 100mM carbonate (pH 10.0-11.0).The protease activity assay was performed by using standard procedure as described in above section. The residual activity of protease enzyme was determined by treating incubated enzyme with azocasein substrate. The activity of enzyme before incubation was considered as 100% activity.

Result and Discussion

Activity and purification of protease from *Inonotus dryadeus*

The extract was prepared from tissue of *Inonotusdryadeus*in 100mM Tris-HCL buffer pH 7.5 for isolation of protease. The presence of protease activity was qualitatively assessed on gelatin X-ray film by spot test (Pichare and Kachole, 1994). Figure 1 shows that digestion of gelatin on X-

ray film when a drop of extract incubated at 37^0C for 30min that indicates the presence of protease activity in extract of *Inonotus dryadeus*. Fungal cell is able to produce proteases which can be produced in large scale in a short time by fermentation process has been proved by previous study (Paula et al., 2015).*Inonotus dryadeus* is commonly known as inedible species of fungus belonging to the genus*Inonotus* and order *Hymenochaetales* (Gary, 2008). The protease was purified by using ammonium sulphate fractionation and gel filtration chromatography. Table 1 reviews the study of protease purification from *Inonotus dryadeus*.The crude extract was precipitated by ammonium sulphate into 30, 60 and 90% saturation, among those fractions 90% saturated fraction showed more protease activity with purification fold of 3.38, specific activityof 19.44 U/mg protein and 78.59% yield. This fraction further purified by gel filtration chromatography with resulting total 30 fractions eluted (Figure 2).Fraction 12 and 16 showing protease activity were pooled together. The protease enzyme was purified in these fractions with purification fold of 6.96, specific activityof 40.06U/mg protein and 49.98% yield. The purification results were quite analogous with earlier reported study of Mehrnoush et al, 2014 where they purified and characterized the thermoalkaline protease enzyme frompitaya (*Hylocereuspolyrhizus*) by performing ammonium sulphate precipitation, ion-exchange and gel filtration chromatography.

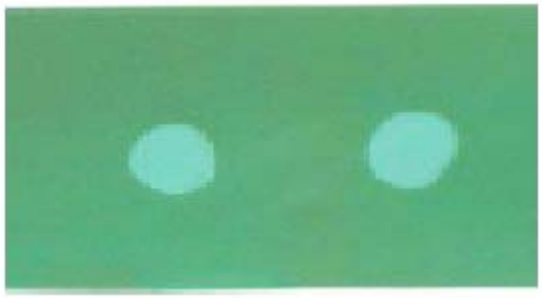

Figure 1: Dot-blot assay-gelatinolytic activity of protease from *Inonotusdryadeus.*

Table 1: Purification steps ofprotease from*Inonotus dryadeus.*

Purification steps	**Total protein (mg)**	**Total activity (U)**	**Specific activity (U/mg)**	**Purification fold**	**Yield (%)**
Crude extract	45.23	260.51	5.75	1	100
Ammonium sulphate fractionation	10.53	204.76	19.44	3.38	78.59
Gel filtration chromatography	3.25	130.22	40.06	6.96	49.98

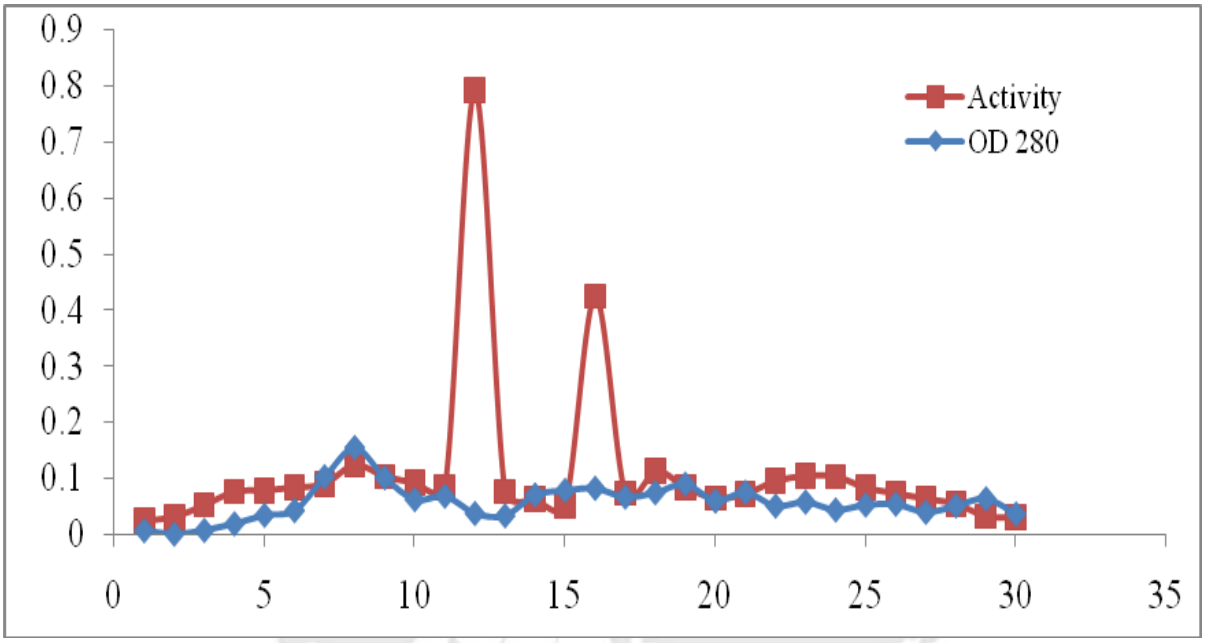

Figure 2: Peaksof protein concentration and protease activity in eluted fractions from gel filtration chromatography. The partially purified fraction from ammonium sulphate precipitation was further purified by sephadex-G-25-80 gel column chromatography and the protein concentration and protease activity in collected fractions was determined by standard procedure.

Optimum temperature of protease enzyme

The protease enzyme available in crude extract was active and stable throughout a wide temperature range (20 to 90^{0}C). The maximum activity of protease was observed at 60 ^{0}C temperature (Figure 3). The enzyme activity increased from 20 ^{0}C temperature to optimum temperature (60 ^{0}C) and next to this temperature activity decreased, the protease activity was totally lost at 100 ^{0}C temperature. The loss of activity could be due to the denaturation of the enzyme at a high temperature.Protease enzyme retained its activity in wide range of temperature (20 to 80^{0}C) this indicating protease enzyme present in *Inonotus dryadeus*is a thermostable at high temperature.This study was quite analogous with the study for isolated protease from some plant sources (Cavello et al., 2013). Thermostability at high temperature is a good characteristic of the protease; such type of protease could be utilized at industrial level to decrease the risk of contaminants at high temperature.

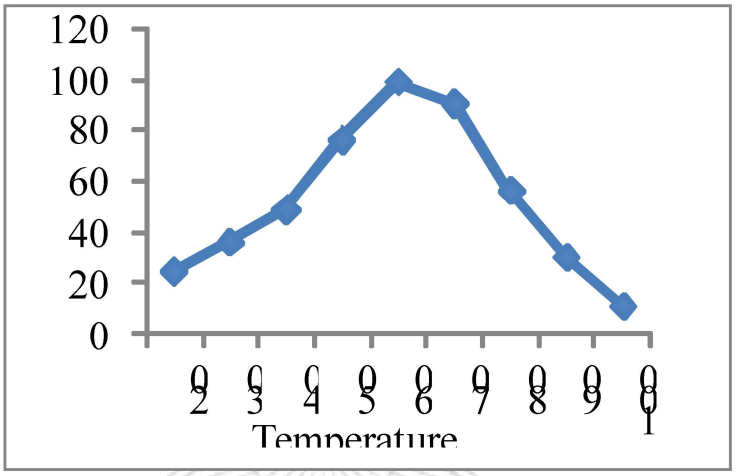

Figure 3: Effect of temperature on protease activity.

Effect of pH on protease activity

Protease enzyme available in crude extract was stable at wide range of pH. The maximum activity of protease was observed at alkaline pH (8.0). At pH 3.0, the protease activity was found to be low and increased continuously towards optimum pH 8.0. Above optimum pH the protease activity decreased and at pH 13.0 activity of protease totally lost. Loss of activity could be due denaturation of enzyme. Remarkable activity at pH 8.0 and stability over a wide pH range reveal the alkaline nature of protease enzyme. The alkaline nature of this protease is important for commercial utilization at industrial level for suitable applications in alkaline environments and with detergents. This result was quite similar to the protease activity from *Euphorbia Milii*where optimum activity observed at pH 8 .0, and activity of protease totally lost over pH 10.0 (Patel et al., 2012).

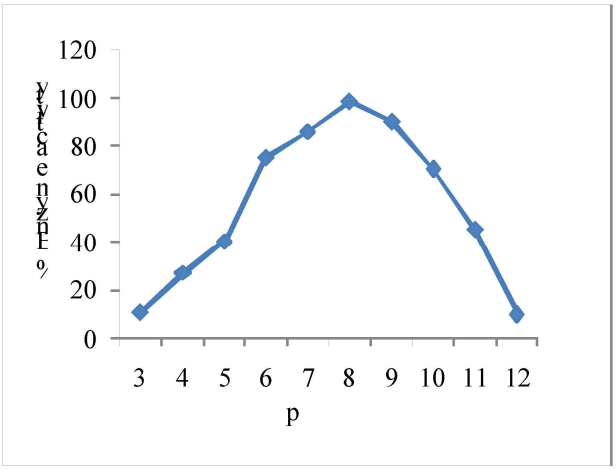

Figure 4: Effect of pH on protease activity.

Conclusion

From the results of this study it was concluded that thermo alkalineproteases enzyme exist in *I.dryadeus* and these proteases may helpful for growth, development and symbiotic relationship with host plant of *I. dryadeus*tissue. Proteases are gelatinolytic, alkaline in nature and active at high temperature, so that this property of *I.dryadeus*proteases is beneficial for utilization of these enzymes in industrial processing at high temperature and pH.

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ALGAL DIVERSITY OF GODAVARI RIVER FROM RAMPURI (VILLAGE) TQ. PATHRI, DISTRICT PARBHANI

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Abstract:

In this study of algal diversity Cyanophyceae, Chlorophyceae and Bacillariophyceae members were recorded from Godavari River in Parbhani district Maharashtra. The colonial, filamentous, non-filamentous algal genera were recorded in winter summer and swmmer season. Different algal mats were analysed. In all 20 algal taxa were recorded from two sites along with three classes with 11 genera. Important members were recorded i.e. Oscillatoria, Rhizoclonium, Scenedesmus, Oedogonium, Cosmarium, Spirogyra Gyrosigma, Synedra, Gomphonema, Fragilaria, Gyrosigmaand Naviculamembers were recorded.

Key words: Rampuri, Godavari river, PathriCyanophyceae, Clorophyceae and Bacillariophyceae

Introduction:-

Phytoplankton are photosynthesizing microscopic organisms that inhibit the upper sunlight layer of almost all oceans and bodies of fresh water, phytoplanktons are autotrophic component of the plankton community. Mostly phytoplanktons are very small which are not individually seen with naked eyes.

Phytoplankton obtains energy through the process of photosynthesis and most therefore live in the well lit surface layer of an ocean lake or other body of water. Phytoplanktons are responsible for much of the oxygen present in the Earth's atmosphere half of the total amount produced by all plant life.Phytoplankton's are a key food item in both aquaculture and mariculture. Both utilize phytoplankton as food for the animals being farmed.It is used as a food stock for the production of rotifers which are in turn used to feed other organisms (Munde 2021).

The Phytoplankton population in any aquatic system is biological wealth of water for fish & constitutes a vital link in the food chain. The Phytoplanktonic study is very useful tool for the assessment of water quality in a type of water body also contributes to understanding of the basic nature & general economy of the lake(Munde 2021).

The present investigation was carried outto study algal diversity of Godavari river in Parbhani districtfrom Rampuri village this work was completed during 2022 to 2023.These algal samples were collected from dhalegaon embankment and nearloard Shiva temple from Rampuri

village tahsil Pathri from Parbhani district Maharashtra

Material and methods:

In this survey of algal diversity algal samples were collected fromGodavari river near from Loard Shiva temple by Random sampling technique with the help of needles forceps, net and directly by hands from different sites. In which most of the samples were collected from Basin of Godavari River (Mulani and Sonule 2018).

Sampling and Morphological study

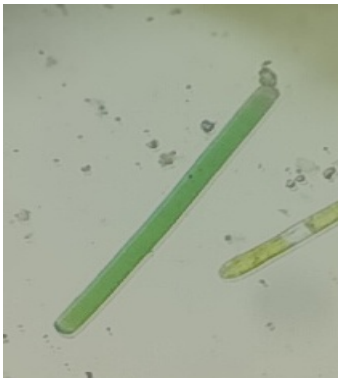
Algal growth was observed in river marginal side, submerged in water, free floating and attached form in water body. Collections of samples were done during the morning period in clean polythene bags and in sample bottles. The collected fresh algal samples were used for the algal identification and remaining ones were preserved in 4% formalin. For the microphotography temporary slides were prepared by using 10% glycerin. Identification of samples was done with the help of standard literature (Desikachary 1959, Anand 1989, Prescott 1951, Ragland et.al. 2014).

Result:

Observations:

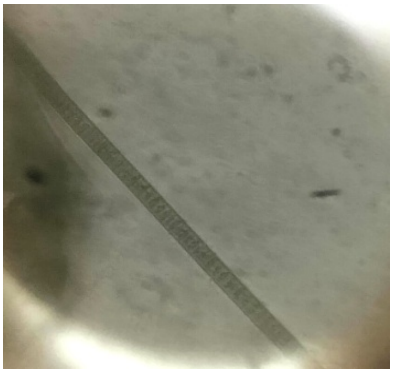
Sr. no.	***Algal speimens***	**Near temple**	**Below embankment**
1.	*Oscillatoria limosa* Ag	Rare	Rare
2.	*Oscillatoria sp.*	Dominant	Rare
3.	*Oscillatoria subbrevis* Schmidle	Dominant	Dominant
4.	*Oscillatoria chilkensis* Biswas	Dominant	Dominant
5.	*Oscillatoria acuta* Bruhl et. Biswas	Dominant	Dominant
6.	*Oscillatoria sp.*	Rare	Rare
7.	*Oedogonium* sp.	Rare	Rare
8.	*Oedogonium argenteum*	Dominant	Dominant
9.	*Oedogonium acrosporium*DeBary	Dominant	Dominant
10.	*Oedogonium crassum*	Dominant	Dominant
11.	*Spirogyra fuellebornei*	Rare	Rare
12.	*Rhizocloniumfontinale*	Rare	Rare
13.	*Scenedesmus quadricauda*(Turp.) Breb	Rare	Rare
14.	*Cosmarium*sp	Rare	Rare
15.	*Gyrosigma* sp.	Dominant	Dominant
16.	*Synedra ulna*	Dominant	Dominant
17.	*Gomphonema gracile*	Dominant	Dominant
18.	*Fragilaria construens*	Dominant	Dominant
19.	*Gyrosigmascalproides*	Dominant	Dominant
20.	*Naviculahungarica*	Dominant	Dominant

In the present research study we have observed the following species



***Oscillatoria limosa* Ag**

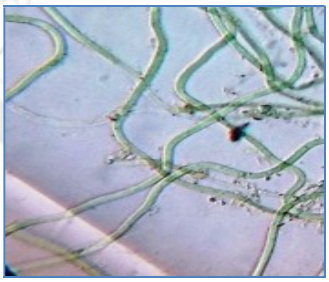
Oscillatoria sp.



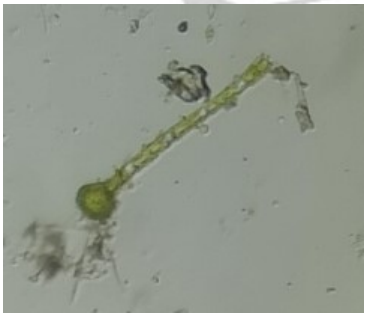
Oscillatoria subbrevis

Oscillatoria chilkensis

Oscillatoria acuta

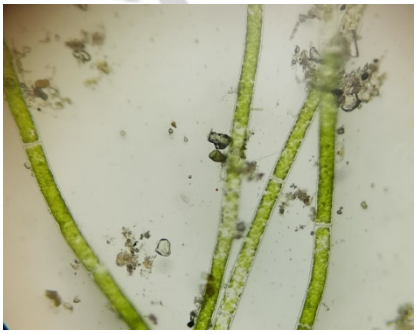


Oscillatoria sp.

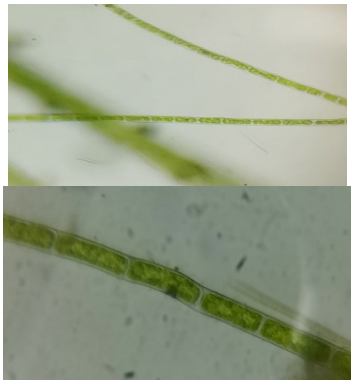


***Oedogonium*sp.**

Oedogonium argenteum

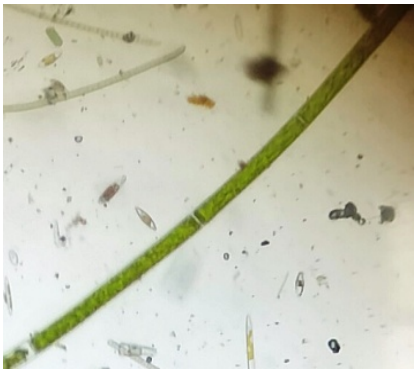


Oedogonium acrosporium



Oedogonium crassum

Spirogyra fuellebornei

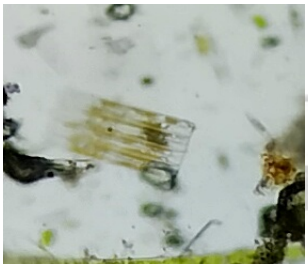


Rhizocloniumfontinale

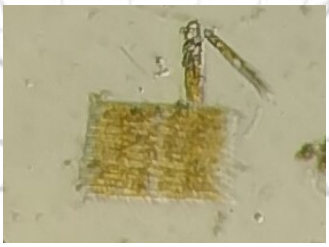
Scenedesmus quadricauda

*Cosmarium*sp

Gyrosigma sp.

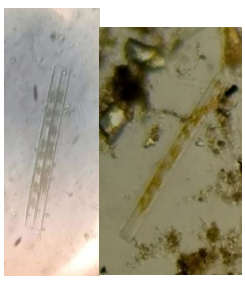


Synedra ulna



Synedra ulna

Gomphonema gracile



Fragilaria construens

Gyrosigmascalproides

Naviculahungarica

1. ***Oscillatoria limosa***Ag. Ex. Gomont

Thallus dark blue green to brown; trichome more or less straight, dull blue green, brown or olive green, not constricted at the cross walls, or only slightly constricted, 11-20(-22)µ long, cross walls frequently granulated; end cell flatly rounded with slightly thickened membrane.

2. ***Oscillatoria subbrevis Schmidle*** Forma

Trichomes single, 5-6 µ broad, nearly straight, not attenuated at the apices; cells 1-2 µ long, not granulated at the cross wall; end cell rounded, calyptra absent.

3. ***Oscillatoria acuta*** Bruhl *et* Biswas, orth. mut. Geitler

Trichomes either solitary or a number of them parallel to each other aggregated in to bundles of moderate size, hardy, brittle, not constricted at the cross walls, 4-6µ thick, 70-400µ long, usually quite straight, narrow or acuminate towards the subobtuse, non-capitate, non-calyptrate apex, which may be straight but is more often rather abruptly bent aside, cells 3-4µ long contents bluish green finely granular, sometimes with some large granules close to the surface

4. ***Oscillatoria chilkensis*** **Biswas**

Trichomes 4µ diameter,somewhat curved, slightly constricted at the joints, apex of the trichomes very shortly tapering,very rarely undulated, not hooked; apical cell obtusely rounded, not pointed or capitate, calyptra none; cells shorter than the diameter, about 2µ in length, transverse walls not granulated, cell contents homogeneous, pale blue green.

5. ***Oscillatoria sp.***

Thallus thin blue green, slimy; trichome straight, fragile slightly constricted at the cross walls, 4-10µ broad, blue-green, sometimes bent at the ends, not attenuated at the apices, not capitate; cells up to one third as long as broad.

6. ***Oedogonium sp.***

Common, submerged aquatic algae. Attached to the solid objects like stone or wood in quiet fresh water. Mature filaments are free floating but the younger ones are attached. Unbranched thread called the filaments. Filaments float in yellowish green mats. In few, it ends in a fine, slender, hair like process. Cell wall differentiated in to two layers. The inner layer cellulosic in nature.

7. ***Oedogonium argenteum*** Hirn

Macrandrous; dioecious. Vegetative cells cylindric, Oogonia solitary; globose or obovoid-globose; opening by a superior pore. Oospores globose or ovoid; not filling the oogonia; outer spore wall deeply scrobiculate; Antheridia 14-18-(22) in diameter. Attached to reeds in a gravel pit.

8. ***Oedogonium acrosporum*****DeBary**

Nannandrous; gynandrosporous or idioandrosporous. Vegetative cells cylindric. Oogonia solitary; ellipsoid; terminal; wall ridged internally with 23-30 longitudinal ribs; operculate;

division superior. Oospores filling the oogonia, with as many ridges on the membrane as the ribs on the wall of the oogonia, and fitting in between them. Dwarf male plants 2 to 4 cells long, the stipe elongate; 2- or 3-celled; attached to the sufi^ultory cell. Antheridia exterior, 7/i, in diameter.

Oedogonium crassum(Hass.)

Macrandrous; dioecious. Vegetative cells cylindric. Oogonia 1-2; ovate; opening by a superior pore. Oospores ellipsoid or ellipsoid-globose; not filling the oogonia; wall smooth. Antheridia (not observed in our collections) 28-33µ in diameter, 8-20)a long.

9. ***Spirogyra Fuellebornei*** Schmidle 1903

Filaments of stout cylindrical cells, with plane end walls; chloroplasts 3-4, making 1 to 2turns. Conjugation by tubes from both gametangia; fertile cellscylindric. Zygospores ellipsoid, with sharply rounded poles; medianspore wall smooth and brown.

10. ***Rhizocloniumfontanum*Kuetzing** 1843,

Filaments coarse, crooked or straight. Cells cylindrical but with uneven lateral walls that are 1.5-2µ thick; 12-22µ in diameter. Branches multicellular, very slightly smaller than the main axis.

11. ***Scenedesmus quadricauda***(Turp.) Breb**(Pl.VII, fig. h)**

Cells forming compact colonies, cells arranged otherwise, colonies flat plate like, cells in groups of variable shapes, colonies irregular, cells are ellipsoidal, fusiform, cells arranged in longitudinal axis. The thallus of *Scenedesmus* is a coenobium consist of 4 cells. Cells parallel with setae, cells are of 4-12 µ long and 2-5 µ broad. Found in stagnant water body. Cell wall smooth, granulate or spicate with lateral or terminal spines. Terminal cell bears long spines. Cell has a tuft of bristles at each end.

12. ***Cosmarium*sp.**

Cells small, slightly longer than broad, sub- rhombic to elliptic, deeply constricted, sinus linear with a dilated extremely; semi cells truncate- pyramidate, basal angles rounded, apical angles rounded, apical angles obtuse, sides straight or slightly convex, apex narrowly truncate; cell wall finely punctate; chloroplast axile with single pyrenoid.

13. ***Gomphonema gracile*** Ehr. var. major Grun.

Valves 67.5 µ long, 10 µ broad, narrowly lanceolate, turgid in the middle and gradually tapering towards the rounded apex and base; raphe thin and straight; axial area narrow; central area with an isolated stigma on the opposite side; striae 10-12 in 10 µ slightly radial and finely punctuate.

14. ***Synedra ulna*** (Nitz) Her **(Pl.XII, fig. e)**

Frustule in girdle view linear with broad end. Valves linear, lanceolate with tapering ends; pseudo raphe narrow, axial, central area varying, valves surface with coarse striae. Length of valve 70-300µ, breath 10-10.5µ girdle width 12µ transverse striae 6-9 in 10µ.

15. ***Fragilaria construens*** Grun var. venter.f. pusilla

Frustules liner attached together to form chain valves long, broad , pseudorape narrow, striae 14-16 µ strong.

16. ***Gyrosigmascalproides***(Rabenhorst) Cleve

Valves 50µm long, 10µm broad, Valves lanceolate, sigmoid, transverse striations perpendicular to the middle line, 22-24 in 10µm.

17. ***Naviculahungarica***Grun **(Pl. XIII, fig. b)**

Valves long central area small, polar stripes strongly marked, stripes 8-9 in 10µm, small forms. Valves with large structure. Central area larger not clearly circular; stripes at the ends of the valve convergent or parallel, valves without long hyline lines.

Conclusion:

In this study of algal diversity Cyanophyceae, Chlorophyceae and Bacillariophyceae members were recorded from Godavari River. In all 20 algal taxa were recorded from two sites along with three classes with 11 genera. From class Cyanophyceae one genus and 06 spobserved, from Bacillariophyceae 06 genus and 07 sp observed and from class Chlorophyceae 05 genus and 09 sp observed. In this study class cyanophyceae and Bacillariophyceae is most dominent as compaire to Chlorophyceae.

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PHYTOCHEMICAL SCREENING, AND ANTIFUNGAL PROPERTIES OF *EUPHORBIA HIRTA* L.

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Abstract:

Various extracts of solvent of Euphorbia hirta(family- Euphorbiaceae) leaves such as hexane, chloroform, dichloromethane, ethyl acetate, methanol and aqueous were evaluated for their phytochemical and antifungal activity against selected fungal sps. like Aspergillus niger, Aspergillus fumigatus, Candida albicans, Saccharomyces cerevisiae and Microsporum gypseum by paper disc diffusion method. The activities of the samples were compared with that of standard antibiotics 'Griseofulvin.' The presence of these phytoconstituents in Euphorbia hirta leaf extracts suggests the potential pharmacological activities of the plant, including antioxidant, antimicrobial, and anti-inflammatory properties. However, further studies are necessary to understand the specific mechanisms of action and potential therapeutic applications of these phytochemicals.In antifungal assay, all the organisms respond to the plant extract but inhibitory zone developed. The chloroform extract showed a higher activity than other extracts. The methanolic extract of Euphorbia hirtashowed higher activity against A. fumigatus and A. niger followed by, Candida albicans, Saccharomyces cerevisiae and Microsporum gypseum the methanolic extract of Euphorbia hirtashowed maximum zone of inhibition against A. fumigatus. The ethyl acetate extract of Euphorbia hirtaexhibited high activity against A. niger and A. fumigatus followed by methanol, chloroform, hexane, and aqueous extracts. The results revealed that the antimicrobial activity exhibited by Euphorbia hirta, chloroform and aqueous extract noted to be most effective than other solvents.

Key words: *Euphorbia hirta*, leaves extracts, phytochemical Screening, antifungal activity

Introduction:

Euphorbia hirta (*E. hirta*) L., from the Euphorbiaceae family, is a tropical, annual herb that can grow up to 90 cm tall, with a slender, hairy, and extensively branched stem. Its leaves are opposite, elliptical to oblong-lanceolate, with serrated edges and a darker top surface [1]. The plant produces small, densely clustered flowers in the upper leaf axils and secretes a white sap when cut. *E. hirta* commonly thrives in disturbed areas like wastelands, watercourse banks, grasslands, and along roadsides and pathways [2,3,4].

E. hirta is highly valued in traditional medicine for its broad medicinal uses. Typically prepared as a decoction or infusion, it treats a wide range of conditions including gastrointestinal disorders, respiratory issues, urinary and reproductive system ailments, skin, and mucosal infections, and provides pain relief for various complaints including headaches and rheumatism. It also offers antiseptic benefits and remedies for insect stings and bites [5]. This study focuses on exploring the phytochemical and antifungal properties of *E. hirta* extracts, aiming to enhance our knowledge of its therapeutic potential [6].

Materials and methods

Plant collection

Fresh and healthy stem of *E. hirta*were collected from in and around Degloor region randomly. Thesamples were washed with tap water to remove dust and contaminant. The plant samples were shade dried untilall the moisture evaporated and pulverized by using mechanical grinder and stored in air tight jar for further use.

Extraction of plant material:

The plant materials were extracted with ethanol using Soxhlet apparatus continuously for 6 to 8 hours. 50 gm ofdried plant material was packed in filter paper and loaded into the thimble of Soxhlet apparatus. 250 ml of differentextract viz; aqueous, ethanol, methanol and acetone were poured into the flask and the all apparatus was set. Theextraction was performed for 6-8 hours. Later the extracted solvent was evaporated under reduced pressure. Thenthe extract was kept in refrigerator for further use.

Phytochemical analysis

The qualitative analysis of tannins, phenols, glycosides, alkaloids, steroids, and flavonoids wereanalysed by standard method [7,8,9].

Selected test microorganisms

Extracts were tested against pathogenic microbes, including the fungi *Aspergillus niger, Aspergillus fumigatus, Candida albicans, Saccharomyces cerevisiae* and *Microsporum gypseum.*

Antifungal activity using disc diffusion method:

The modified paper disc diffusion was employed to determine the antifungal activity of solvent extract ofleaves of *E. hirta*. For antifungal properties, 0.1 ml fungal suspension of 10^5 $CFUml^{-1}$ was uniformlyspread on PDA plate to form lawn cultures. The petroleum ether, chloroform, ethyl acetate and methanol extractswere prepared in their respective solvents in such a manner that ultimate amount (in dry form) in each disc cameto 10mg, 8mg, 6mg, 4mg and 2mg. The blotting paper discs (10mm diameter) were soaked in various dilutedextract, dried in oven at 600^oC to remove excess of solvent and tested for their antifungal activity against fungalpathogens by disc diffusion technique. After incubation of 24 h at 37^0C, zone of inhibition of growth wasmeasured in mm. The antifungal activity was classified according to the zone of inhibition

such as strong (19-22mm), moderate (15-18mm) and mild (11-14mm). Griseofulvin 10mcg (Hi-Media disc) was used as positivecontrol while discs soaked in various organic solvents and dried were placed on lawns as negative control [10].

Results and Discussion

Phytochemical screening of *E. hirta*

Presence and absence of primary phytochemical viz., alkaloids, flavonoids, glycosides, steroids, phenols, tannins, saponins and resins was confirmed in the laboratory tests.

The preliminary phytochemical results of selected solvent extracts of *E. hirta*were showed in the Table 1. It has been mentioned that antioxidant activity of plants might be due to their phenolic compounds [11]. Flavonoids are most known for their antioxidant activity. They are modifiers which modify the body's reactions to allergens, viruses, and carcinogens [12]. They show anti-allergic, anti-inflammatory, antimicrobial and anticancer activity [13]. The presence of alkaloids explains its anti-bacterial activity, since this phytochemical is reported to have anti-bacterial activity. Tannins are reported to have various physiological effects like anti-irritant, antifungal and antimicrobial and antiparasitic effects. Phytotherapeutically tannin-containing plants are used to treat nonspecific diarrhoea, inflammations of mouth and throat and antimicrobial [14].

Table.1 Preliminary phytochemical screening of selected solvent leaf extracts of E. hirta

S. No	Phyto-chemicals	n-Hexane	Chloroform	Dichloromethane	Ethyl acetate	Methanol	Aqueous
1.	Alkaloids	-	-	-	+	-	-
2.	Flavonoids	+	+	+	+	+	-
3.	Glycosides	+	+	+	-	+	+
4.	Steroids	-	-	-	-	-	-
5.	Phenols	-	+	+	+	+	+
6.	Tannins	-	+	+	+	+	+
7.	Saponins	+	-	-	-	-	-
8.	Resins	-	-	-	+	+	-

Antifungal activity of *E. hirta*

The antifungal activity has been screened because of its great medicinal relevance with the recent years, infections have largely increased and resistance against antibiotics, become an ever-increasing therapeutic problem [15,16]. Plant based antimicrobials have enormous therapeutic potential as they can serve the purpose without any side effects that are often associated with synthetic antimicrobial compounds.

Table.2 represents the antifungal effect of selected solvent extracts of *E. hirta*by paper disc

diffusion method against selected fungal strains and the zone of inhibition was assessed in millimetre diameter. The aqueous extract of plant showed best zone of inhibition against *Aspergillus niger and A. fumigatus*. Methanolic extract showed significant activity against *Aspergillus niger and A. fumigatus*. and same zone of inhibition result against *Candida, Saccharomyces and Microsporum*. The ethyl acetate and dichloromethane showed moderate zone of inhibition against fungi. The antifungal activity of n-hexane of *E. hirta*showed maximum zone of inhibition against *Microsporum gypseum* comparison to others. The chloroform showed constantly best zone of inhibition in all fungi among all other solvents. The standard antibiotic "Griseofulvin" showed good antifungal activity and it is considered as standard antibacterial drugs as used today which is taken as positive control against others fungal sps.

Table.2 Antifungal activity of selected solvent extracts of E.hirta (10mg/ml)

S. No.	Fungal sps.	Control	n-Hexane	Chloroform	DCM	Ethyl acetate	Methanol	Aqueous
1.	*Aspergillus niger*	30mm	14mm	11mm	8 mm	13mm	16mm	18mm
2.	*Aspergillus fumigatus*	30mm	10mm	11mm	8 mm	8mm	18mm	20mm
3.	*Candida albicans*	28mm	8mm	12mm	8 mm	10mm	10mm	8mm
4.	*Saccharomyces cerevisiae*	30mm	12mm	10mm	10 mm	10mm	10mm	8mm
5.	*Microsporum gypseum*	26mm	13mm	11mm	11 mm	8mm	11mm	9mm

Control= Griseofulvin 10mg/ml

Conclusion

From the above resultit suggests that the crude extract obtained from the leaves of *E. hirta* exhibits antifungal activity, possibly owing to the presence of diverse phytochemical constituents within them. As a result, these extracts could be proposed as a potential source for pharmaceutical and traditional medicine materials used in the formulation of antifungal agents [17]. This plant different solvents extract recommended further as best antifungal drug. The antifungal activity was screened because of their great medicinal properties towards the pathogenic organisms. The medicinal plant *E. hirta* showed good antifungal against several organisms like *Aspergillus niger, Aspergillus fumigatus, Candida albicans, Saccharomyces cerevisiae and Microsporum gypseum* as supported by previous studies.Additionally, comprehensive studies including toxicity assessments, pharmacokinetic analyses, and clinical trials would be necessary to evaluate the safety and efficacy

of these extracts for use as antifungal drugs in medical practice.

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ISOLATION AND SCREENINGOF ACTINOMYCETES USING VARIOUS PRE-TREATMENTS AND DEPICTING ITS DYE DEGRADATION ABILITY

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Abstract-

Actinomycetes are microorganisms that are found all over the world. It is mostly found in soil, water, and other environments, but most of the habitats are being studied in order to discover new cultures. The current study focuses on a comparative study of actinomycetes isolation from various sources using various treatments. It was discovered that agricultural soil contains a wider variety of actinomycetes than garden soil and lake mud. Actinomycetes were isolated using a variety of treatments. Calcium carbonate and phenol treatments yielded a greater quantity of actinomycetes. The primary dye degradation experiment revealed that around six of the isolates were able to decolorize the red bandhani dye (local bandhanicolor) efficiently. Among those three isolate no. A7 was the highly efficient strain that showed higher decolourisation activity.

Keywords: Actinomycetes, pre-treatments, soil microbes, dye, degradation.

I. Introduction

Soil contains a dominant group of microorganisms known as actinomycetes, in addition to bacteria and fungi. It is a diverse group of microorganisms that shows thread-like filamentous feature similar to fungi(Sapkota et al. 2020). The saprophytic characteristic of this microbial

group, as well as its ability to create a wide range of bioactive chemicals and secondary metabolites, has earned it widespread recognition(Yu et al. 2015).

Actinomycetes are the most common source of antibiotics among bacteria, fungus, and other microorganisms. The antibiotics which are mainly obtained from actinomycetes include tetracycline, chloramphenicol, beta-lactum, etc(C. Dilip V., Mulaje S. 2015). They are able to transform the xenobiotics by means of oxidation, reduction, condensation, dehydration, hydrolysis etc. *Nocardia* and *Streptomyces* are able to perform transformation of selectively specific complicated chemicals that may be synthetic or natural (Banat 2014)

They are widely distributed in nature and are also known for their presence in extreme habitats(Malviya et al. 2014).The number and type of strain present in soil is greatly affected by the geographical location, climate and humidity of environment(Samar, Nasser, and Hanin 2018). Because the presence of actinomycetes is so diverse in nature, their isolation demands a variety of techniques, including sample pre-treatment, enrichment, selective medium, antibiotic usage, and a combination of treatments. Isolation of a new strain with novel activity or traits is a difficult process that necessitates the use of an isolation approach tailored to it. Novel strategies must be adopted for unusual strains(Shivabai and Gutte 2019).

Bacteria other than actinomycetes grow quickly and hence prevent actinomycetes from growing in a pure culture. Traditional approaches were effective in isolating common actinomycetes strains with key characteristics(Singh et al. 2016). Nutritional selection, selective inhibition, sample pre-treatment, enrichment procedure, and other approaches have all been used to develop selective isolation methods(Kumar and Jadeja 2016).

Many of the species can degrade dyes used in the textile, leather, paper, and food industries. Dyes emitted from industrial effluents are toxic to the environment. For example, the higher concentration of dyes in waste water reduces water transparency, resulting in less sunlight penetration in bodies of water. Along with other aquatic life, zooplankton photosynthetic activity is disrupted. Dye degradation products have a negative impact on aquatic and other life forms(Bhattacharya, Goyal, and Gupta 2017). These dyes are needed to be removed from the waste water to reduce its harmful effects. Actinomycetes are capable of producing extracellular and intracellular enzymes that can carry out the mineralisation of recalcitrant azo-dyes(Preethi and Pathy 2020). Few reports have beenpresented over the degradation studies of azo dyes.*Salinisporaarenicola*, *Streptomyces spp.*and*Micromonosporafulviviridis* were able to degrade erichrome black T and congo red from effluent sample(Sahana and M 2016). *Streptomyces cacaoi subsp. cacaoi* was able to degrade red azo dye(Janaki 2016).

The present study deals with the comparative study and application of various methods to isolate the actinomycetes from different sources. The isolates were also studied for the dye degradation ability.

II. Materials & methods:

Reagents:

All the chemicals and reagents used were of analytical grade. The red tie-dyewas obtained from local market of Chh.Sambhajinagar, Maharashtra. Actinomycetes isolation agar, $CaCO_3$ were procured from Hi-media Laboratories Pvt. Ltd. Mumbai.

The components of other media and chemicals such as phenol, K_2HPO_4, $FeSO_4$, $MgSO_4$, NH_4Cl, NaCl, Dextrose were obtained from S D Fine Chem Ltd. Mumbai.

Sample collection:

Soil sample was collected from various locations around Chh. Sambhajinagar. The locations were selected as garden soil, farm soil, lake mud etc. The soil sample collected using the method previously used by A. Sapkota and colleagues(Sapkota et al. 2020).Top 10-12.5 cm layer of the soil surrounding the roots of various plants was dug up for soil sample collection. The samples were collected and stored in sterile zip-lock polythene bags and stored at lower temperature(4^{o}C) until used.

Isolation of Actinomycetes from soil samples:

The soil samples were subjected to various treatments for enrichment of actinomycetes(Kumar and Jadeja 2016).Each sample was divide into four parts. First three treatments were done according to(Shivabai and Gutte 2019)

A) $CaCO_3$ treatment:

A 10gm soil sample was air dried in a sterile petriplate. It was then combined with 1% calcium carbonate and kept at 30° C for three days.

B) Hot air oven treatment:

1gm of soil sample was taken in sterile petri-plate and placed in hot air oven at 60^{o}C for 3 days.

C) Phenol treatment:

1gm of air dried soil sample was added to 1.5%(w/v) phenol solution,it was then incubated at 30^{0}C for 30 min.

D) Sun drying treatment:

The fourth sample was sun dried for a weekin a sterile petriplate(Njenga et al. 2017).10gm of soil sample was placed in a sterile petri-plate and then incubated under sun heat for 7 days. Then it was suspended in sterile distilled water at 50^{o}C for 30 min.

After the respective treatment, the samples were subjected for culture isolation method.

Common media and technique used for isolation:

The common media used for actinomycetes strains was actinomycetes isolation agar supplemented with glycerol(Lee et al. 2014).All the samples were serially diluted upto 10^{-4}& 10^{-5}using sterile distilled water. 0.5 ml of aliquots of each sample dilution were inoculated in the

plates of AIA media using pour plate technique and spread plate technique. All the plates were incubated at room temperature for 7 to 10 days. After incubation the isolated coloniesshowing typical actinomycetes like morphological characters were picked up. The pure strains of actinomycetes were stored on AIA agar slants and were used for further studies.

Morphological properties:

Colony colour, form, margin and elevation, pigmentation on the surface of media and below the surface of media were recorded. Cover slip method was used to study and identify the isolates according to(Mohan et al. 2014).

Primary screening of dye decolourisingisolates:

Dye decolourising activity of the isolates was studied using minimal salt media (both agar and broth). Red bandhani dye was added to the media in 1mg/ml concentration (Wai, Yusop, and Pahirulzaman 2020). The isolates were spot inoculated on the dye accompanied media. A loop-full culture of each isolate was inoculated in the dye accompanied broths,separately. The media were placed for incubation at room temperature. The decolourisation activity was checked for every 48 hrs.

500 ul sample from each sample was collected aseptically in a sterile eppendorff and centrifuged at 5000 rpm. Supernatant was collected to check the absorbance at its $\lambda_{max.}$ λ_{max} for the red bandhani dye was observed to be 500nm. The plates were observed for zone of clearance around the colonies. The data was represented graphically.

Analysis of the dye decolourisation at variable concentration:

The selected isolates from the primary screening procedure were analysed for their dye decolourisation efficiency. The isolates were tested for decolourisation of different dye concentrations(Khan and Joshi 2020).Three sets ofminimal media tubes were prepared for each of the isolate to be studied with different concentration of tie-dye such as 0.5mg/ml, 1mg/ml, 1.5mg/ml, 2mg/ml, 2.5mg/ml, and 3mg/ml. The isolates were inoculated into the media separately. All the tubes were incubated at room temperature until the dye decolourisation occurs. The aliquots of 1ml were removed from each of the tube to check the dye decolourisation using the method given above.

III. Results:

Isolation of Actinomycetes from soil samples:

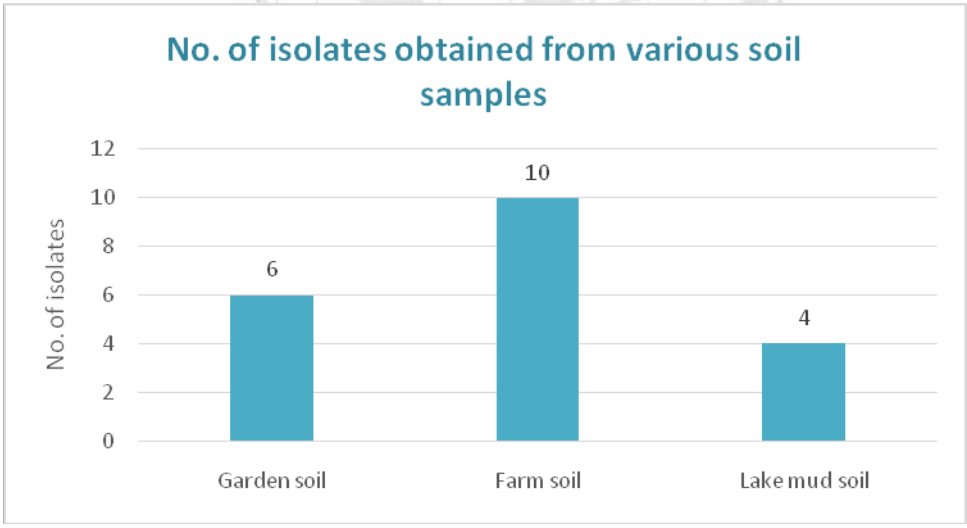
Using diverse procedures, a total of 20 isolates were isolated from various soil samples. The use of phenol and calcium carbonate as treatments for actinomycetes isolation was shown to be successful and suitable method. Actinomycetes of different types were found in all of the treatments. The agricultural soil had the most strains present out of all of the soil samples tested. Table no. 1 and 2 indicate the quantity and percentage of isolates detected in different soil samples with different treatments.

Table no. 1. Actinomycetes isolation details from various soil samples.

Sr. no.	Soil sample	No. of isolates obtained
1	Garden soil	6
2	Farm soil	10
3	Lake mud soil	4

Table no. 2. Percentage of actinomycetes isolated from soil sample using various treatment

Pre-treatment	No. of colonies obtained	% of total isolates obtained
Calcium carbonate	8	40
Phenol	5	25
Hot air oven	3	15
Sun drying	4	20



Graph no. 1. Soil sample used with number of isolates

Morphological properties:

The morphological characters of the isolates along with the pigment colour are presented in the table no. 3. And figure no. 1 As from the obtained data some of the isolates were able to produce melanin like pigmented colonies. Others were able to produce dark pigment on reverse side of agar.

Table no. 3 Morphological properties of isolates.

Sr. no	Culture	Colour	Reverse side pigments	Diffused pigmentation
1.	A1	White	White	-
2.	A2	White	Pale white	-
3.	A3	White with pink tinge	Pale white	-
4.	A4	White	Pale white	-
5.	A5	White	Pale white	-
6.	A6	Pale white (later grey)	Pale white (later black)	-
7.	A7	Pale white (later grey)	Pale white (later black)	-
8.	A8	White with pink at centre	White	-
9.	A9	Grey brown	Dark brown	-
10.	A10	White	Brown	Brown
11.	A11	Brown	Dark brown	Light brown
12.	A12	Brown with white margin	Brown	-
13.	A13	White	Pale white	-
14.	A14	White	Pale white	Light brown
15.	A15	Pink	Pale white	-
16.	A16	White	White	-
17.	A17	White	White	-
18.	A18	Yellow	Yellow	-
19.	A19	White	Pale white	Light brown
20.	A20	White to light violet/pink	White	-

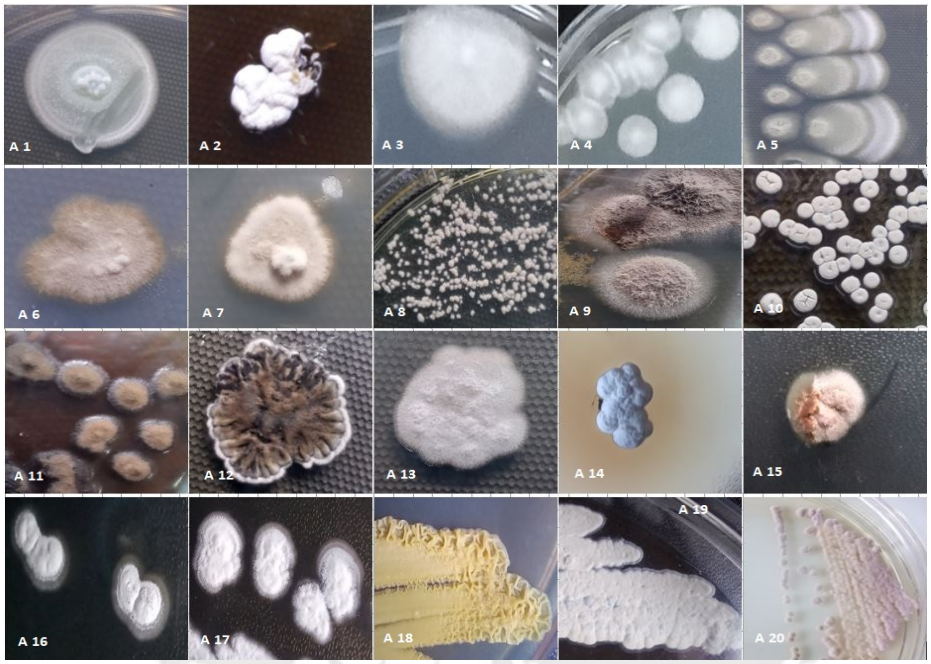


Figure no. 1 Isolates with their images

Primary screening of dye decolourising isolates:

Most of the isolates were able to degrade the dye, both on plate and broth. It was noticed that among the 20 isolates, isolate no. 6, 7, 9, 13, 18, 19 had shown maximum ability to degrade the red bandhani dye. The dye degradation ability on agar plates was observed by measuring the clear zone (cm) around the colonies. Among all the 20 isolate no. 6,7,19 were found to be highly efficient strains and were selected for further studies. The details can be observed in fig. no. 2 & 3

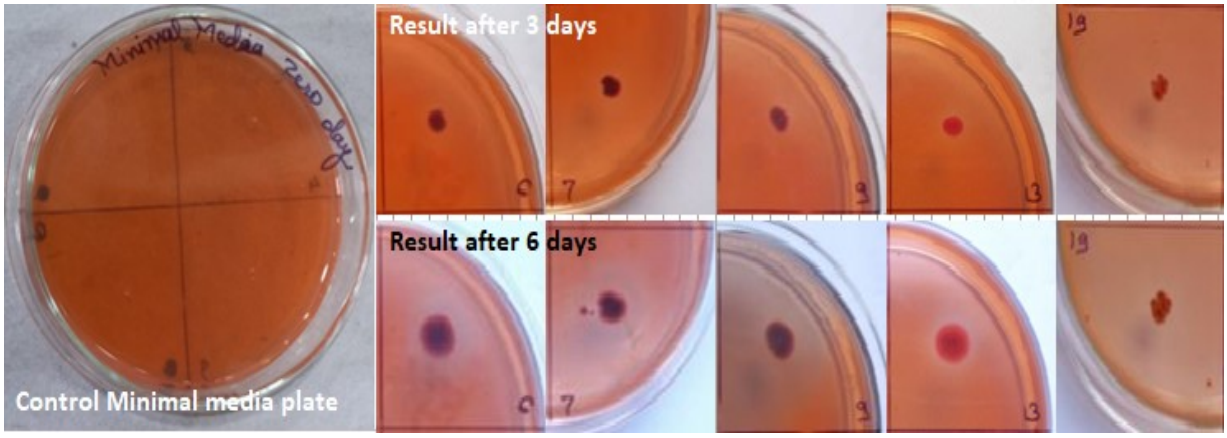


Figure no. 2 Tie dye degradation (Before and after)

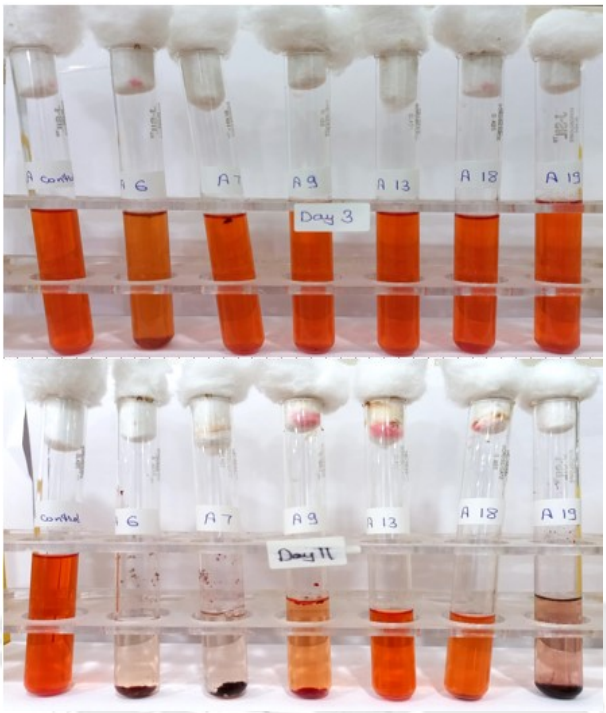
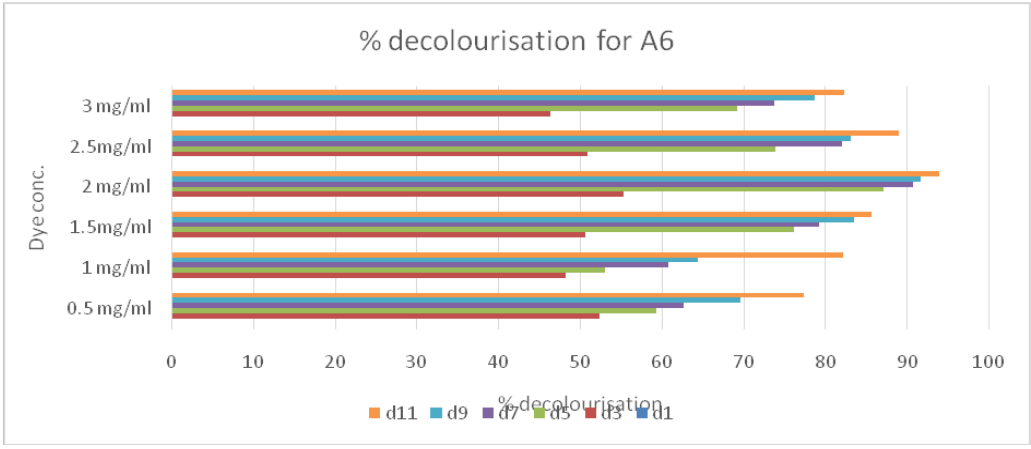


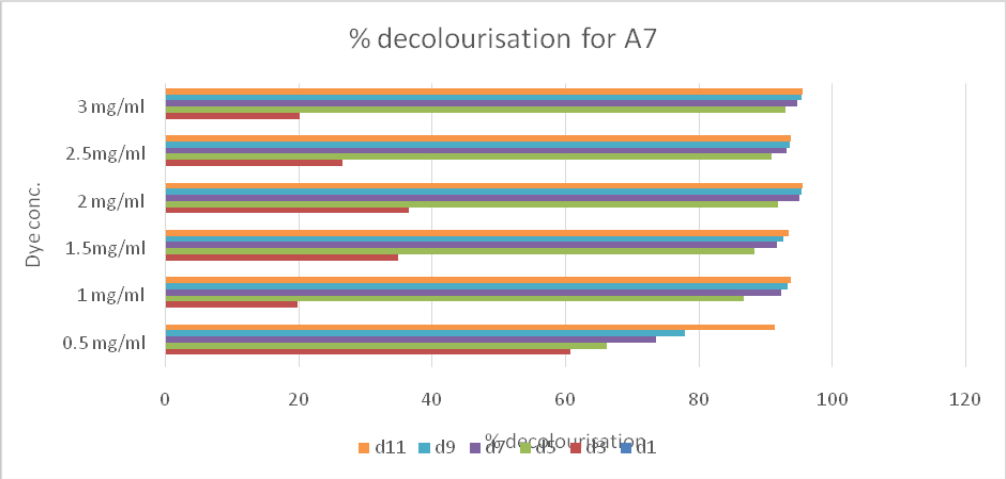
Figure no. 3 Tie dye degradation (showing the results from day 3 and 11)

Degradation analysis for selected isolates:

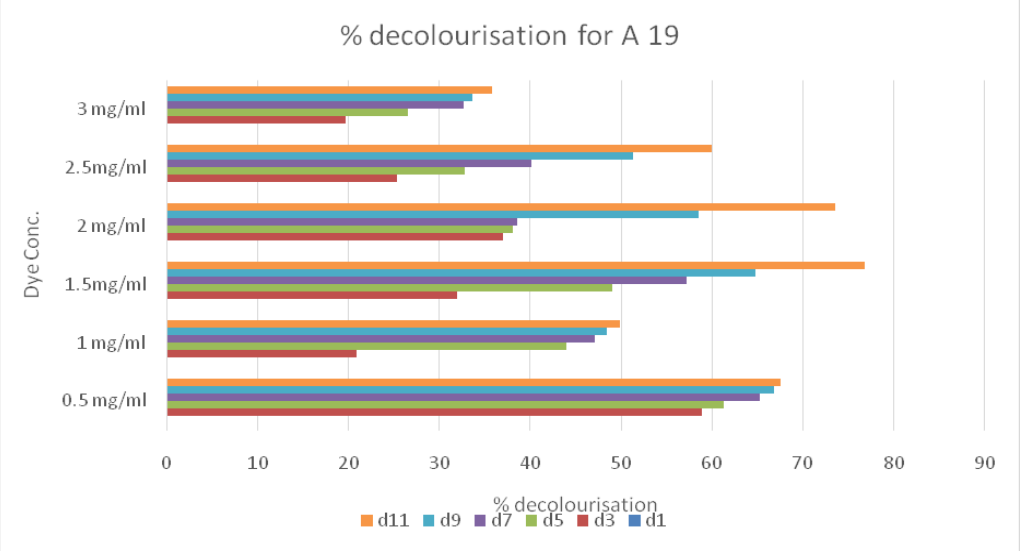
All the three isolates were incubated with a variable concentration of dye for several days. An aliquot of 1ml was removed from each tube was removed after an alternate day of incubation and was checked for the calculation of percentage of dye decolourisation. All the data can be seen in the following graph no.2,3 and 4. Among the three isolates the culture no A7 was very efficient in dye decolourisation at all the concentration of dyes in minimal media.it was able to show the higher percentage of dye degradation that ranges between 90-95% of dye degradation for all the concentrations. Next to it was culture no. A6 and A19,that shows the degradation percentage ranging between 70- 95% and 35-75% respectively.



Graph no. 2 Showing % of dye decolourisation for culture A6



Graph no. 3 Showing % of dye decolourisation for culture A7



Graph no. 4 Showing % of dye decolourisation for culture A19

IV. Conclusion:

From the ongoing research it was found that the agricultural soil is far rich in actinomycetes. Garden soil and lake mud also consist of moderate amount of actinomycetes. When it comes to isolation of actinomycetes, pre-treatments are necessary. Calcium carbonate and phenol treatment were effective for the isolation process. 40% and 25% of the total isolates were obtained from calcium carbonate and phenol method respectively. Both pigmented and non-pigmented colonies were found. Experimental analysis for red bandhani dye degradation showed that some of the isolates are capable of degrading the red bandhani dye. Among 20 isolates.A6,A7,A9,A13, A18,A19 were competent to show the positive results. A6, A7 and A19 showed the maximum degradation capacity. When it comes at dye decolourisation at variable concentration the isolate no A7 has maximum capacity to carry out the decolourisation activity.

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ANATOMICAL WORK ON *MORINGA CONCANENSIS* NIMMO AND *MORINGA OLEIFERA LAM*

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Abstract

Moringa species, Moringa concanensis Nimmo. and Moringa oleifera Lam. have gained significant attention due to their diverse medicinal, nutritional, and industrial applications. Comparative anatomical studies between these two species remain limited. This research aimed to provide a anatomical comparison between Moringa concanensis Nimmo. and Moringa oleifera Lam. Fresh plant material collected from native habitats and subjected to standard anatomical techniques, including sectioning, staining, and microscopy various anatomical features such as stem, pedicel, peduncle, petiole.

Keywords: Moringaceae Family, *Moringa concanensis* Nimmo., *Moringa oleifera* Lam. anatomy.,

INTRODUCTION

Moringaceae is monogeneric family (genus Moringa Adans) and comprises ca. 13 species in world. It is distributed worldwide from tropic to sub-tropic and arid to sub-arid zone (Olson, 2002). While in India, it comprises only 2 species, *Moringa oleifera* Lam. and *M. concanensis* Nimmo. distributed to all over India specially in arid to sub-arid zones (Cook, 1903).

Habit of the genus Moringa is vary from species to species, it shows large shrub to small tree. The genus consists of bi or tripinnately compound leaves, alternate; light weighted and light-coloured wood; flowers white to cream in colored, zygomorphic bearing on axillary or apical panicle; fruit siliqua with winged seed.

Moringa oleifera Lam. commonly known as horse-radish tree, drumstick tree, mother best tree and Indian ben for its multi-purpose uses (Abubakar et al., 2011). Leaves, pod, flowers are used as vegetable, source of non edible oil and micronutrients; making of dye, honey, clarifier medicine, ornamental, water purification; and consist of antimicrobial (caceres et al., 1991), antioxidant and pharmacological properties (Saalu et al., 2011). Leaf of this plant contains rich micronutrient like zink, iron, and vitamin A etc., which are used in treating malnutrition in children. The high proportions of mineral and vitamin in Moringa leaves suggest its importance for human as well as animal. *Moringa oleifera* is cultivated as a fodder crop in many parts of the world. (Sanchez et al 2006).

Moringa oleifera Lam. is native to southern foot hills of the Himalaya. This is the only species that widely cultivated in tropics to sub- tropics of the world than any other species of genus.

Moringa concanensis Nimmo. is distributed narrow range from India to Baluchisthan (Cook, 1903), mostly at drier parts and semi arid to arid zone. *M. concanensis* have traditional medicinal value. It is used in many diseases like dental problem, aphrodisiac, paralysis, abscess, epilepsy, rheumatism etc, (Prajapati, 2003). The leaves and flowers possess anti-inflammatory, analgesic, antipyretic antimicrobial properties (Balamurugan & Balamurugan, 2013). It is also used in Ayurveda, Siddha, Unani and Homeopathic systems (Sri Krishna, et al., 2006) and as a traditional medicine in developing countries (Tubuti et al., 2003).

Anatomical works of many species of the genus have been done by many workers even anatomy related to ecology. Anatomical variation according to population in *M. oleifera* Lam. have been worked by Olson (2001), Abubakar, et al. (2011), Iman et al. (1996) and Abubakar (2013).

In present work we have done following objectives

1) Gross anatomical study on stem, petiole, peduncle and edicel of *M. concanensis* Nimmo.
2) Gross anatomical study on stem, petiole, peduncle and pedicel of *M. oleifera* Lam.
3) Differences between *M. concanensis* Nimmo. and *M. oleifera* Lam. by means of gross anatomy of stem, petiole, peduncle and pedicel.

METHODS AND MATERIAL

In present work the plant materials (stem, petiole, peduncle and pedicel) of *Moringa concanensis* were collected from wild while, plant materials (stem, petiole, peduncle and pedicel) of *M. oleifera* collected from cultivated plants around the Shahada city. Nandurbar District Collected plant materials were fixed in 50% alcohol for 2 to 10 days. Transverse sections (T. S.) were taken of fixed plant material through hand by using razor.

The transverse section stained by using conventional double stained method with 1N HCL treatment. For staining, we were used Safranin and Fast-green stain (Table. 1).

For permanent slide, we used conventional method i.e. combination of butanol and glacial acetic acid (Table.2). Same sized plant materials (T.S.) were selected for anatomical description of *M. concanensis* and *M. oleifera*. Herbarium specimens and permanent slides were deposited in Department of Botany.

Table. 1: Procedure of double stain

Steps	Procedure	Time
1	T.S. were kept in dilute Safranin	5 Min
2	Stained T.S. wash in Tap water	2 Min
3	T.S. kept in 1N HCL	2-3 Min
4	T.S. washed in Tap water	2 Min
5	T.S. kept in dilute fast green	5 Min
6	T.S. washed in Tap water	½ Min

Table: -II Procedure of permanent slide

Step	Procedure	Time
I	T.S. kept in Glacial acetic acid	5 Min
II	T.S. kept in (Glacial acetic acid) 3 parts: Butanol 1part	10 Min
III	T.S. kept in (Glacial acetic acid) 1 part: Butanol 1 part	10 Min
IV	T.S. kept in Butanol	10 Min
V	T.S. kept on slide for drying	
VI	Wait for slightly dry. DPX on slide near to T.S with carefully without any air bubble	
VII	Put cover slip on material kept. Take care for air bubble. The slide kept overnight for drying.	
VIII	Extra DPX material (out of slide) were cut by means of sharp blade	

RESULTS AND DISCUSSION:

1.a) *Moringa concanensis* Nimmo.: T.S. of Stem

Epidermis consists of single compact cell layer, thick cuticle layer at outer side, below the epidermis cortex layer present. Cortex consists of 5-6 layer; first layer consists of 1-3 celled thick schlerenchymatous cells; second consist of 3-5 cell thick collenchymatous cell; below that thick single tangential cell layer exist which connected to pericycle through became 2-3 celled irregular thick strand like structure; endodermis not differentiate. Phloem and xylem distinctly separated through 3-4 celled thick tangential shaped cambium cells. Xylem possess large oval to circular vessels in row in various size probably for water store. Below the xylem thin cell walled parenchymatous cell present, which contains oval to round shaped clustered granules. At the center very small cavity found.

1.b) *Moringa concanensis* Nimmo.: T.S. of Petiole

Epidermis consists of 1-2 celled thick. Stomata, glandular and eglandular single celled trichomes laying at outer side, below the epidermis 3-4 cortex layers exist. First layer of cortex consists of thin-walled chlorenchymatous cells, 5-6 celled thick, loosely arranged with intercellular space; below that 8-10 cell thick schlerenchymatous cells layer present, pericycle cell layer interrupted with 2-3 celled thick strand irregularly, below that pericycle exist. Endodermis not differentiated. Xylem and phloem separated by 1-2 celled thick cambium cells. Xylem consists of many vessels, in a row for water storage. Below the xylem parenchymatous thin-walled cell present, oil granules absent. At the center small air cavity exist.

1.c) *Moringa concanensis* Nimmo.: T.S. of Peduncle

Epidermis consists of single compact cell layer, unicellular glandular and eglandular trichomes laying at outer side. Cortex consist of 4-5 layer; upper layer consists of 1-3 row of collenchymatous cell; below that 8-10 celled thick chlorenchymatous cell layer present, ca. 8-10 schlerenchymatous celled layer (pericycle) present. This layer interrupted with phloem cells. Phloem and xylem separated by 2-3 row of tangential cambium cell. Xylem contain oval to rounded shape vessels, 2-5 vessels forms a row. The wood parenchyma surrounded on primary vascular bundle. At pith region consist of big rounded loose arranged, thin-walled parenchymatous cell, which contain cluster of oil granules. At the center air cavity exist.

1.d) *Moringa concanensis* Nimmo.: T.S. of Pedicel

Epidermis consists of single compact cell layer, unicellular glandular and eglandular trichomes and stomata laying at outer side. A single row collenchymatous cell layer lying below the epidermis, ca. 8 celled thick row layer of parenchymatous cell lying below the chlorenchymatous layer, loosely arranged, contains oil granule below that 2-3 collenchymatous cell layer exist. Endodermis and pericycle not distinguished. Phloem patch consist of ca. 6-8 cells while xylem patch consists of 1-3 cells. Parenchymatous cells interrupted in to vascular bundle, large angular circular parenchymatous cell exist at central region, loosely arranged with few granules of oil.

2.a) *Moringa oleifera* Lam.: T.S. of Stem

Epidermis consists of single compact cell layer, thick cuticle layer at outer side, below the epidermis cortex layer present. Cortex consists of 5-6 layer; first layer consists of 1-3 celled thick schlerenchymatous cells; second consist of 3-5 cell thick collenchymatous cell; below that thick single tangential cell layer exist which connected to pericycle through became 2-3 celled irregular thick strand like structure; endodermis not differentiate. Phloem and xylem distinctly separated through 3-4 celled thick tangential shaped cambium cells. Xylem various size probably for water store. Below the xylem thin cell walled parenchymatous cell present, which contains oval to round shaped clustered granules. At the center very small cavity found.

2.b) *Moringa oleifera* Lam.: T.S. of Petiole

Epidermis consists of 1-2 celled thick. Stomata, glandular and eglandular single celled trichomes laying at outer side, below the epidermis 3-4 cortex layers exist. First layer of cortex consists of thin-walled chlorenchymatous cells, 5-6 celled thick, loosely arranged with intercellular space; below that 8-10 cell thick schlerenchymatous cells layer present, pericycle cell layer interrupted with 2-3 celled thick strand irregularly.

Below that pericycle exist. Endodermis not differentiated. Xylem and phloem separated by 1-2 celled thick cambium cells. Xylem consists of many vessels, in a row for water storage. Below the xylem parenchymatous thin-walled cell present, oil granules absent. At the center small air cavity exist.

2.c) *Moringa oleifera* Lam.: T.S. of Peduncle

Epidermis consists of single compact cell layer, unicellular glandular and eglandular trichomes laying at outer side. Cortex consist of 4-5 layer; upper layer consists of 1-3 row of collenchymatous cell; below that 8-10 celled thick chlorenchymatous cell layer present, ca. 8-10 schlerenchymatous celled layer (pericycle) present. This layer interrupted with phloem cells. Phloem and xylem separated by 2-3 row of tangential cambium cell. Xylem contain oval to rounded shape vessels, 2-5 vessels forms a row. The wood parenchyma surrounded on primary vascular bundle. At pith region consist of big rounded loose arranged, thin-walled parenchymatous cell, which contain cluster of oil granules. At the center air cavity exist.

2.d) *Moringa oleifera* Lam.: T.S. of Pedicel

Epidermis consists of single compact cell layer, unicellular glandular and eglandular trichomes and stomata lying at outer side. A single row collenchymatous cell layer lying below the epidermis, ca. 8 celled thick row layer of parenchymatous cell lying below the chlorenchymatous layer, loosely arranged, contains oil granule, below that 2-3 collenchymatous cell layer exist. Endodermis and pericycle not distinguished. Phloem patch consist of ca. 6-8 cells while xylem patch consists more than 8 xylem cells. Parenchymatous cells interrupted in to vascular bundle, large angular circular parenchymatous cell exist at central region, loosely arranged with parenchymatous cell it contains cluster of oil granules.

CONCLUSION: -

- *Moringa concanensis* Nimmo. and *Moringa oleifera* Lam. were showed same in gross T.S. of stem, petiole and peduncle.
- But both species were showed slightly dissimilarities in T.S. of pedicel. The pedicel gross anatomy character can be useful for identification of species.
- On the basis of gross pedicel anatomy, the key of both species are as below:

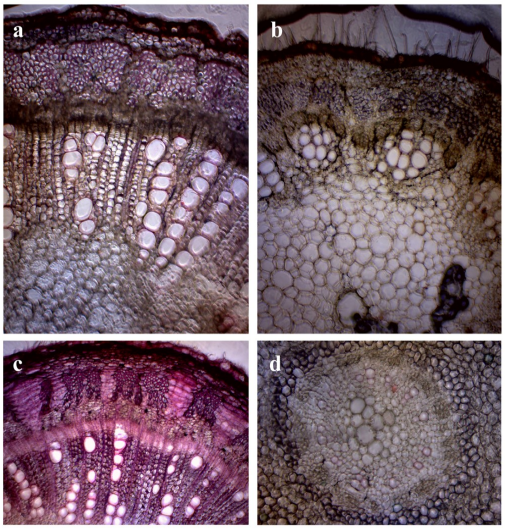
1a. Vascular bundle consists of 1-3 xylem cells; pith parenchymatous cell contains few numbers of oil granules and do not form clusters …...

***M. concanensis* Nimmo.**

1b. Vascular bundle consist of more than 8 xylem cells; pith parenchymatous cell contains number of oil granules in the form clusters……

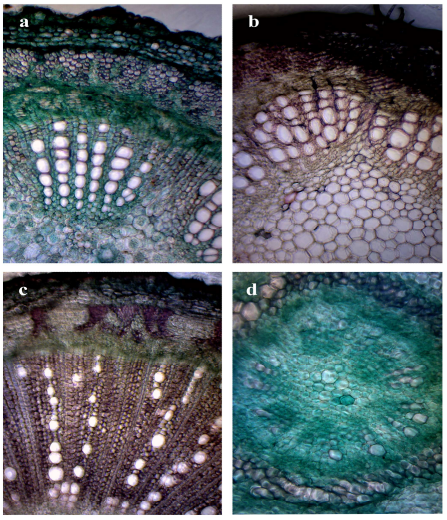
***M. oleifera* Lam.**

PLATE - I



***Moringa concanensis* Nimmo.: T.S.: a. stem; b. petiole; c. peduncle; d. pedicel**

PLATE - II



***Moringa oleifera* Lam.: T.S.: a. stem; b. petiole; c. peduncle; d. pedicel**

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PRELIMINARY PHYTOCHEMICAL SCREENING AND PHARMACOGNOSTIC STUDIES OF *EUCALYPTUS RUDIS* ENDL. (NILGIRI)

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Abstract

Eucalyptus rudis Endl. Commonly known as eucalyptus or flooded gum. Local name of eucalyptus is Nilgiri. The purpose of current study was identifying the primary phytochemicals and pharmacognostic studies of leaves and stem of E. rudis. Eucalyptus origin is Australia. Most of the species of eucalyptus found in Australia and Tasmania. The eucalyptus was rapidly distributed tropical and subtropical region of world. Eucalyptus belongs to the Myrtaceae family and more than 700 species found across the world. Plants are evergreen, large grow up to 45 to 50 m in height. The plant material collected from the different region of Nanded district of Maharashtra. Collected material shade dried and made it powder. The leaves and stem powder were successively extracted with methanol as a solvent. Soxhlet's extraction methods was used. In the present study of pharmacognostic investigation including morphology of plant, macroscopic, microscopic, fluorescence analysis and physico-chemical studies was done. In microscopic investigation stomatal number and stomatal index were done. For the anatomical studies were taking free hand sections of leaf and young stem. T. S. of leaf shows the single layer of epidermis both side of leaf and epidermis followed by cortex, endodermis, bicollateral vascular bundles and scattered secretary cavities. T. S. of young stem shows the primary growth, epidermis covered by thick cuticle, epidermis followed by the few layers of cortex, endodermis, bicollateral vascular bundles and centrally piths. In physico-chemical studies including moisture content, swelling index and foaming index were done and all the observation mentioned in results tables. Preliminary phytochemical screening of E. rudis, leaf and stem extract revealed the presence of alkaloid, flavonoids, saponins, triterpenoids, steroid, saponin, tannins, anthraquinone, phenol and carbohydrates, while the absence test of glycosides, fixed oil and coumarin. The findings of this study proved that the Eucalyptus plant contain many medicinally important components which helps to preparation of several drugs and treatment of various diseases.

Keywords: pharmacognostic study, *Eucalyptus rudis,* Nilgiri, phytochemical analysis of eucalyptus etc.

Introduction

Mankind has been benefited by the nature in various ways. In recent time, the use synthetic medicine and drugs lead to number of side effects and this converges an alternate way to use natural products. As plant-based medicines have least or no side effects (Preeti et al, 2018). Presently in the developing countries, synthetic drugs are not only expensive and inadequate for the treatment of diseases but are also often with adulteration and side effects. There is therefore the need to search for plants of medicinal value (Pranay et al. 2010). Eucalyptus is evergreen, perennial, tall plants. The eucalyptus is occurring in tropical and sub-tropical region of world. The origin of eucalyptus is Australia. Large amount of eucalyptus species is found in Australia and Tasmania. Eucalyptus plant belong to Myrtaceae family and more than 700 species distributed as worldwide. In Marathi, Local name of eucalyptus is a Nilgiri. Many species of eucalyptus rapidly distributed in India. Eucalypts are presently among the most important planted hardwoods with 18 million ha in 90 countries under temperate, tropical and subtropical climate conditions, Different species are grown in different countries, according to the adaptability to the weather and soil conditions (Duarte et al. 2015). In India eucalyptus specially grown for their hardwood, furniture and medicinal oil. Most of the plants cultivated side by roads and waste lands. The eucalyptus plant found in wild in hills region and forest region. Eucalyptus plant has many medicinal properties which is used in folk medicines. Eucalyptus used in timber wood, dye industries, paper industries, drugs and medicinal oil. Some common species of eucalyptus such *as E. globulus, E. rudis, E. tereticornis, E.citriodora, camaldulensis, etc. Eucalyptus globules* and *Eucalyptus rudis* are most common species found in Maharashtra state. *E. rudis* commonly known as flooded gum plant.

In addition to the source of energy, plants have been synthesizing a large variety of biochemical compounds. These compounds in addition to basic metabolites include, compounds, phenolic terpenes, alkaloids, steroids and other chemicals substances which as known as “secondary metabolites” which have prominent effect on the animal’s systems and some possess important medicinal properties which can be and have been utilized in the treatment and cure of human diseases for many centuries (Sani et al. 2014). Its secondary metabolites are now being recognised as potential renewable natural resources for human health care. Eucalyptus species have been utilized for medicinal purposes, their roots, leaves and fruits have been used as traditional drugs for treatment of various diseases such pulmonary influenza, tuberculosis and diabetes (Zakia et al. 2016). Eucalyptus plant has several amounts of essential oil in their leaves and young stem. Essential oil has biological effects, antiviral, antibacterial and anti-fungal segments and long history of utilization against the impact of flu, cold, other respiratory illnesses, rhinitis, and sinusitis. Essential oil has been cultivated in many parts of the world for the production of medicinal oil (Dipankar et al. 2020). Eucalyptus plant oil is readily steam distilled

from the leaves and can be used for cleaning, deodorizing and in very small quantities in food supplements, especially sweets, cough drops and decongestants (Schulz et al., 1998). eucalyptus leaves and bark has strong antifungal activity, antibacterial properties and dermatological properties. Present study was done pharmacognostic point of view and preliminary phytochemical analysis of *Eucalyptus rudis.*

Methods and materials

Collection and Authentication of plant material

The plant parts like stem and leaves of Eucalyptus were collected from local forest of Nanded district of Maharashtra. The collected material were brought to laboratory. The dust and other adherent were removed by washing thoroughly with clean fresh water and air dried in a shaded area. The collected plant material was stored for further use. The collected and fresh plant material were used for calculation of stomatal index and anatomical studies. The plant material were identified and Authenticated from Department of Botany, B.A.M.U. University, Aurangabad with accession no. 00896.

Extraction of material

Plant material like leaves and stem were shade dried and made in to powder by using the electrical grinder. The coarse powder (100g) was extracted successively with methanol, each 250 ml in a Soxhlet apparatus for 24 hrs (Tresinha et.al.2014). The methanolic extracts of plants were collected in test tube and stored in a refrigerator for further uses.

Macroscopic Study

Macroscopic examination is the study of external morphology of plants and plant part seen by naked eyes. Which included the study of habitat, root, stem, leaf, flower, fruits, seed of plant. This study was done partly in field and laboratory and the characteristic feature of the plant were recorded. Microscopic Study In microscopic study anatomical observation of plant sections were made. The free hand sections of leaves and stem were taken in the laboratory and stained using safranin and fast green. After staining the sections were fixed in glycerine and were observed under the microscope and photographed using camera.

Stomatal Number and Stomatal index

The study of stomatal number and stomatal index was done by taking of epidermal peels of leaves. For the study of stomatal number and index leaves epidermal peel was removed and stained it by Safranin and observed under the 10X eye-piece and 45X objective of light Microscopes. The total number of stomata at specific area of objective per peel were counted. The number of stomata at specific area of objective were counted and the stomatal index were determined by using following formula (Shyam Baboo et.al.).

Stomatal index = $S/ S+E$ x100

Where, S= stomatal cells, E=epidermal cells.

Organoleptic study of powder

In organoleptic evaluation, the characters like colour, odour, taste and textures of leaf and stem powder were studied are recorded in table (Shanthi 2014).

Physico-chemical property of powder

In physico-chemical studies we have analysed leaves, stem-bark powder for fluorescence analysis, moisture content, swelling index, foaming index etc including primary phytochemistry.

Fluorescence analysis

The eucalyptus leaves and stem-bark powder were treated with various chemical reagents and passing through the visible light and UV light. The powder of leaves and stem was prepared after passing it through mesh 40 and its fluorescence characters were studied both in daylight and in UV light (254 and 366 nm) using different solvents like sulphuric acid, hydrochloric acid, ferric chloride acetic acid etc (Tanwar et. al. 2012).

Moisture content

The studies on moisture content of eucalyptus powder were performed by the loss on drying methods. The moisture present in eucalyptus leaves and stem were determined by drying the sample in hot air oven at 110°C till constant weight. Following equation was followed to determine the moisture content (Ahmad Raza, 2015).

Moisture %= $Initial\ weight{-}Final\ weight\ Initial\ weight$

Swelling index

According to WHO guideline swelling index was decided by following methods with slight modification. Accurately weighed 1 gram of fine leaf, stem and root powders were introduced in 100 ml measuring cylinder and marked in 0.2 ml divisions from 0-10 ml in an upwards direction on cylinder. 100 ml of distilled water was added to the powders and shake it to mix thoroughly. One gram powder occupied initial volume were marked. Then the mixture were allowed to stand for 12 hours at room temperature. After that the final volume occupied by the plant material was measured (in ml).

For the calculation of swelling index following formula were used.

Swelling index = final volume – initial volume (in ml).

Foaming index

According to WHO guideline studies on foaming index were done by following method with minor modification. One gram of fine powder (leaf, stem and fruits) were taken into separate conical flask (500 ml). 100 ml of boiling water was poured into the flask and maintained in the temperature at 80-90° C by heating for 30 minutes. Then allowed to cool at room temperature and sufficient amount of water added into the decoction to make the volume up to 100 ml. 10 clean test tubes were taken and marked with 1 to 10. The successive portions of 1 ml, 2 ml up to 10 ml of powder was taken in separate tubes and adjusted remaining volume with the distilled water up to

10 ml in each tube. Tubes were shaked for 15 seconds and allowed to stand for 15 min. The height of the foam were measured. If the height of the foam were less than 1cm in each tube, the foaming index is considered as less than 100 (not significant). If the foam is more than 1cm height after the dilution of plant material in the 6th tube, then corresponding number of the test tube was the index sought (significant). If the height of the foam in every tube is more than 1cm, the foaming index is more than 1000 (more significant).

Foaming Index was calculated by using the following formula,

Foaming Index = 1000/a Where, a = Volume (ml) of decoction used for preparing the dilution in the tube where exactly 1 cm or more foam was observed.

Preliminary phytochemical screening

The preliminary phytochemical screening of leaves and stem was done by the following test for secondary metabolites as described by Hasanuzzaman (2016)

1) Alkaloids; Mayer's Test: In 1ml of plant extract 1ml of Mayar's reagent were added by the side of test tube. Formation of white or creamy precipitate indicates the positive result for alkaloids.

2) Flavonoids; Alkaline Reagent Test: For the detection of flavonoids 1 ml of plant extract were treated with few drops of 5% NaOH solution. The colour turns to yellow. After addition of few drops of 10% HCl solution become colourless, which indicates the presence of flavonoids.

3) Steroids; Libermann-Burchard's test: 1ml acetic anhydride solution was added into the filtrate then 1ml of concentrated sulphuric acid, a brown ring is formed at the junction of two layers. The upper layer turned into green or blue colour indicates the presence of steroids.

4) Triterpenoids; Libermann-Burchard's test: 1ml acetic anhydride solution was added into the filtrate then add 1ml of concentrated sulphuric acid, a brown ring is formed at the junction of two layers. The formation of deep red colour in lower layer indicates the presence of triterpenoids.

5) Saponin; Froth Test: for the detection of Saponins few ml of extracts was mixed with the same amount of distilled water. The suspension is shaked for 15 to 30 seconds and allowed to stands. The foam formation in test tube indicates presence of saponin.

6) Tannins; Ferric Chloride Test: About 0.5g of plant extract was boiled in 20 ml of distilled water in a test tube, then filtered it. After that 1ml of 0.1 % ferric chloride solution into the filtrate. Appearance of brownish green or blue-black colour indicates presence of tannins.

7) Glycosides; Keller-Kiliani test: For the detection of glycosides, 1ml of filtrate was treated with 1ml of glacial acetic acid, few drops of ferric chloride solution and few drops of concentrated sulphuric acid was added. Appearance of green blue colour indicates the positive result of cardiac glycosides.

8) Anthraquinones; Sanker-Nahar test: One ml of filtrate was treated with the same

volume of aqueous base NaOH solution. Appearance of pink or violet colour in the base layer of solution indicates presence of anthraquinones.

9) Coumarins; A little amount of extract is dissolved in methanol and 3-4 ml alcoholic KOH was added to it. Formation of a yellow colour which disappeared on adding concentrated HCl indicates the presence of coumarins.

10) Oil and fats/lipid; Spot test: For this detection, few drops of filtrate was pressed between two filter paper indicates the presence of fixed oil.

11) Phenol; Ferric chloride test: In 1ml of plant extract, few drops of diluted ferric chloride solution was added. Formation of violet or blue, green and red colour indicates the presence of phenol.

12) Protein; Millions reagent test: In 1 ml of plant extract, 1 ml of million's reagents was added in test tube. Formation of radish brown colour indicate the presence of protein.

13) Carbohydrates; Iodine test: 1ml of plant extract treated with few drops of iodine solution. Formation of blue colour indicates presence of carbohydrates.

Results and Discussion

Macroscopic / Morphological characters

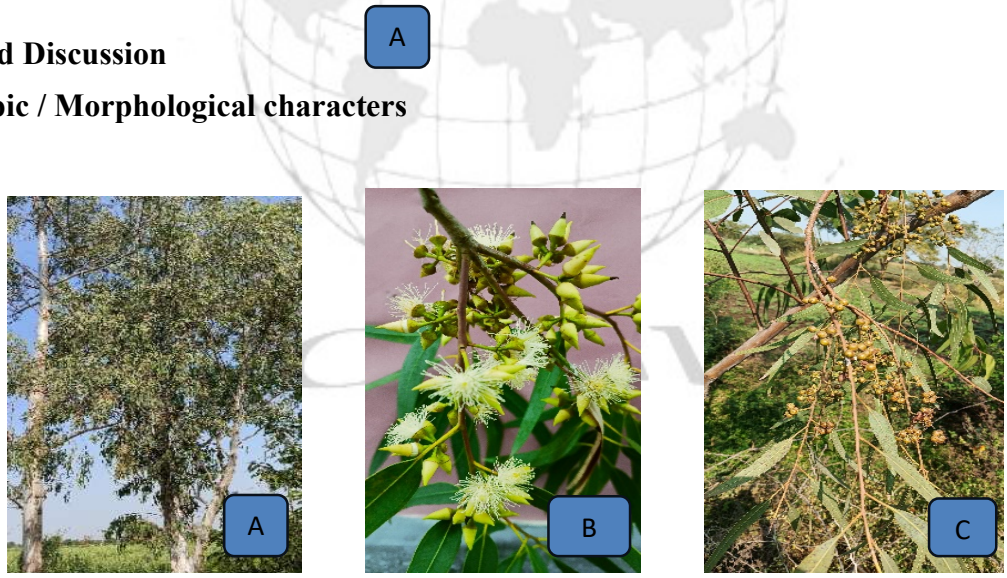

Figure 1, shows A) - E. rudis tree, B) - E. rudis flowers, C) - E. rudis fruits.

E. rudis commonly known as Nilgiri plant. eucalyptus is evergreen, perennial tree, grow up to 45 to 50 m height. Stem is unbranched white shining in colour, bark is rough dark. *E. rudis* (Flooded gum) has rough dark bark on the trunk and lower branches making it easily distinguishable from other eucalyptus species. Leaves are simple, alternate, petiolate, exstipulate, entire and broadly elliptic. Dotted gland found on leaf surface. Inflorescence – Axillary umbels, flower is sessile 6 to 7 flower together, small, complete, pentamerous, actinomorphic. Calyx and corolla fused, stamen is filaments long, indefinite, polyandrous, white in colour, unequal, anther

dithecous, introrse. Gynoecium Tricarpellary, Syncarpous, ovary inferior, trilocular, style long, stigma minute. Fruit –Truncate. Seeds - Few, small, shiny black. Flower & Fruit – February to June.

Stomatal number and stomatal index

Free hand sections of leaf shows the both side surface of leaves stomata were present. Lower surface of leaves more stomata as compare to upper surface.

Table 1, shows the Stomatal number and Stomatal index

Sr.no.	Epidermis	Stomatal no.	Stomatal Index
1	Upper epidermis	08-10	12 %
2	Lower epidermis	10-12	14%

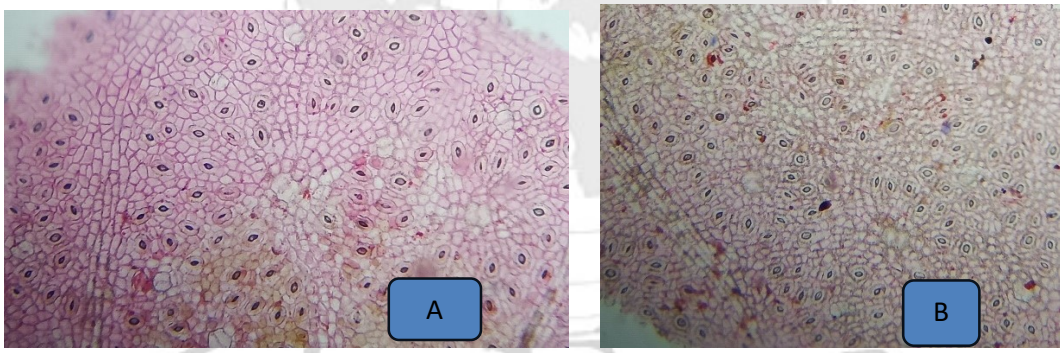

Figure 2, shows A) stomata on upper leaf surface B) stomata on lower leaf surface

T. S. of Leaf

E. rudis leaves were long and dorsi-ventrally flattened. Thin free hand sections of leaves show the small, single layer of upper and lower epidermis, both the epidermal cells covered by thin cuticle. The midrib contains the vascular bundles, secretary gland and leaf lamella has several layers of mesophyll cells and palisade cells. Epidermal cells layer followed by elongated palisade cells and spongy mesophyll cells. Mesophyll cells made from the loosely arranged parenchymatous cells. The region of midrib, beneath the epidermal cells were collenchyma cells presents. Mid region of midrib endodermis contains the vascular bundle. The vascular bundle is of Meri stele type which is composed from protoxylem towards outer side and metaxylem towards inside. The phloem were bicollateral type and phloem present above and below of xylem. Secretary cavity and oil glands scattered in mesophyll tissues and vascular tissues

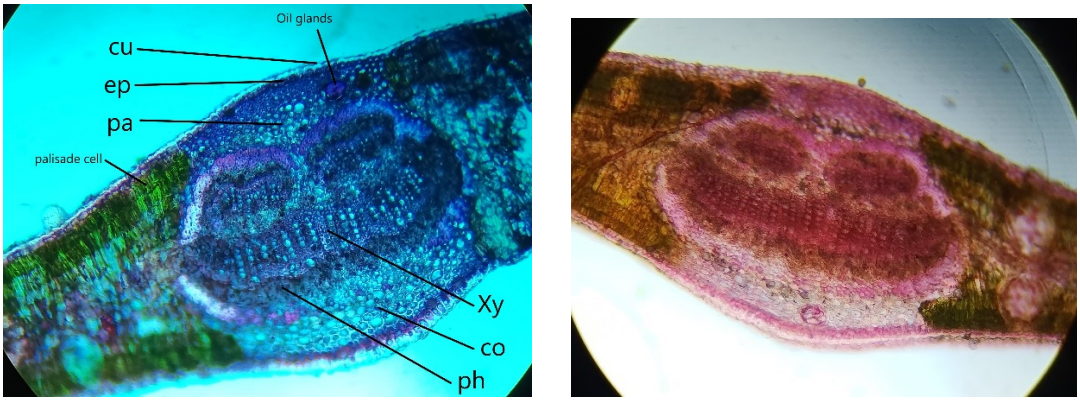

Figure 3, shows T. S. E. rudis leaf where, cu-cuticle, ep-epidermis, pa-parenchyma, Xy-xylem, ph-phloem, co-collenchyma, cor-cortex.

T. S. of Stem

The eucalyptus is perennial plants and its shows the secondary growth with the help of cambium ring. In present study of T. S. of young stem shows the primary growth. With the help of free hand sectioning T. S. of stem shows the following anatomical characteristics. Small regular single layer of epidermis present outer side stem which covered by thick cuticle. Beneath the epidermis five to seven layers of cortex present. Cortex also contain secretary cavity and oil glands. Next to the cortex followed by single layer endodermis. Endodermis encloses the vascular bundles. Bi-collateral type of vascular bundles present. In vascular bundles xylem present in between of phloem and phloem present in upper and lower region of xylem. Pith is present central region of vascular bundle. Pith is made from the storage cells, parenchyma and collenchyma cells.

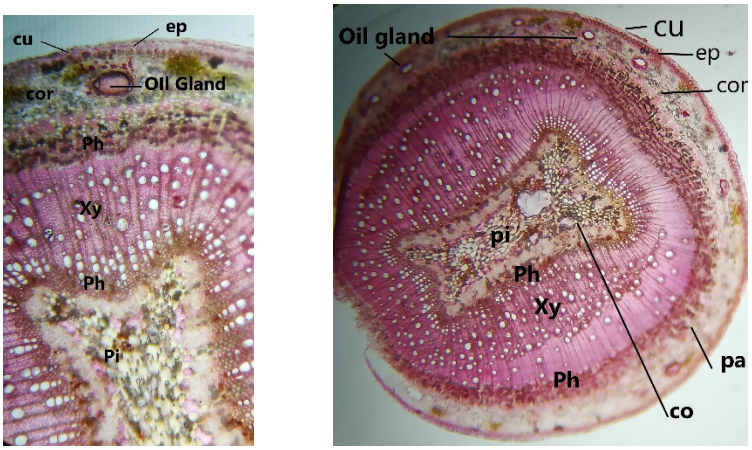

Figure 4 shows T. S. E. rudis Stem, where, cu-cuticle, ep-epidermis, pa-parenchyma, Xy-xylem, ph-phloem, co-collenchyma, cor-cortex.

Organoleptic study

In organoleptic study the physical properties of plant powder checked such as colour, odour, taste and texture obtained results mention in following table.

Table 2, shows organoleptic study of powder

Sr. no.	Character	Plant Parts	
		Leaves	Stem bark
1	Colour	Light green	Greyish
2	Odour	Aromatic	Slightly aromatic
3	Taste	Slightly bitter	Tasteless
4	Texture	Smooth	Friable

Figure 5, shows powder form of leaf and stem of Eucalyptus rudis

Physico-chemical studies

Physico-chemical studies included the moisture content, swelling index, foaming index and fluorescence analysis of leaves and stem powder of *Eucalyptus rudis* results represented the following tables.

Table 3, shows Moisture content

Sr. no.	Plant part	Moisture content%
1	Leaves	3.73%
2	Stem	3.28%

Table 4, shows Swelling index

Sr. no.	sample	Quantity of sample	Initial volume	Final volume	Swelling index
1	Leaves	1 g	07	13	06
2	Stem	1 g	08	15	07

(Value in ml)

Table 5, shows Foaming index

Sr. no.	Sample	Foaming index	
1	Leaves	125.00	Significant
2	Stem	500.00	Significant

Table 6, shows fluorescence analysis

Sr. no.	Reagent with powder	Leaf		Stem	
		Visible light	UV Light	Visible light	UV Light
1	P +Alone	Greenish	Herbage green	Light green	Green
2	P + water	Light green	Umber light	Light yellow	Green
3	P + ethanol	Light green	Brown	Pale yellow	Green
4	P + methanol	Green	Brown	Light yellow	Deep green
5	P + NaOH	Light orange	Dark brown	Greenish yellow	Green
6	P + HCl	Buff	Brownish black	Greenish yellow	Green
7	P + H2SO4	Dark orange	Radish brown	Greenish yellow	Black
8	P + HNO3	Orange	Dark green	Radish brown	Brown
9	P + KOH	Orange	Dark red	Light green	Green
10	P+ acetic acid	Yellow	Orange	Pale yellow	Yellow

Preliminary phytochemical test

The results of preliminary phytochemical analysis of *Eucalyptus rudis* are mention in table

Table 7, shows preliminary phytochemical test

Sr. no.	Chemical constituent	Test	Plant parts	
			Leaves	Stem
1	Alkaloids	Mayers test	+	+
2	Flavonoids	NaOH and HCl test	+	+
3	Tannin	Ferric chloride test	+	+
4	Steroids	Lebermann- Burchards test	+	+
5	Triterpenoids	Lebermann- Burchards test	+	+
6	Saponins	Foam test	+	+
7	Glycosides	Keller-Kiliani test	-	-
8	Anthraquinones	Sanker-Nahar test	+	+
9	Coumarins	KOH, HCl test	-	-
10	Fixed oil and fats	Spot test	-	-
11	Phenol	Ferric chloride test	+	+
12	Protein	Million's reagent test	-	-
13	Carbohydrates	Iodine test	+	+

Discussion and conclusion

Eucalyptus is native plant of Australia. The presence of fast growth and fast adaptation this characteristic of eucalyptus rapidly distributed to other part of world. The local name of eucalyptus is Nilgiri and commonly called as flooded gum. Eucalyptus plant belong to Myrtaceae family. *Eucalyptus rudis* distributed all over the country. In Maharashtra eucalyptus found in hills region, forest region, on waste land, beside the road, some cultivated for ornamental purposes in garden and some eucalyptus grown by farmer for their commercial purposes. Eucalyptus used as folk medicine to treated of various diseases. In microscopic studies the stomatal number and stomatal index was done by taking out of epidermal pees and observe it under microscopes. Each epidermis passes the stomata, upper epidermis contains the 08 to 10 number of stomata and stomatal index is 12%. Lower epidermis contain 10 to 12 numbers of stomata and stomatal index is 14%. Lower epidermis contains more stomata compare to upper epidermis. Multicellular trichomes are absent on leaf surface. several dotted glands and cavities present on leaf surface. Organoleptic study was done by physical observation on the basis of colour, odour, taste and texture of crude powder of Stem, leaves and stem. Observation of organoleptic study mention in following table 2. Transverse section of leaf and stem of *E. rudis* done by free hand sectioning and stained it. Under the microscopic observation T. S. of leaf shows the small single layer of epidermis present on both surface of leaf. Epidermis covered by cuticle. Epidermis followed by the 4 to 6 layers of cortex, endodermis and bicollateral vascular bundles. Phloem is divided in two parts, above and below the xylem. Most of the tissue made by the parenchyma and collenchyma cells. T. S. of stem of *E. rudis* shows the single layer of epidermis followed by cortex, endodermis, bicollateral vascular bundles, phloem present above and below the xylem, centrally storage cells and pith are presents. The cambium ring helps the secondary growth of plants.

In physico chemical studies, moisture content of leaves and stem shows the 3.73% and 3.27% moisture respectively. Swelling index of 1g powder of leaves and stem was 06ml and 07ml swelling index respectively. Foaming index of *E. rudis* leaves and stem shows the significant foaming index. In case of fluorescence analysis, the plant powder treated with various chemical and observe under the day light and UV light, obtained results mention the table 6. Preliminary phytochemical screening of *E. rudis* leaves and stem shows the presence of alkaloids, flavonoids, tannin, triterpenoids, saponins, anthraquinones, phenol and carbohydrates. Absence of glycosides, coumarins, fixed oil and proteins on the basis on qualitative tests.

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ETHNOMEDICINAL PLANTS USED FOR JOINT DISEASES (JOINT PAIN, RHEUMATISM AND ARTHRITIS)IN MAHUR RANGE FOREST OF NANDED DISTRICT, MAHARASHTRA, INDIA.

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Abstract

The present research workwas undertaken to study the ethnomedicinal practices of some medicinal plants used to cure joint pain, rheumatism and arthritis in Mahur range forest of Nanded district. During survey 23 flowering plants belonging to 16 families were collected and identified. Venders, local herbalists and tribalsusethese medicinal plants in the treatment of joint pain, rheumatism and arthritis. The medicinal information was collected through semi-structured interviews. It was pointed out that roots, leaves, seed, tender shoot, fruit and latex are commonlyused in the preparation medicines in the form of powder, paste, oil, extract and juice. The medicinal plants are arranged alphabetically with their family, local name, parts used, method of preparation and mode of administration of medicine.

Key Words: Ethnomedicinal Plants, Tribals, joint pain, rheumatism, arthritis, fracture, Mahur forest, Maharashtra

Introduction

The ethnobotanical survey can bring out many ideas for the development of drugs to treat different human diseases, most of derived from higher plants were discovered in an ethnobotanical or ethnomedicinal context (Thirumalai, et.al., 2009).Tribal inhibit in and around the forest use the forest resources for the treatment of diseases (Shyam, et.al., 2013).It has been observed that most of local people and tribal community are use medicinal plants for the treatment of joint pain, rheumatism and arthritis. The joint diseases are more common in old age group in this area. Tribal, vender and local herbalists are using medicinal plants for the preparation of drugs. The information collected form tribal practitioner is useful for research in the field of ethnobotany and ethnomedicine for further study (Ayyanar and Ignacimauthu, 2005). In recent year use of herbal medicine has increased considerably both at home and abroad (Ghizlane and Aziz, 2018). The most widely used species in the treatment of joint pain, rheumatism and arthritis are: *Benincasa hispida* (Thunb.) Cong.,*Cadabafruticosa* (L.) Druce.,*Caesalpinia bonduc*(L.) Roxb., *Indigofera cordifolia* Heyne ex Roth, *Leucas cephalotes* (Roth) Spreng. And *Ipomoea pes-tigridis* L. The present study aimed to documenting the uses of ethnomedicine plants to treat joint pain, rheumatism and arthritis in mahur range forest of Nanded district.

Material And Methods

The tribal population of Mahur consists of*Andh, Kolam, Gond, Naikede* and *Pradhan* (Pawade*et al*., 2008). From this region ethnobotanical data was collected during 2008-2010. The information wasgathered through semi structured interviews ofknowledgeable elders between the age group of 45 to 65years.During the course of the study Each informant was visited three times in order to verify reliability of the obtained data.

The collected plants were identified with help of standard floras (Naik, 1979; Naik, *et al.,* 1998) and Yadav and Sirdesai (2002).The plants were enumerated alphabetically along with botanical name, family, Local name, Part used and uses

Enumeration

The plants were enumerated alphabetically along with botanical name, family, Part(s)used and vernacular name.

1. ***Benincasa hispida* (Thunb.) Cong.**

   Family: Cucurbitaceae. **Local Name:**Kohla. **Part(s) used:** Fruit.

   Ethnobotanical Uses: About two spoonful juice of fruit is taken twice a day for seven days to treat rheumatism (Pawar).

2. ***Blepharis repens* (Vahl.) Roth**

   Family: Acanthaceae. **Local Name:**Hadsan. **Part(s) used:** Entire plant.

   Ethnobotanical Uses: About two spoonful powder of plant is taken twice a day for seven days to treat rheumatism (Doheli).

3. ***Cadabafruticosa* (L.) Druce.**

   Family: Capparaceae. **Local Name:** Kali taklan. **Part(s) used:** Leaves.

   Ethnobotanical Uses:

   - Leaves are cooked in rice, and consume once a day up to fourteen days to treat rheumatism (Doheli).
   - Powder of leaves is mixed in cow ghee, about spoonful mixture is taken thrice a day for four days to cure rheumatism (Chavan).
   - Warmed leaves are tided on joint over night against joint pain (Pawar).

4. ***Caesalpinia bonduc*(L.) Roxb.**

   Family: Caesalpininaceae. **Local Name:**Gajaga or sargargota.**Part(s) used:** Seed.

   Ethnobotanical Uses: Powder of warmed seed is consumed along with 50 gm ghee in early morning for six days to control rheumatism (Mantue).

5. ***Cassia auriculata* L.**

   Family: Caesalpiniaceae. **Local Name:** Tarota. **Part(s) used:** seeds.

   Ethnobotanical Uses: Aspoonful powder of seeds is taken along with tea once a day for eight days to treat rheumatism (Perchake).

6. ***Cajanus cajan* (L.) Millsp.**

Family: Fabaceae. Local Name: Tur. Part(s) used: Leaves.

Ethnobotanical Uses: Paste of leaves is applied on joint, held up to three days, then wash with hot water continue till recovery (Pawar).

7. ***Cissus quadrangula*L.**

Family: Vitaceae. Local Name:Hadjodi. Part(s) used: Young shoot

Ethnobotanical Uses: Paste of tender shoot is applied on joint twice a day to treat joint pain (Gangaram).

8. ***Clerodendrum multiflorum* (Burm. f.) O. Ktze.**

Family: Verbenaceae. **Local Name:**Pandhritakalani.**Part(s) used:** Leaves

Ethnobotanical uses: Warmed leaves tied on joint to treat joint pain (Gangaram).

9. ***Clitoriaternatea* L.**

Family: Fabaceae. **Local Name**: Gokarna. **Part(s)used**: Whole plant

Ethnobotanical Uses: About one spoonful powder of plant is consumed twice a day for three days to control rheumatism (Pawar).

10. ***Cocculus hirsutus* (L.) Diels**

Family: Menispermaceae. **Local Name:**Wasanwel. **Part(s) used:** Root.

Ethnobotanical Uses: About two spoonful extract of root is drunk twice a day for seven days to treat arthritis (Chavan).

9. ***Datura inoxia* Mill.**

Family: Solanaceae. **Local Name:**Dhotra. P**art(s)used:** root.

Ethnobotanical Uses: Paste of root is used against arthritis (Kamble).

12. ***Euphorbia barnhartii*Croizat, Euph.**

Family: Euphorbiaceae. **Local Name:** Tindharinivdung.**Part(s) used:** Plant latex.

Ethnobotanical Uses: Latex of plant is applied on joints to cure rheumatic pain (Adhe).

13. ***Euphorbia dracunculoides* Lamk.**

Family: Euphorbiaceae. **Local Name:**Pisola. **Part(s) used:** Entireplant.

Ethnobotanical Uses: Paste of plant is applied over joints to control arthritis.

14. ***Hygrophilaschulli* (Buch. Ham.) M. R. & S. M. Alme ida.**

Family: Acanthaceae. **Local Name:** Talim khana. **Part(s) used:** seed.

Ethnobotanical Uses: About spoonful powder of seed is consumed along a cup of cow milk once in a day for seven days to control rheumatism as well as arthritis (Ubale and Gangaram).

15. ***Ipomoea pes-tigridis* L.**

Family: Convolvulaceae. **Local Name:**Beshramwel. **Part(s) used:** Leaves.

Ethnobotanical Uses: Paste of leaves is applied on joints to treat joint pain (Perchanke).

16. ***Indigofera cordifolia* Heyne ex Roth**

Family: Fabaceae. **Local Name:**Bhuigavat. **Part(s) used:** Root.

Ethnobotanical Uses: Paste of root is applied regularly on joints at night for rheumatism (D. D. Kamble).

17. ***Launaea procumbens* (Roxb.) Ramayya &Rajgopal**

Family: Asteraceae. **Local Name:**Pathari. **Part(s) used:** Leaves.

Ethnobotanical Uses: Paste of leaves applied on joints twice a day for fifteen days to cure joint pain (Gangaram).

18. ***Leucas cephalotes* (Roth) Spreng.**

Family: Lamiaceae. **Local Name**: Tumba. **Part(s) used:** leaves.

Ethnobotanical Uses: Paste of leaves or juice is applied on joints for rheumatic swelling (Gangaram).

19. ***Madhuca longifolia* (Koen.) Macbr.**

Family: Sapotaceae. **Local Name:** Mahuwa. **Part(s) used:** Seed

Ethnobotanical Uses: Oil of seed is applied on joints to control arthritis and control rheumatism (Gite).

20. ***Melothriamaderaspatana* (L.) Cogn**.

Family: Cucurbitaceae**. Local Name:**Kamuni. **Part(s) used:** Leaves.

Ethnobotanical Uses: Paste of leaves is applied on joints regularly to treat joint pain (Gite).

21. ***Rorippa indica* (L.) Hiern.**

Family: Brassicaceae. **Local Name:**Ranmohri.**Part(s) used:** Leaves

Ethnobotanical Uses: Paste of leaves is applied on joint against joint pain (Ubale).

22. ***Tribulus terrestris* L.**

Family: Zygophyllaceae. **Local Name:** Sarata. **Part(s) used:** Fruit.

Ethnobotanical Uses: A spoonful powder of fruit is taken along with cow milk twice a day for seven days against arthritis (Madawe).

23. ***Vitex negundo* L.**

Family: Verbenaceae**. Local Name:**Nirgudi. **Part(s) used:** Leaves.

Ethnobotancial Uses: Warmed leaves are tided on joint to cure arthritis (Perchake).

Leaves are cooked in rice and advised to consume early in morning for eight days to cure rheumatic pain (Perchake).

Discussion

The data revealed that 23 medicinal plants belongs to 17 family were used by Venders, local herbalists and tribals for the treatment of joint pain, rheumatism and arthritis. 11 plants are

used in the treatment of rheumatism, 8 plants are used in the treatment of joint pain and 8 plants are used in the treatment of arthritis. The various plants parts are used in the preparation of medicine are root, leaves, seed, tender shoot, fruit and latex. The herbal medicine obtained from seeds, roots, and stem are used in the treatment of chronic joint pain (Saravanan, et. al., 2018). The drugs are prepared in the form of powder paste, oil extract and juice.Leaves of 9 plants, roots of 3 plants, fruit of 2 plants, seeds of 4 plants and 4 entire plants are used in preparation of drug in the treatment of joint diseases in study area. Herbal medicineis commonly prepared from leaves.

Acknowledgements

The author is grateful to all those informers who shared their knowledge about medicinal plants during survey. Author is thankful to Dr. V.K. Kothekar, Ex-Principal, Nutan Mahavidyalaya, Sailu, Dr. S.D. Biradar, Ex-HOD, Department of Botany D.S.M. College parbhaniand Dr. U. C. Rathod, Principal, Nutan Mahavidyalaya, Sailu for their constant inspiration.

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INDIAN PALM SQUIRREL IN COLLEGE CAMPUS

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Abstract

Indian palm squirrel is an important mammal of ecology and Hindu mythology. It is a small rodent chiefly feeds on fruits and nuts. These are attractive and less studied animal in Marathwada region of Maharashtra and hence an attempt has been made to study its ecology in campus of M S P Mandal's, Shri Shivaji College, Parbhani. The present study has been carried out during the period of February 2023 to January 2024 and the findings are discussed in full-length paper.

Key words – Indian palm squirrel, Ecology, Shri Shivaji College, Parbhani

Introduction

As per the Wildlife (Protection) Act,1972, Indian palm squirrel, *Funambulus palmarum*, has been placed underschedule IV and it is considered as endangered. Hence declared as State Animal of Puducherry Union Territory (Envis Newsletter, 2017).Its an omnivore mammal but chiefly feeds on fruits and nuts. Its near about 15 – 20 cm in length and 100 to 120 gm in weight. M S P mandal's, Shri Shivaji College, Parbhani is renowned institute in the vicinity and located in the heart of the city. College campus holds enough greenery. The vegetation provides better habitat to many birds, mammals and other creatures. An attempt has been made to study the ecology of Indian palm squirrel in the campus of Shri Shivaji College, Parbhani.

F. palmarum builds nests from leaves, twigs, and other plant-based fibres at a height of about 25 feet from the ground. The nests areusually lined with twigs and filled with dry leaves that serve as a bedding material for the young ones (Thurston and Brittingham,1997). By 5 weeks of age, the pups fully develop a coat of fur and by 10 weeks of age, the young ones are completely weaned and nolonger depend on the mother. Palm squirrels in the wild live for about 2 to 3 years. *F. palmarum* is commonly found in dry tropicalhabitats that include grasslands, scrublands, plantations, and all urban ecosystems (Long, 2003).

Materials and Methods

Parbhani is one of the eight districts of Marathwada. M S P Mandal's, Shri Shivaji College, Parbhani is one of the leading institute of the area with a campus of about 20 acre. The campus is enough green with trees like ashoka, teak, neem, nilgari, tamarind, mango, Indian blackberry, guava, coconut, sweet lime, orange, sapota (mud apple), custard apple and manymore. These trees provide food and space for shelter and nesting to many creatures. Indian palm squirrel, though mythologically and ecologically important, less studied animal in this area and hence an attempt

has been made to study its ecology in the college campus. The study has been carried out for the period of one year i.e., from February 2023 to January 2024 with regular observation with naked eyes and sometimes with binoculars.

Results and Discussion

During the study period, i.e., from February 2023 to January 2024, behavior of Indian palm squirrel has been observed to study its ecology. As the college campus is enough green, it harbors enough diversity of animals.

In this area, near about 10 individuals of experimental animal were recorded. They recorded as diurnal, arboreal and usually found to feed on nuts and fruits but occasionally feed on insects (Philip, 1980).

Palm squirrels are opportunists, and they exhibit a wide range of food preferences. They are omnivores andhence feed on plants, fungi, insects, and other animal-based foods. When their population peaks at a particular location, they chew treebarks and other animal matter (Thurston and Brittingham, 1997).

In addition, cannibalisticbehaviour has also been recorded (Sadakathulla& Kareem 1995,Edirisinghe &Sudasinghe2012). Thefirst observation of *F.palmarum* preying on spider egg sacsreported by Abegunawardhana& Bandara (2023).According to Anderson (1978) spider eggs contain enough energy for themetabolic costs of development. The consumptionof spider egg sacs as an energy-rich food item bythe squirrel is therefore not entirely unexpected (Abegunawardhana1 & Bandara 2023).They showed positive response to temperature and photoperiod variations in their behavior pattern (Kour et al., 2014). Life span varies between 18 months (wild) and 6 years (captivity). These individuals attain maturity at the age of 9 months and can give birth to 1 – 5 young-ones per year (https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/pests/invasive-animals /prohibited/indian-palm-squirrel).

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Peer Reviewed Refereed Journal **ISSN : 2278 – 5639**
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} Volume – XIII Special Issue – III March – 2024

STUDY OF SOME PLANT GALLS OF NANDED DISTRICT OF MAHARASHTRA STATE

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Abstract:

This research paper includes the study of plant galls found in different parts of Nanded district of Maharashtra, India. these plant galls were collected from different parts of Nanded District viz. Naigaon, Bhokar, Khandar, Vishnupuri etc.

Key Words: Plant Galls, Nanded District, Maharashtra.

Introduction

Plant galls or tumors are abnormal growths are found on different plant parts. Almost all plant parts i.e. leaf, shoots, stems, roots and inflorescences develop plant galls. Plant galls develop as a interaction between organisms and plant. The organisms who cause plant galls are popularly known as Zoocecidia or Cecidozoa. The example of Zoocecidia are Protozoas, Nematodes, Mites and Insects. Plant galls are also caused by Phytocecidia like bacteria and fungi. Over 106 plant galls have been reported from Maharashtra which includes 37 plant galls from Marathwada region (Sharma R.M.2003 and 2009) . More than 25 plant galls previously reported from Nanded district so far.

Plant Galls on Family Amaranthaceae

Eight galls known from this family at present include five stem galls, and one gall each on root, leaf and flower. Two new cacidomyiidae galls caused by contarinia asperae Sdq et.al.
And Lasioptera asperae Sdq et.al. are reported herewith.

Leaf gall of *Achyranthes aspera* (L) *Contarinia asperae* Sdq et.al.
(Cecidomyliidae: Diptera)

Achyranthes aspeara (L) is a wild herb and is of medicinal importance. It is used as diuretic and laxative medicine. A new leaf gall is reported as under.

Description of gall : Leaf gall usually hypophyllous, globose or subglobose, ovioid or fusiform, solid, solitary, glabrous, indehiscent, large and irregular; persistent or subseculent swelling at the base of the midrib or of the main lateral veins, pale green on yellow when young, turns reddish brown towards maturity. Larval cavity single axial, long, monothalamous enclosing single a single maggot. Ostiole hypophyllous, generally single gall per leaf but many a times 2-3 galls found on single leaf. Size 7-10 mm long and 3-4 mm thick.

This new midge gall reported for first time from Maharashtra and is collected from forest of

Sitakhandi, Bhokar, kandhar (Dist. Nanded). Two midge fly species viz. male female sp. nov. And *Lasioptera asperae* male female sp. nov. Were bred from these leaf galls. Lasioptera species is believed to be gall former whereas Contarinia sp. is believed as an inquiline is new record of two galls midge flies bred from leaf gall on this host plant from study area.

Stem gall of *Achyranthes aspera* (L) (*Lasioptera asperae* Sdq et.al.)
(Cecidomyliidae: Diptera)

Achyranthes aspera Linn. is a wild herb and found all over the Maharashtra.

Description: gall solitary , globose or sub globose, elongated or elongated cylindrical, shiny, irregular, solid, hard, woody, costate, tomentose, indehiscent persistent ; young galls dark green, old galls turns yellowish-brown on maturity. Gall cavity long, unilocular and spacious and enclose generally a single larva. Pupation inside the gall, lot of excretory material found inside the gall. Size variable 1-2 cm long 15-20 mm thick, usually 3-4 galls may arise on a single twig.

A new gall reported for the first time from Sitakhandi forest Dist. Nanded. Maharashtra State, India. Causative midge flies i.e. *Lasioptera asperae Sdq.et.al*. is a new cecidozoa for the science.

Result And Discussion:

As data collected by author on plant galls shows that there are numerous types of plant galls found in Nanded district. These plant galls are from Different families of Angiosperms. Yet lot of scope for study of plant galls from study area.

Conclusion:

From above result and discussion it is clear that Nanded district has rich biodiversity of plant galls . The places viz. Vishnupuri, Bhokar, Khandar, Naigaon, Ardharur has numerous types of plant galls. These plant galls may be pest of various cops.

Acknowledgement:

We express our gratitude to Principal, Sharadchandra College, Naigaon (Bz), Dist. Nanded, for facilities and encouragement.

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ANTIBACTERIAL PROPERTIES OF DIFFERENT SOLVENT EXTRACTS OF *GLIRICIDIA SEPIUM* (JACQ.) FLOWERS

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Abstract:

Several solvent extracts of Gliricidia sepium flowers were tested for their antibacterial efficacy against Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus using the agar diffusion method. Several solvent extracts were used in the qualitative phytochemical analysis of the Gliricidia sepium flowers. At the minimal inhibitory concentration (MIC), the ethyl acetate extract of Gliricidia sepium flowers showed significant antibacterial effectiveness against Pseudomonas aeruginosa (104 µg/ml) and Escherichia coli (102 µg/ml). The ethanol extract exhibited antibacterial activity of (122 µg/ml) against Escherichia coli. The least effective bactericidal agent against Escherichia coli (256 µg/ml) and Pseudomonas aeruginosa (240 µg/ml) is the chloroform extract derived from Gliricidia sepium flowers. Upon qualitative analysis, almost all phytochemicals are present in most floral extracts.

Keywords: *Gliricidia sepium*, antibacterial activity, Phytochemical analysis

Introduction:

Herbal products have grown in popularity recently in a variety of industrialized and developing nations alike. The World Health Organization reports that 80% of people currently utilize herbal remedies for a variety of basic healthcare (Cowan, 1999). Many different plants are used in ethnomedicine to cure a wide range of illnesses. Antimicrobial agents eliminate or stop the spread of diseases. Disinfectants, which are antibacterial drugs, are applied to inanimate objects or external bodily parts. Microorganisms are essential to the production of potent pharmaceuticals and bioactive small molecules from natural sources that are used to treat a variety of illnesses.

A significant therapeutic challenge in the treatment of infectious diseases is the emergence of bacterial resistance to various drugs. Due to the widespread use of commercially accessible antimicrobials in healthcare, microorganisms have become resistant to these medications due to inappropriate use. (Rauha et al., 2000). Researchers were forced to look elsewhere, most notably at herbal resources, in order to discover novel antibacterial compounds from therapeutic plants.

Materials And Methods:

Plant material:

The *Gliricidia sepium* plant, whose flowers were taken from the Bhokar area of the District of Nanded, was authorized and certified by a taxonomist from Yeshwant Mahavidyalaya, Nanded-

431602, Maharashtra.

Preparation of Plant extracts:

Gliricidia sepium flowers have been collected and allowed to dry in the shade. To turn the dried flowers into a fine powder, a mixer grinder was utilized. Water, ethanol, chloroform, ethyl acetate, and other solvents were used to separate the plant extract from the fine powder using the Soxhlet instrument. Following extraction, the resulting extract was concentrated and utilized for many tests.

Preliminary Phytochemical Analysis:

The phytochemistry of *Gliricidia sepium* flower extracts was examined using a methodical process involving many solvent extracts (Yadav and Agarwala, 2011).

Test microorganisms:

In the present experiment, test organisms included *Pseudomonas aeruginosa* (MTCC-2453), *Staphylococcus aureus* (MTCC-96), and *Escherichia coli* (MTCC-739). They obtained it from the School of Life Sciences, S. R. T. M. University, Nanded, Maharashtra, cultural collection facilities center. Subcultures of the obtained cultures were regularly employed for the current investigation.

Antimicrobial activity by agar diffusion method:

The agar diffusion technique was used to evaluate the effectiveness of various solvent extracts derived from the flowers of *Gliricidia sepium* and their antibacterial properties. A subcultured microbial suspension, with a volume of 100 µl, was created to spread the agar medium. To determine the level of antibacterial activity, several different concentrated extracts were used (Tenover, 2006). Following the addition of the sample to the plates, it was kept there for an hour to enable the extract to spread throughout the plates. After a period of twenty-four hours at 37 degrees Celsius in an incubator, the inhibitory zone of the plates was measured in millimeters (mm). The findings are compared to those obtained from the use of standard antibacterial medications.

Results And Discussions:

A preliminary phytochemical investigation found that the *Gliricidia sepium* flower extracts all included saponin, phenols, tannins, glycosides, terpenoids, flavonoids, alkaloids, and coumarins. With the exception of the ethyl acetate extract's absence of saponins, glycosides, terpenoids. Chloroform extract's absence of terpenoids. The flavonoids and coumarins that were present in the aqueous extract of the *Gliricidia sepium* flower were not present. Table 1 summarizes the findings of the phytochemical analysis. The plant's large number of phytochemicals results in a higher degree of biological activity.

The antibacterial properties of several solvent-based extracts of *Gliricidia sepium* flowers are listed in Table 2. The *Gliricidia sepium* flower ethyl acetate extract had the best antibacterial

activity, with MIC values of 102 µg/ml against Escherichia coli, 104 µg/ml against Pseudomonas aeruginosa, and 135 µg/ml against Staphylococcus aureus. When tested against Escherichia coli, the different extracts of *Gliricidia sepium* flowers showed significant MIC values in ethanol extract (122 µg/ml). The results were contrasted using reference substances with MIC (41 µg/ml), which were typical cephalosporins. When tested against *Pseudomonas aeruginosa*, the various extracts of *Gliricidia sepium* flowers showed substantial MIC values in ethanol extract (132 µg/ml). The outcomes were contrasted with Cephalosporins at 48 micrograms/milliliter (MIC). When *Gliricidia sepium* flower extracts were tested against *Staphylococcus aureus*, the ethanol extract (126 µg/ml), water extract (237 µg/ml), and ethyl acetate extract (140 µg/ml) showed remarkable minimum inhibitory concentrations (MICs). Gentamicin (36 µg/ml) was used as a reference drug.

Many phytochemicals found in plants have long been used in folk or ethnomedical remedies, extending back many centuries. China provided the first records of plant use for medical purposes about 5000 BC (Greathead, 2003) and originated about 2000 BC in India (in the Rigveda and Atharvaveda) (Ramawat et al., 2008). Natural remedies were commonly utilized until the early part of the 20th century when people started using synthetic medications instead since they were more lucrative, more effective, and could be patented (Pichersky and Gang, 2000). The utilization of natural chemicals for medical reasons has, nonetheless, drawn more attention in recent years. Because these traditional remedies have lower rates of adverse responses than contemporary conventional pharmaceuticals and are more affordable, public and national medicinal institutions should consider using them as an alternative to synthetic medications (Perez et al., 2005). A renewed interest in the search for new antimicrobial compounds from natural sources for use as food preservation agents, nutritional supplements, and beneficial and preventive measures against microbial diseases has resulted from the emergence of strains of bacteria that are becoming ever more resistant to antibacterial agents and their increasing prevalence. Since the amount of documented data on plants that are now accessible is rather little in comparison to the large number of plants in the world, ethnopharmacologists, botanical researchers, bacteriologists, and natural product chemists are continuously searching for the therapeutic effectiveness of herbs including their components (Levy, 1992, Zhou et al., 2017). Plants generate a wide variety of substances that have a diversity of phytochemicals in the extract and may form a substantial inhibitory zone. Numerous plant constituents especially polyphenols, alkaloids, terpenoids, and flavonoids, have bactericidal qualities. High quantities of phytochemicals and bioactive compounds have a greater ability to cure a wide range of dangerous microorganisms, according to several scientific research. (Moloney, 2016). Plant-based therapies have the potential to both prevent and cure a wide range of chronic illnesses brought on by different microorganisms. Numerous societies still use ethnomedicine to cure ailments and get beyond challenges without

experiencing any detrimental health impacts.

When used excessively, plant-based medications have much fewer negative effects than commercial antibiotics. The researchers are substituting conventional antibiotics with plant-based therapies to avoid lethal infections caused by different microbes.

Conclusion:

According to the data, the extract in ethanol and ethyl acetate has the greatest potential; this might be because it has the greatest concentration of bioactive chemicals with antibacterial action and phytochemical components. Further study on *Gliricidia sepium* flower extract is needed to discover and purify compounds that might be utilized as natural pharmaceuticals instead of synthetic pharmaceutical therapies.

Acknowledgment:

The authors are thankful to the Principal, Digambarrao Bindu Arts, Commerce, and Science College, Bhokar for facilities and encouragement.

Table 1. Preliminary phytochemical analysis of *Gliricidia sepium* flower extracts

Sr. No.	Phytochemical Test	flower extracts of *Gliricidia sepium*			
		Water Extract	Ethanol extract	chloroform extract	Ethyl acetate extract
1	Saponins	+	+	+	-
2	Phenols	+	+	+	+
3	Tannins	+	+	+	+
4	Glycosides	+	+	+	-
5	Terpenoids	+	+	-	-
6	Flavonoids	-	+	+	+
7	Alkaloids	+	+	+	+
8	Coumarins	-	+	+	+

Table 2. Antibacterial activity of *Gliricidia sepium* flowers

Sr. No.	Microorganism	Minimum inhibitory concentration (MIC) Flower extracts of *Gliricidia sepium* (µg/ml)					
		Water extract	Ethanol extract	Chloroform extract	Ethyl acetate extract	Gentamicin (µg/ml)	Cephalosporins (µg/ml)
1	*Escherichia coli*	172	122	256	102	ND	41
2	*Pseudomonas aeruginosa*	144	132	240	104	ND	48
3	*Staphylococcus aureus*	237	126	135	140	36	ND

The results summarized are the mean values of two parallel experiments. ND- Not determined

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Peer Reviewed Refereed Journal ISSN : 2278 – 5639
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} Volume – XIII Special Issue – III March – 2024

PHYTOCHEMICAL ANALYSIS OF *CYNODON DACTYLON* L. AND *AGERATUM CONYZOIDES* L. PLANT EXTRACTS USING DIFFERENT SOLVENTS

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Abstract:

Cynodon dactylon L. and Ageratum conyzoides L. plants were screened for their phytochemical constituents. Phytochemical screening revealed the presence of Steroids, Terpenoids, Carbohydrates, Flavanoids, Alkaloids, Glycosides, Saponins, Tannins, and Proteins. Cynodon dactylon showed the large number of bioactive compounds in Aqueous and Ethanol solvent extracts whereas Ageratum conyzoides contains large number of bioactive compounds in Chloroform and Petroleum extracts. The results support that the extracts of weeds exhibit a wide spectrum of pharmacological activities and promisingly used as traditional medicine, novel fungicides against devastating fungi and bears antimicrobial activity. The present study will be helpful to standardize the drugs.

Keywords: Weeds, Phytochemicals, Ethanol, Chloroform, Petrochemical ether

Introduction:

In India, weeds are often considered nuisances in agricultural fields, but their extracts have been found to possess valuable antibacterial and antifungal properties, offering potential applications in various sectors including healthcare, agriculture and Pharmaceuticals. Secondary plant metabolites (phytochemicals) with unknown pharmacological activities have been extensively investigated as a source of medicinal agents (Krishnaraju et al., 2005). Traditionally, the screening of bioactive compounds involves, a brute force approach that demands huge investment of significant time and resources to identify a single promising lead compound from chemical libraries consisting of up to several million entities, finding an efficacious drug to bring to market have little or no guarantee. Plant secondary metabolites, contained in extracts of many higher plants are reported to exhibit antibacterial, antifungal and insecticidal properties under laboratory and field tests. Natural products isolated from plant appear to be one of the alternatives

as they are known to have minimal environmental impact and danger to consumers in contrast to synthetic pesticides (Verma and Dubey., 1999). For the present study weeds used are *Cynadon dactylon* and *Ageratum conyzoides*. As the weeds are easily available in amount and combat the demands of growing world. *Cynodon dactylon*, commonly known as Bermuda grass, a perennial grass species belonging to the family Poaceae. Bermuda grass is renowned for its lush green appearance, rapid growth, and ability to withstand various environmental conditions and possesses medicinal properties and has been traditionally used in various herbal remedies. It contains phytochemicals with antioxidant, anti-inflammatory, and antimicrobial properties, which are believed to offer health benefits ranging from wound healing to digestive aid. *Ageratum conyzoides*, commonly known as billygoat weed or goatweed, is a fast-growing annual herbaceous plant belonging to the family Asteraceae. The utilization of weed extracts for their antibacterial and antifungal activities aligns with the growing interest in exploring natural alternatives to synthetic antimicrobial agents. However, further research is necessary to elucidate the mechanisms of action, optimize extraction methods, and evaluate safety profiles before these weed extracts can be effectively incorporated into commercial products. Nonetheless, their abundance in India presents an opportunity for sustainable utilization and innovation in combating microbial infections while also addressing weed management challenge.

Materials and Methods:

The weed plants viz., *Cynadon dactylon* and *Ageratum conyzoides* which is present in abundant amount were collected from college campus. The extract was prepared through the method described by Khan et al., 2018 with slight modifications. Briefly, the plants were washed, shed dried and grounded following soaking (1:10; w/v) into three different solvents namely Water, Methanol and Hexane. The mixture was kept for 48 h and then filtered using Whatmann's filter paper (No.1) following centrifugation for 5 min at 10,000 rpm. The filtrate was evaporated, and the crude extract was collected followed by storage at -20°C until further use. The percentage yield was calculated by the formula, weight of the extract × 100 / weight of the dry sample. The qualitative chemical analysis of plant molecules present in the extracts was carried out using the standard procedures (Harborne J. B.,1993; Srivastava et al., 2012). The different solvent extracts were used for the following metabolites tests.

Test for Alkaloids:

5 mg extract was dissolved in 1 ml double distilled water. Into this, 5 drops of 1% HCl were added and steam was passed through it. To the 1 ml of this solution, 6 drops of Wagner's reagent were added. The appearance of brownish-red precipitate indicated the presence of alkaloid.

Test for Carbohydrates:

5 mg extract was dissolved in 1 ml solvent (respective solvent). To it, 5 drops of Molisch reagent were added. The mixture was allowed to stand for 2-3 min. The formation of red or dull

violet color indicated the presence of carbohydrates.

Test for Cardiac Glycosides:

5 mg extract was dissolved in 2.5 ml solvent (respective solvent). To it, 2 mL of glacial acetic acid was added containing 5 drops of $FeCl_3$ (5% *w/v*). Then, 500 μl of concentrated H_2SO_4 was added. The formation of a brown ring indicated the presence of cardiac glycosides.

Test for Flavonoids:

In 1 ml of extract containing its 5 mg, a few drops of sodium hydroxide were added. Formation of yellow color took place, which disappeared upon the addition of a few drops of 70% HCl.

Test for Phenols:

5 mg extract was dissolved in 2 ml DDW. Upon addition of 10% $FeCl_3$ (10 drops) to it, the blue-green color appeared which indicated the presence of phenols.

Test for Steroids:

5 mg extract was dissolved in 2 ml of chloroform. To it, 2 ml H_2So_4 was added. The topmost layer of sulphuric acid turned red. Further, it turned into yellow color with green fluorescence showing the presence of steroids (Harborne., 1967).

Test for Saponins:

5 mg of extract was dissolved in 1 ml of DDW. Upon shaking the test tube, formation of persistent foam took place indicating the presence of saponins.

Test for Tanins:

5 mg of extract was dissolved in 1 ml of DDW. It was added with 5% $FeCl_3$. The appearance of black-blue precipitate indicated the presence of tannins.

Test for Terpenoids:

In 1 ml chloroform, 5 mg of extract was dissolved followed by the addition of 10 drops of concentrated sulphuric acid. The formation of reddish-brown precipitate at the interface indicated the presence of terpenoids.

Test for Proteins:

Biuret test: Take 1ml of solvent extract with 1ml of 10% NaOH and 1ml of 1% copper sulphate in a test tube, shake gently. Development of purple color indicated that the occurrence of proteins.

Result:

Qualitative analysis showed that *Cynodon dactylon* has highest reaction for flavonoid, alkaloid, tannins and saponins in distilled water and Ethanol, while chloroform extract and petroleum extract shows the presence of carbohydrates and proteins. Only petroleum ether extract shows the presence of steroids as in Table.1. *Ageratum conyzoides* showed the presence of large

number of bioactive compounds in all four exracts. While saponin is present only in the aqueous extracts. Whereas alkaloids are absent in the ethanol extract as shown in Table.2.

Table 1: Preliminary phytochemical tests of various extracts of aerial parts of *Cynodon dactylon*

Test	Aqueous Extract	Ethanol Extract	Chloroform Extract	Petroleum ether
Steroids	-	-	-	+
Terpenoids	-	-	-	-
Carbohydrates	+	+	+	+
Flavanoids	+	+	-	-
Proteins	+	+	+	+
Alkaloids	+	+	-	-
Glycosides	-	-	-	-
Saponins	+	+	-	-
Tannins	+	+	-	-

Table 1: Preliminary phytochemical tests of various extracts of aerial parts of *Ageratum conyzoides*

Test	Aqueous Extract	Ethanol Extract	Chloroform Extract	Petroleum ether
Steroids	+	-	+	+
Terpenoids	-	+	+	+
Carbohydrates	+	+	+	+
Flavanoids	-	+	+	+
Proteins	-	+	+	+
Alkaloids	+	-	+	+
Glycosides	+	+	+	+
Saponins	+	-	-	-
Tannins	+	-	+	+

The maximum extractive value was found in distilled water and ethanol extract (66.66%) of *Cynodon dactylon* and in *Ageratum conyzoides* the extractive value was found in chloroform and petroleum ether (88.88%) followed by aqueous (66.66%) and ethanol (55%) extracts.

Discussion:

The present work has been undertaken as weed extracts are often more cost-effective and efficient to produce in large quantities, facilitating broader accessibility for experimentation. Previous study of the ethanolic extracts of *C. dactylon* were subjected for phytochemical analysis. Phytochemical screening of the crude extract revealed the presence of alkaloids, cardiac

glycosides, terpenoids, saponins, tannin, flavonoids and steroids but reducing sugars, carbonyl (aldehyde) and Phlobatanin show negative results (Venkatesan et al., 2009). The The primary phytochemical analysis revealed that the extracts contained some phytoconstituents such as saponins, steroids, tannins flavonoids, which could be responsible for the observed antimicrobial property (Komali et al., 2022). The production of secondary metabolites by the plant cells growing in culture have been confirmed by several scientist (Ramawat., 1999). Factors that might have been responsible for the variations are differences in extraction methods, nature of solvent, solvent concentration and polarity, part of plant used as well as the age (Folashade., 2012). The drying process may have caused conformational changes to occur in some of the chemical constituents found in these plants (Thilagavathi., 2015). Phytochemicals have highest therapeutic efficiency in pharmaceutical field (Radcliffe.2019). These phytochemicals been linked to various activities such as antimicrobial, hepatoprotective, cardioprotective and antioxidant, wound healing, hepatocholesterolemic, spermicidal, insecticidal, anthelminthic, molluscicidal and contraceptive activities and evidential from its traditional uses already mentioned in the literature (Radcliffe-Smith, 1987; Iwu, 1993; Galvez et al., 1993; Sharma and Sharma, 1995; Ebi, 2001; Williamson, 2002; Tona et al., 2004).

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PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW OF CRUCIFEROUS VEGETABLES AS ANTI-CANCER AGENTS

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Abstract:

Vegetables belonging to family Cruciferae, also known as Brassicaceae vegetables are commercially very important flower bearing family due to their medicinal value as anti-cancer agents. The two most important anti-cancer edible vegetable of cruciferous family are Cauliflower and Cabbage. The cruciferous vegetables covered in this article that are readily available locally are Brassica (Mustard), Cauliflower, Cabbage and Radish. Some Cruciferous vegetables have strong flavour and aromatic fragrance due to the presence of compounds called glucosinolates, which contains sulphur. These vegetables are full of nutrients, minerals, vitamins (C, E, and K), folate, and various carotenoids (beta-carotene, lutein, and zeaxanthin). They are very good source of fibre as well. It has been discovered that indoles and isothiocyanates present in these vegetables are able to prevent/subside growth of cancer in organs of rats and mice namely stomach, liver, lung, colon, breast, and bladder. Numerous possible anticancer mechanisms are discussed in this article discovered by investigations on laboratory-grown cells and animal models. The work that is being presented sheds insight on the anticancer potential of readily available cruciferous plants, there probable mechanisms and there cooked and uncooked recipes for human consumption.

In this review article vegetables like broccoli, cabbage, kale, collards, cauliflower and brussel sprouts are discussed for their potential anticancer properties. This family of vegetables contains powerful phytochemicals like carotenoids, indoles, and glucosinolates and isothiocyanates that have been studied and proven to slow the growth of many cancers.

Keywords: Anticancer, Cruciferae, glucosinolates.

Introduction

Vegetables classified as cruciferous, or Brassicaceae vegetables, are members of the Brassicaceae family (previously called Cruciferae). Cruciferous veggies have abundant anti-cancer qualities apart from other potential health advantages. Including them in diet can certainly help improve general health of human beings

Brassica genus comprises cruciferous vegetables, which include common varieties like

broccoli, cabbage, kale, cauliflower, brussel sprouts, and more. These vegetables are not only delicious but contains enormous nutrients and scholars have been closely studying these nutrients role and their possible positive influence on cancer treatment and prevention.

Cruciferous vegetables have gained popularity due to their potential cancer-fighting properties. This diverse group of plants includes various edible options, each providing unique health benefits.

Cancer is a very dangerous disease because of abnormal growth of unrecognised cells in body, the cells grow continuously with rapid pace which disturbs the cell cycle. There are many types of cancers in the world, such as throat, lung, colon, uterus, ovary, brain, breast and blood cancer. Cancer patients have a higher death rate compared to other diseases. After patient's chemotherapy, the toxic effects of the chemotherapy drug and the toxic side effects of cancer treatment negatively affect the patient. To maintain optimal health, it is important to live a healthy life with a balanced diet and an active lifestyle. When it comes to nutrition, we all know that we should eat lots of vegetables, but there are certain vegetables that are known to fight cancer, in addition to offering many other health benefits.

In last 25 years many phytochemical substances have been added to medical practice apart from numerous antibiotics due to their enhanced anticancer activity or ability to meet particular therapeutic needs. Though recently discovered antibiotics have found important role in modern therapy, certain phytomedicines of cruciferous plants are proven to be helpful for cancer patients due to growing resistance to current allopathic treatments, which can be fatal if left untreated. Further clinical and scientific research is needed to confirm that these compounds, such glucosinolates, are safe and efficient anticancer agents.

Cruciferous or Brassicaceae family vegetables are natural weapons with enhanced anti-cancer properties against all types of Cancers. Literature and reviews have shown that all types of cruciferous vegetables have anti-cancer properties and this available information can be used scientifically to enhance capacity of researchers in discovery of new anti-cancer drugs.

Following is the list of vegetables belonging to Cruciferous or Brassicaceae family having Anti-cancer properties

Broccoli: Packed full of vitamins and antioxidants, broccoli is recognizable for its vivid green florets.

Cauliflower: Cauliflower is a multipurpose vegetable that may be mashed, roasted, or used in place of low-carb rice.

Cabbage: Used in salads, coleslaw, and stir-fries, cabbage comes in a variety of colours, including green, red, and savoy.

Kale: Packed with vitamins, minerals, and fibre, kale is a nutritional powerhouse.

Brussels sprouts: Roasted or sautéed, these little cabbages taste great.

Bok Choy: Often referred to as Chinese cabbage, this vegetable boasts crunchy stalks and delicate

leaves.

Mustard Greens: Known for their flavour and pepperiness, mustard greens are frequently used in Southern cooking.

Radishes: A zesty addition to salads, these crunchy root vegetables come in a variety of hues.

Arugula (Rocket): This leafy green has a hint of pepper flavour.

Important cancer-fighting vegetables that must be a part of daily healthy diet and which will help human beings to lead healthy life.

Arugula

Arugula contains a variety of phytochemicals that are stored in various plant organs. For example, arugula seeds contain 5.6±0.2% gluoraphanin and 94.4±0.2% glucocerucin, while arugula leaves contain 51.6±3.0% glucosinolate, and the root contains 3.8±0.4% marsic glucosinolates.

These natural compounds, which are the source of the bitter taste and intense aroma are believed to provide protection from certain types of cancer, such as breast cancer, prostate cancer, lung cancer, and colorectal cancer. Arugula can also help reduce inflammation. It contains high levels of vitamin K. Vitamin K is essential for bone health and may help protect against bone loss

Bok choy

Bok choy, like other vegetables in the Brassica family, also contains certain antioxidants. These chemicals include thiotocyanates (a type of thio-cyanoacetic acid), indole- 3-carbolinol (a type of indole-2-carbolinol), lutein (a type of lutein), zeaxanthine (a type of lyophilisate), sulfforaphane (a type of sulfone), and isoto-cyanoacyanates (tynocyanates).

Bok choy is rich in anti-cancer compounds, including vitamin C, vitamin E, vitamin C-2, vitamin C-3, vitamin C-4, vitamin C-5, vitamin C-6, vitamin C-7, vitamin C-8, vitamin C-9, vitamin C-10, vitamin E-11, vitamin E-12, vitamin E-13, vitamin E-14, vitamin E-15, and vitamin E-15. It is also packed with powerful antioxidants that help protect cells from damage caused by free radicals. It also contains folate, selenium, and other compounds that may help slow tumour growth.

Broccoli

Broccoli is said to contain lot of bioactive chemicals, including phenolic compounds, glucose, vitamin C and mineral nutrients. In a recent study, it was found that stems of broccoli have a high amount of ascorbic acids, malic acids, phenolic compounds and caffeic acids. It also has a high amount of linoleic acids, oleic acids, stearic acids and myrestic acids. Elemental analysis using the XRF method showed that the flower of broccoli contains as little as 0.5 parts per million (1.5 Na, 1.5 Ca, 1.5 Mg, 1.5 Fe, 1.5 Cl). The chemical components present in broccoli have been shown to block certain mutations in DNA that can lead to cancer, which can slow down tumour growth. Sulfforaphane, for example, has been shown to inhibit the growth of cancer cells

and is believed to slow down the spread of cancer cells to other parts of the body.

Brussels sprouts

Brussels Sprouts are part of the cruciferous vegetable family, which includes Broccoli, Cauliflower, Cabbage, Kale, and Collard greens. All these cruciferous vegetables all contain a phytochemical that contains sulphur. This phytochemical is known as glucosinolate. It is responsible for the strong smell and bitter taste of Brussels sprouts. When Brussels sprouts are cooked or digested, they break down into compounds called glucosinols. The glucosinols in Brussels sprouts have been studied and found to have anti-cancer properties, including the ability to protect cells from DNA damage, as well as the ability to inhibit the growth of new blood vessels in tumour cells.

Modern Brussels sprouts

Cabbage (Brassica oleracea) is a green, red, or light green biennial vegetable grown as an annual crop for its dense, leafy heads. In the 1990s Dutch scientist, Hans van Doorn, identified the bitter chemicals, sinigrin, and progoitrin, which enabled Dutch seed companies to create modern high-yield varieties of the low-bitter cabbage, thus increasing its popularity over time. Cabbage comes from wild B. oleracea Var. oleracea and is classified as a "collar crop" or brassica, meaning it is related to broccoli, cauliflower, and Brussels sprouts. The average weight of a cabbage is 500-1,000 g (1-2 pounds). Smooth-leafed green cabbage with a firm head is the most common variety. Smooth-leafed purple cabbage and Savoy cabbage with wrinkled leaves are less common. Cabbages can grow very large under long sunny days, especially in summer at high north latitudes. As of 2012, the largest cabbage weighed 62.71 kg (138 lb). Cabbage grows well on long sunny days, for example in summer at high north latitudes. The heaviest cabbage weighed 62.71kg (138lb 4 oz) as of 2012. Cabbage heads are typically harvested during the first year of the plant's life cycle. Seeds are allowed to germinate for a second year, and must be kept away from other grape plants in order to prevent cross-pollination

Collards

Collard is one of the most popular leafy green vegetables in the world. It is rich in vitamins and minerals, as well as dietary fiber. Collard is often taken as a supplement to help with digestion, inflammation, and antioxidants.

Collard greens belong to the Acephala culture group (Kale) [1][2], but they have their own cultivar (Var. viridis) under the name collard greens. The name collard comes from the word collwort (a medieval word for not cutting). Collard greens are cooked and eaten as vegetables, just like cabbage and broccoli. Collard greens have been eaten for thousands of years, and evidence suggests that the Greeks cultivated the plant. The term collard has been used to refer to a variety of Brassica (B. oleracea) plants. American collards are best placed in the Viridis culture group (Culture Group Acephala) [3], but Acephala (Greece for “headless”) culture group refers to the

lack of a leaf interior, like cabbage. This makes the collards more tolerant to high humidity and less prone to fungal diseases. The plant blooms twice a year and has winter frosts. Some cultivars may become permanent in temperate areas. The collard has a long, upright stem that can reach up to 2 feet tall in Portuguese varieties and up to 6 feet in others. Common collard cultivars include "Georgia Southern", "Vates" (a cultivar of "Morris heading"), "Blue Max" and "Top Bunch". Other popular collard cultivars are "butter collard" (from "butter manteiga"), the "butter colard" ("tronchuda") or "groninger blauw". In Africa, the collard is also known as "sukuma" (in East Africa), "muriwo" or "umBhida" (in South Africa).

Eating cruciferous vegetables, such as collard greens, has been shown to reduce the risk of certain types of cancer, including prostate cancer, breast cancer, ovarian cancer, lung cancer, bladder cancer, and colorectal cancer. Older research and newer studies have shown that people who eat cruciferous vegetables are less likely to develop certain types of cancer.

Cruciferous vegetables are high in vital nutrients which are essential for DNA synthesis and cell division. Vitamins C, E, and K present in cruciferous vegetables promote healthy skin, blood coagulation, and immune system performance. Dietary fiber content promotes fullness, which helps with weight management.

Principal content Glucosinolates has unique flavour are broken down during digestion to produce beneficial compounds. Indoles Guard against DNA damage to cells. Isothiocyanates like sulforaphane, have antiviral and antibacterial properties in addition to anticarcinogenic property.

The United States Department of Agriculture (USDA) states that adult women should strive to consume 2.5 cups of veggies per day. Men should eat three cups of veggies a day which should include Broccoli, Brussels sprouts, or cauliflower, whether they are cooked or uncooked to help protect body from infection.

Recipes for eating cruciferous vegetables

Cruciferous vegetables in daily meals helps in keeping overall health and well-being of human beings. With so many varieties and ways to cook them, there's sure to be at least one cruciferous vegetable that everyone in your family is a fan of.

Arugula recipe: Use arugula in pasta dishes or as a substitute for basil in pesto.

Bok Choy Recipe: Chinese cabbage with a mild flavour, goes well with potatoes or soups..

Broccoli Recipe: Raw in salads or as a cooked vegetable

Probable Anticancer Mechanisms of cruciferous vegetables

The glucosinols present in cruciferous vegetables are hydrolysed to form isothiocyanates. Compounds such as sulfforaphane may contribute to cancer prevention by increasing the body's ability to eliminate carcinogens from its environment and increasing its ability to transcribe tumour suppressor protein, including those that are silenced by epigenetics. There is some evidence from epidemiological studies that human exposure via cruciferous plant consumption may reduce cancer

risk. However, the protective effects of this may be affected by individual genetic variations in metabolism and elimination from the human body. Studies in animals and lab experiments revealed that these compounds may help prevent cancer by shielding cells from DNA damage and help neutralize harmful substances by inactivation of Carcinogens. They also show some Anti-Inflammatory properties which helps in induction of Cell Death (Apoptosis), inhibition of tumour blood vessel formation and cell migration.

Conclusion

Vegetables plays very important role in maintaing health in this busy world. Cruciferae, also known as Brassicaceae vegetables plays very important role in daily food on one side and its medicinal role having abundant anticancer properties on the other side. Cruciferous vegetables are foods rich in nutritive composition and are also a good source of dietary fibre. The findings based on reviews suggest that frequent consumption of cruciferous vegetables was associated with beneficial effects on inflammation and cancer This little information provided in this review article will help researches to direct their investigation in isolation and characterization of the chemical constituent's present in these vegetables and their possible role in cure and prevention of cancer.

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REARING PERFORMANCE OF *BOMBYX-MORI L.* SILKWARM IN MONSON SEASON OF NANDED, DISTRICT.

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Abstract

Farmers in Nanded district choose sericulture as secondary source of money. I visited several places of farmer which are installing their shade. Present investigation has been made to study the rearing performance of multivolatine Bombyx Mori L. Silkworm breed. It has been realized statistically for different traits in sericulture, which will help in selecting the alternate of mulberry silkworm, which is a more susceptible in monsoon season. The result obtained showed the Bombyx Mori L. Rearing can be most promising for the rainy season and it is very less susceptible to different silkworm disease also.

Key Wors: Nanded, Multivolatine, Breeds, *Bombyx Mori L.*

Introduction

To synthesis productive silkworm breeds is an important component in the development of sericulture, which is depend upon testing fairly large number of breeds/hybrids. Evaluation of different breeds is undoubtedly the most important method of identify their superiority. Silk is a natural fiber which although has claimed less than 1% of the world textile fiber, it total production is studied increase in spite of an increase in demand of manmade synthetic fibers, which texture tensile qualities, luster, comfort, adaptability to all climate condition and ability to take up dice and some of the natural qualities of silk. (Anonymous, 1981).

Silk gives a look of rugged yet smooth cotton, warmth of wool and subdued shine of silk which is much final and elastic than any other fiber. The cocoons of silk worm Bombyx Mori L. are being spun into thread like cotton and the weaving done in handloom under cottage industry, it has also medicinal value. Concentrated patches of plantation can be seen in Pawdewadi, Dhanaj, vishnupuri, mugut, Barad, Musalmanwadi and adjoining areas. By using this first time and attempt to check feasibility of rearing Bombyx Mori L. in Nanded climatic conditions with assessment of many parameters in monsoon seasons was attempted.

MATERIAL AND METHODS

The present study has been conducted in Nanded. Bombyx Mori L silkworm wear selected for the experiment to check their rearing performance in Nanded reason in monsoon season. The rearing was conducted in consecutive to monsoon seasons to analyze the various aspect of

silkworm i.e. hatching percentage, yield/10000 larvae (by number), yield/10000 larvae (by weight), cocoons weight, shell weight, shell ratio and pupation rate. Standard rearing method was adopted as recommended by Ueda. S etal (1962). During rearing other precautionary measures as use of disinfectant, removal of diseased silkworm larvae general cleanliness and sanitation were taken up proceed for the study of seasonal variation.

RESULT AND DISCUSSION

The silkworm Bombyx Mori L breed selected for experiment was subjected fluctuating agro-climatic conditions in monsoon season. On evaluation of results for the various rearing parameters viz. hatching %, yield/10000 larvae by number, by weight, cocoons weight, shell weight, cocoons shell% and pupation rate as shown in table 1. Bombyx Mori L silkworm should better results regarding yield/10000 larvae by number (8600), by weight (28.89), cocoons weight (2.34 g), shell weight (0.22 g), cocoons shell% (15.46) and pupation rate (90.56%). In Present study also same of the character like yield, by number and by weight, shell ratio, total days and pupation rate in % showed significant differences among the both monsoon seasons of year 2022 and 2023 and that adaptation is very important in silkworm. These characters are not only controlled by since and are known to be influenced by different climatic factors such as temperature, humidity, photoperiodic cycle, nutrition etc (Watanabe, 1928).

Table No.1. **Performance of *Bombyx-Mori L* with different parameters in Monsoon season.**

Generation	No. Of Eggs Per Laying	Date of hatching	Date of maturing	Total days	Weight of 10 grown worms(gm)	Weight of cocoons (gm)	Weight of 10 cocoons without pupa(gm)	Silk ratio	Larve by no.	EER yield by wt(Kg)	Pupation rate%
Monsoon 2021-2022	378	11 July	2 Aug.	23 days	85 gm	23.48	3.48	15.07	8650	28.59	88.49
Monsoon 2022-2023.	383	13 July	6 Aug.	25days	88 gm	24.22	3.51	15.53	8970	30.32	90.73

Table No.1. **Performance of *Bombyx-Mori L* with different parameters in Monsoon season.**

Months	Temperature ^{0}C		Humidity %		Rainy Days
	Maximum	Minimum	Maximum	Minimum	
July/ Aug. 2021-2022	31.7^{0}C	24.6^{0}C	93.01%	76.4%	Nil
July/ Aug. 2022-2023	31.3^{0}C	30^{0}C	73%	61.3%	7

The present City shows similar to several s in tropical country where they were succeed original repairing Mishra 1987, Devaiah etal., 1981 Bombyx Mori L silk worm bearing showed better results which support the monsoon climatic condition in Nanded district.

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Peer Reviewed Refereed Journal **ISSN : 2278 – 5639**
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} **Volume – XIII** **Special Issue – III** **March – 2024**

ANATOMY OF PETIOLE IN SOME VERBENACEAE

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Abstract:

Petiole anatomy in 02 genera and 08 species of the Verbenaceae is investigated. The mechanical tissue in the form of collenchymas or sclerenchyma occurs in a few plants. The xylem elements are additionally mechanical in function. The vascular tissue in the form of distinct bundles or an arc shaped strand is recorded in different members. The variation in the distribution of the mechanical tissues and the shape as observed in a transverse section of the leaf axis can be employed for the segregation of the taxa studied.

Keywords: Anatomy, Leaf axis, Mechanical tissues, Systematic, Verbenaceae.

Introduction

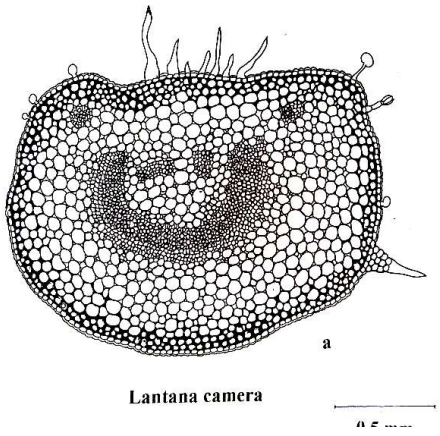
The vasculature of petiole has of considerable importance in systematic investigations (De Candolle, 1879; Vesque, 1881, 1885; Acqua, 1887; Petit, Hare, 1943; Howard, 1963). Grew (1675) was the first botanist to recognize the different patterns of vascular bundles in a petiole. Earlier work on the structure of the petiole in certain members of the Verbenaceae are mainly of Solereder (1908) exhibited a variation in the vasculature of petiole. Metcalfe and Chalk (1980). Since the petiole anatomy in the family has received little attention it warrants a detailed study. The present account deals with such on 09 species spreads over two genera of the family.

Materials and Methods

The Plant material of ***Lantana camera*** L., ***Lantana indica*** Roxb.***Phyla nodiflora*** (L.)Green.***Stachytarphetajamaicensis*** (L) Vahl. ***Priva cordifolia***(L.f) Drue.***Verbenabipinnatifida*** Schau.***Duranta erecta*** L., ***Holmskioldia sanguine*** Retz. Were collected from Aurangabad and fixed in F.A.A. They were preserved in 70% alcohol. Free as well as paraffin infiltrated microtome sections were taken and stained with safranin fast green combinations.

Observations

The leaves are generally simple, petiolet. Petiole is short, medium or long in length



***Lantana camera* L. (Fig. a)**

It is circular to oval in outline, more or less flat at the adaxial surface. The epidermis is of small, thick- walled cells with thick cuticle. The stomata are few in number.

The hypodermis is of two to three layered collenchyma followed by a broken

Parenchymatous cortex. The central vascular tissue is of an arc shaped structure in which lie medullary bundles. In addition two cortical bundles occur at two corner adaxially. The pith is parenchymatous. Both glandular and non glandular trichomes are common.

***Lantana indica* Roxb.**

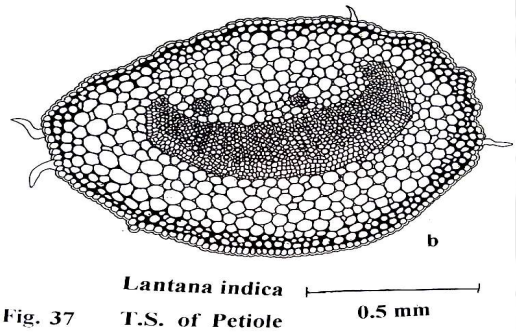
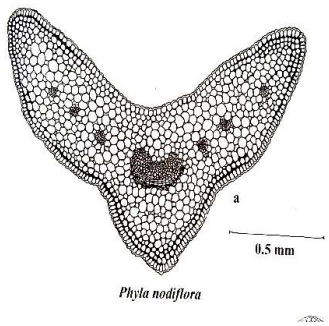


Fig. 37 T.S. of Petiole

The Petiole is more or less cylindrical and oval shaped. The epidermal cells are small thick walled with thick cuticle. Unicellular trichomes are common. Epidermis is followed by two to three layered collenchyma and then parenchymatous cortex. The vascular tissue is in the form of a prominent are shaped structure above which lie two smaller bundles.

***Phyla nodiflora (*L.) Green.,**

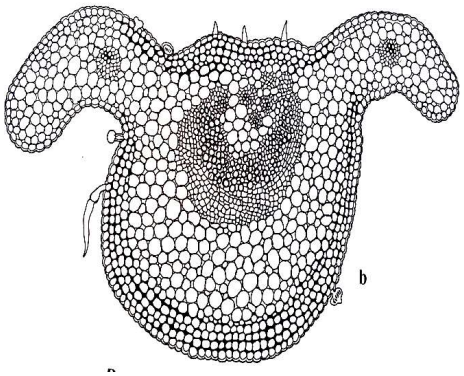


T.S. of petiole appears triangular.

Epidermis consists of large elongated cells with thick wall. The cuticle is moderated.The stomata are few in number. The stomata are few in number. The collenchyma occur in hypodermal region which is not continuous. It consists of 3 to 4 layered tissue at three corners. The cortex is parenchymatous. The central arc shaped vascular bundle and other six smaller bundles occur in a row. The central vascular bundle sclerenchymatous

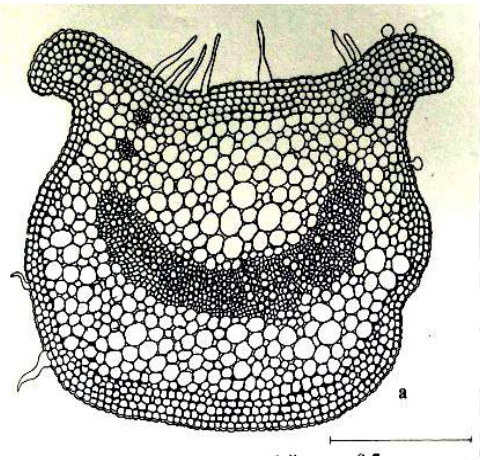
at the adaxial side and xylem tissue occurs in row.

***Stachytarphetajamaicensis* (L) Vahl.**l wing and a short median ridge. The epidermal layer is of small thick walled cells. The cuticle is thick. Trichomes are variable. The stomata are few in number. The epidermis is followed by collenchymatous hypodermis. The next few layers are of parenchyma. The vascular tissue is in the form of an arc shaped structure. In addition, the solitary cortical bundle occurs in each wing.



***Privacordifolia* (L.f) Drue.**

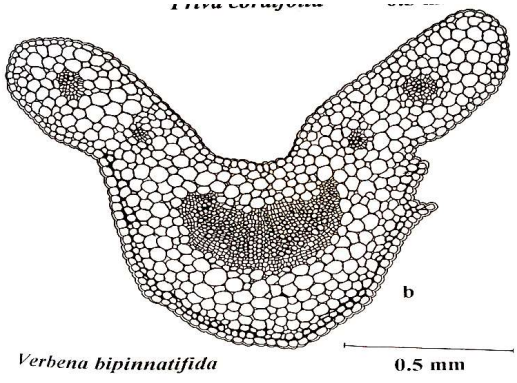
It is more or less circular in out line with two small adaxial wings and a small groove adaxially. The cells of epidermis are small with thick walls and thick cuticle. Trichomes are variable. Stomata are few. The epidermis is followed by 2 to 5 layered collenchyma. The wing has more amount of collenchyma. The rest of the ground tissue parenchymatous. The vascular tissue consists of a central large arc shaped strand and 2 to 3 or four small cortical bundles which lie adaxially.



***Verbena bipinnatifida*Schau.**In T.S. it occurs triangular. The epidermal cells are large, thick-walled with moderate cuticle. Stomata are few in number. The epidermis is followed by 1 to 2 layered collenchyma at the abaxially side. Rest of the cortex is parenchymatous. The vascular tissue is in the form of central large arc shaped strand and four cortical vascular bundles which lie adaxially in a wing.

***Durantaerecta* L.,**

It is cylindrical with two lateral wings and a median small ridge develops adaxially. The epidermal layer is small thick walled cell. The cuticle is thick. The trichomes are variable. The stomata are few. The epidermis is followed by the two to four layered collenchymas abaxially. Rest of the cortex is parenchymatous. The vascular tissue comprises of central an arc shaped vascular strand and few medullary bundles. In addition two cortical bundles, each one is extended in a wing.



***Holmskioldiasanguine* Retz**

It is circular in outline with a deep groove adaxially.

The epidermallayer is large thick walled cell with thick cuticle. The trichomes are many celled. The stomata are few. The epidermis is followed by 2 to 6 layered collenchyma. The rest of cortex is parenchymatous. The vascular tissue consists of a distinct arc shaped strand,

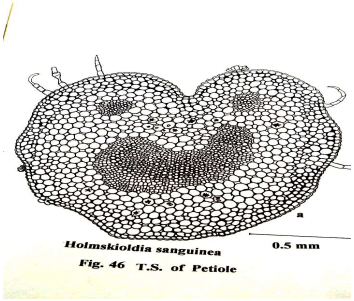


Fig. 46 T.S. of Petiole

which is centrally located and two cortical vascular bundles which are adaxially formed. The calcium oxalate crystals occur in the cortex.

Discussion

In T.S. the petiole shows various shapes like circular, oval , flat, triangular lobed and concave or concave or concave or convex adaxially. In some cases it has two short or well developed lateral wings. A longitudinal median groove is seen a *Holmskioldia.* Two longitudinal channels are formed on the adaxial surface in Duranta.

The petiole structure may easily be compared with the primary tissue of the stem. There is a close similarity between the petiole and the stem, petiole, the rachis and the stem in regard to the structure of epidermis. The ground parenchyma of the petiole is like that of stem cortex in arrangement of cells.

The mechanical tissue in the form of collenchyma and sclerenchyma are distinct in the leaf axis of presently investing taxa. The xylem elements are additionally mechanical in function. Sometimes parenchymatous cells become thick walled and collenchymatous and thus it becomes difficult to distinguish.

The distribution of collenchyma is significant. It occurs in all the species. Generally a continuous ring of collenchyma in hypodermal region is recorded. However, the amount of layer is variable in different taxa. Generally adaxial and abaxial side exhibit more amount of it.

Continuous Sclerenchyma develops close to the arc shaped vascular strand in ***Phyla.*** In other taxa like ***Lantana, Stachytarpheta, Priva, Verbena, Duranta, Holmskioldia,*** the sclerenchyma is not associated with vascular tissues.

The vascular tissue is an arc shaped in ***Priva, Stachytarpheta, Phyla, Duranta, Lantana, Verbena, and Holmskioldia.***

The development of cortical and medullary bundles is significant. Two cortical bundles are known in ***Lantana camera, Holmskioldia, Stachytarpheta.*** The number of cortical bundles may increase in some taxa like three in ***Priva***, Four bundles in Verbena and six bundles in ***phyla.***Two cortical bundles extend in the wing in case of ***Stachytarphetawhile*** four cortical bundles and arc shaped strand occur in one row in ***Phyla.*** In addition 2-3 medullary bundles are also recorded in Duranta, Lantana camera. It is to be noted here that Lantana indica has arc shaped strand and only two medullary bundles.

The present study indicates that petiole has principal vascular tissue and accessory vascular bundles- cortical and /or medullary. The cortical bundles are reported in all the taxa except

Lantana indica. The cortical bundles are invariably developed adaxially. Certain plants have both accessory bundles- cortical and medullary i.e. in Duranta. Lantana camera, while L. indica has only medullary strands.

The variation in the distribution of various mechanical tissues is found to be significant in taxonomic delineations and will be seen later.

Solereder (1908) exhibited a variation in the vasculature of petiole. Metcalfe and Chalk (1980) describe accessory bundles in such organs of few genera in Verbenaceae. Earlier Hubert (1921), and Perrot and Hubert (1922, 1923) made detailed study on medullary bundles in the leaf axis of the family.

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NEEM EXTRACT MANAGEMENT AGAINST LEAF SPOT OF VIGNA RADIATA (LINN.)

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Abstract

Green gram is one of the important pulse crops grown throughout India. Vigna radiata is a plant species of Fabaceae which is also known as green gram. It is sometimes confused with black gram (Vigna mungo) for their similar morphology, though they are two different species Cultivation and production of black gram showed decreased trend in last few years mainly due to the incidence of diseases. The effective control of the disease with the application of Biopesticides is need of hour. The aim of the study was to evaluate Neem extract in vivo against leaf spot disease causing fungi on Vigna mungo. This experiment was conducted to examine the efficacy of Neem extract against Leaf spot (fungal disease) on Black gram caused by Cercospora canescens, Fusarium equisetti and Curvularia lunata in Black gram. The experiment was carried out during Kharif season-2023 and the experimental side exactly located on 19°02'58.8"N 77°40'59.1"E. The results showed that Neem extract was highly effective in controlling the incidence of Leaf spot in Black gram. Present investigation revealed that biopesticide Neem extract is potent to control the leaf spot diseases on green gram caused by various fungi and enhance grain yield and quality of the seed.

Keywords: Black gram, *Cercospora canescens*, *Fusarium equisetti, Neem Extract.*

Introduction:

Vigna radiate L. is one of the important pulses crop, grown throughout the country. The crop is resistant to adverse climatic conditions and improves the soil fertility by fixing atmospheric nitrogen in the soil. The pulse is used in rheumatism, nervous and hepatic disease. The roots of the plants are narcotic and are used for aching bones. The plant prevents soil erosion and conserves soil moisture. Cultivation and production of green gram showed decreases trend in last few years *Cercospora canescens* attacks the crop and the symptoms appear on leaves as water soaked spot with greyish borders. As the disease becomes severe cause death of the tissues of infected leaves. The petioles, stems and pods also get affected by the pathogen. During favourable condition the spots increase in size and at the time of flowering and pod formation lead to defoliation in case of severe attack of *Cercospora* premature defoliation is also observed. Sometimes the leaves may become unshaped and wrinkled mainly due to the incidence of diseases.

The average yield of green gram is very low due to low inherent yield potential and susceptibility

of crop to the disease (*Thakur et.al., 1977*). Leaf spot disease caused by *Cercospora canescence* is a serious disease in the black gram growing areas during the season (*Bashir and Jubair, 1985*); which is responsible for 23% losses in yield (*Quebral and Cagampang, 1970*). Maximum loss of 61% was observed in case of grain yield (*Iqbal et al., 1995*). Several workers had reported the effective control of the disease with the application of Biopesticides.

Materials and Methods:

The experiment was conducted during 15th June to 30th August 2023 (i.e. Kharif season) at 19°02'58.8"N 77°40'59.1"E. at Ganipur Tq. Umri Dist. Nanded (M.S.) to evaluate the efficacy of Neem extract against leaf spot disease in green gram. The green gram variety (Nirmal seed) selected for the study and sowing was done on 10th June 2023 at a spacing 30 cm and 10 cm between rows and plants respectively. The first spray was taken up after initial appearance of the disease in the treated crop field and further sprays were done at an interval of 15 days with 'High Tech' sprayer @ 1000 ml/0.40 hector for through coverage of foliage with sprayer fluid. The severities of leaf spot were recorded one day before the every spray standard rating scales during the season in both the fields. Percent Incidence (PI) of the disease was calculated for Leaf spot.

Results:

During the experimental period the data regarding the incidence of leaf spot was presented (Table 1). The results showed that the biopesticides, Neem extract 1000 ml/0.40 hecter was found effective against leaf spot. The Percent Incidence (PI) of the leaf spot was nearly constant during the season in treated plot, since the incidence of leaf spot was very rare in the treatment compared with untreated control. Severe incidence of leaf spot was observed in untreated control plots during the season. Hence, it was evident that Neem extract was highly effective in controlling the incidence of leaf spot in green gram.

Table 1: Efficacy of Neem Extract against leaf spot of *Vigna radiata* during Kharif season - 2023.

Treatment	PI (Percent Incidence) of leaf spot disease during 4 sprays					Yield Kg/0.40 ha
	I st spray (After 25day)	II nd spray (After 40 day)	III rd spray (After 55day)	IV th spray (After 70day)	Mean	
Neem Extract, *1000ml/0.40 hecter*	12.70	14.20	16.25	18.60	15.43	590
Untreated Plot	13.25	16.50	22.55	27.10	19.85	430

The results obtained in the present study revealed that all the treatments significantly increased the seed yield (590 Kg/0.40 ha) over the untreated control (430 Kg/0.40 ha). The grain yield was the highest from the experimental plots treated with Neem extract at 1000 ml/0.40 ha

during the season. The biopesticide treatments not only increased the yield but grain quality was also superior as compared to uncontrolled plot.

Discussion:

The test biopesticides, Neem extract was proved effective against leaf spot diseases. The efficacy of Neem extract against foliar fungal diseases in different crops was well documented. D.A. Mahmoud,* N.M. Hassanein, K.A. Youssef, and M.A. Abou Zeid (2011) reported Neem extract having a antifungal activity. The Percent Incidence (PI) of leaf spot nearly constant during the season over treated field and it increasingly trend over untreated field. The percent incidence of leaf spot nearly same at the time of first spray, but from second spray percent incidence of leaf spot increase on untreated plot. On untreated plot percent incidence of leaf spot 16.50%, 22.55% & 27.10% after IInd,IIIrd & IVth spray as compare to treated plot 14.20%, 16.25% & 18.60% after IInd,IIIrd & IVth spray respectively. Mean of percent incidence of leaf spot on untreated plot is 19.85% as compare to treated plot 15.43%. The yield of both plot are completely different, untreated plot loss of yield due to disease incidence as compare to treated plot. Finally yield count both of the plot its 590 kg & 430 kg per 0.40 ha. in treated & untreated plot respectively.

During this investigation the *Cercospora canescence* causes leaf spot on green gram crop. *Cercospora* leaf spot is a devastating disease that causes qualitative and quantitative losses to the crop (Sivprakasam, 1983). The *Cercospora* leaf spot disease well-defined spots often bound by veins and purplish border develop, the centres of which may turn grey, it appearing about 5-6 weeks after planting, depending upon the weather condition mostly temperature and humidity. It also caused premature defoliation and reduction in size of pods and grains (*Grewal et al., 1980*). *Curvularia lunata* (Wakker) was isolated from the infected leaves and pods of black gram. The spotting is mostly confined to leaf blades; occasionally it occurs on the pods and floral parts. It might be due to the availability of infected test crop, dead and decaying materials and favourable weather condition. However, continuous rain affected the incidence of *Curvularia* spores in the air (*Mallaiah and Rao,1980*).The presence of *Fusarium* spores in air over test field might be due to the prevalence leaf spot and top necrosis disease in untreated fields. *Fusarium equsetti* caused the leaf spot and top necrosis on black gram crops in untreated field. The incidences of disease occur after 4-5 weeks from the date of sowing.

Conclusion:

Present investigation revealed that Biopesticides Neem Extract is potent to control the leaf spot diseases on green gram caused by various fungi and enhance grain yield and quality of the seed.

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TAXONOMY AND DIVERSITY OF POLYPORUS FROM THE KINWAT (NANDED) DISTRICT OF MARATHWADA, MAHARASHTRA (INDIA)

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Abstract:-

Polyporus of Aphyllophorales (Basidiomycetes) from the Kinwat, Nanded Marathwada. Polyporus is the genus from Aphyllophorales with 1500 species in word. Only 355 species have been reported from India but the Present study reports 3 species. The species are each describe and the fruit bodies, spores & hyphae.

Keywords:- Aphyllophoreales-Polyporaceae-Marathwada-Maharashtra

Introduction:-

The Kinwat & Nanded district rain forest is a costal ecosystem characterized by low biological diversity. Over time it has, been diminished significantly by h uman activities that have nearly caused its complete destruction. Few mycological studied by the Polyporus (Aphyllophoreales) that's like ainsworth et.al.1973, and domanski 1972, domanski et.al.1973 ; Ryvarden 1976-1978 ; reverden&Johansen 1980; Gilbertson & Ryverden 1986-87, Ryvarden & Gilbertson 1993-94; corner 1983-1989b; Lorsen & cob-Poulle 1990.

In india montagne 1842,1846; Berkely 1954, Liyod 1898-1925; Theissen 1911; Bose 1924,1925,1934,1937,1946,Bagchee etal 1954,Bakshi 1971& Ratan 1977, In addition reports from India by Bakshee 1957-1961,Bakshi 1950, B.&singh 1960, Bakshi et al 1963, Banerjee 1935,1947 & Sharma J. 1989,1993,1994, etc. contributed to the study of this genus

Material and Methods.

Collection of Aphyllophorales were made from September to Jun reserves from the Kinwat Nanded District (Marathwada). Collection, preparation of the material & micro & macroscopic analyses were made following the usual methods for these fungi (Maerz & paul 1950; Fidalgo & Bononi 1989, Martin 1934, Kotlaba & Pouzer 1964; Singer 1951;
Teixeira 1995.)

For identification the following literature was used; cooke (1961) , Harrison (1973), Ratten (1974), Maas Geesteranus (1978), Gilbertson & Ryvarden (1986); Stalpers (1996)
& Ryvarden (2001).

Result and discussion

Three species of Polyporaceae like polyporus aveolaris , Polyoporus gramonocephalus & Polyporus Tenuiculus are recorde in the surveyed areas, like Kinwat Nanded District

(Marathwada)

Key to the species of Polyporus

1. badius 5mm thick; stipe concolours with pileus & not black at the base.
   p. badius
1. Stipe Black at the base 2
2. Basidiocrap Sessile to dimidiate of flabelliform with only tapering base, tropical species brumalis
2. Basidiocrap not sessile 3
3. Pileus White to cream, often tesulated; spores 9-12 mm long; tropical sp ---------- tricholoma
3. Pileus white to redish 4

Species description

Polyporus badius -(DL .. fr.)

Basidiocarps- Annual, stipitate to sessile, circular dimidiate; Stipe central to Latral, buff, glabrous, upto 1 cm, long & 0.5 cm. thick ; uppersurface pale reddish yellow; fibrillose to squamose with flattenel triangular squamuses, with age becoming ivory to pale buff, azonate, glabrous, smooth; margin concolorous; pore surface White to tan; pores dimond shaped, rdially elongated, 1-2 per mm tangentially with thin dissepimets that become lacerate with age; contest pale tan to ivory, azonate, corkey, up to 1 mm thick; tube layer continuous with the context, upto 4mm thick

Hyphal System- Di- Trimatic ; generative hyphae hyaline I k oh, thin walled, rarely branched with clamps, 2.5-4 mm in dim. Binding hyphae thick walted, nonseptate, much branched with tapering apices, other with rare branching, 3-5.5 mm. in dim.; cystidia absent; hyphal pegs present, 4.50*10-45 mm ; Basidia clavate, 4-Sterigmate, 20-35*6- 9mm. with a basal clamp; Basidiospores cylindrical hyaline, smooth 10.5-14(15)*4-4.5mm **Specimens examined**:- on dead hard woods of Butea monosperma (mu-147), citrus lemon (mu-277), Boswellia serrata (mu-141)
Terminalia Cattapa (mu-141)

Geographical distribution- Ceylon, Cuba, Mexico. Australia, Brazil. USA, East Indies, Philippines, Pacific Islands, Africa & India, newzealand, China, Malasiya, Japan, Swedan, Asia, Europe, Indonesia, UK. Java, North America.

Polyporus brumalis- (Berk.)

Basodopcarps :- annual , solitary, pileate, dimidiate, flabelliform or sapthualte and laterally attached with a stipe like contracted base, upto 3.5 cm wide and long, up to 4mm thick at base; upper surface glabrous, ocharaceous to tan or pale brown with numerous fine radial lines becoming more tufted towards the base which often can be coverd with raised tufts to agglutinated hyphae; margin thin and reflaxed in dried specimens; stipe as such usually absent but in few specimens short stipe present, sterile on the lower side between the pores, ochraceous, upto 5mm in diam;

Pore surface straw coloured, tan to pale brown in old specimens; pores thin walled angular, sometimes slightly split,3-5 per mm; Tubes upto 3mm thick ; context 1-4 mm thick, cream to ochraceous homiogenous **Hyphal System**- dimitict; generative hyphae with clamps, 2-4mm wide; binding hyphae bovista type, abundantly present, thick walled to solid, upto 10 mm thick at the main; cystidia, other sterile elements absent; Basidia clavate, 4-sterigmate, 20-25*5-9mm, with basalk clamp; basidiospores oblong, ellipsoid 5-6.5 (7) – 2-3 mm. thin walled

Hyaline, smooth

Specimens examined: on dead hard woods of butea monosperma (mu-15). Buteamonosperma (mu-160)

Geographical distribution-

Philippines, India, Ceylon, Austrelia, New zeland, Cuba, Brazil, Java, Jamaica, Costarica, Islands, Colombia, Canada, & India

Polyporus tricholoma -(Beauv.) fr.

Basidiocarps:- Annual, solitary, imbricate or in small clusters with several fruit bodies arising from the same point of attachment, flabelliform spathulate to dimidiates & semicircular, 2 cm wide & liong , upto 4 cm thick at base, thinner towards the margin, soft when fresh Light and brittle when dry, ore rarely the fruit bodies may become distinctly stipitate with a central to lateral short and stout stipe with strongly decurrent pores; upper surface white when fresh, cream to altuaceous or pale ochraceous when dry, glaborous except basal part of pileus which may be coverd by a short inconspicuous tomentum, often irregular in tufts, surface smooth or distinctly tessulate reflecting the pores below; if smooth, usually without any noticeable radial lines or striate; margin thin entire or lobed; pore surface concolours with the poleus ; pores hexagonal or radialy elongated, pores walls thin, often undulating and finely incised, in circular fruit bodies the pores have a tendency to be hexagonal, in flabellate specimens they tend to be radialy elongated 1-3 per mm in some specimens upto 2mm wide, pores rather shallow , rarely more than 3 mm deap; contex whit to pale ochraceous , thin up to 2 mm thick at base.

Hyphal System :- dimitict; generative hyphaae hyaline, 2-4mm in dim. Thin walled clamped, binding hyphae moderately branched thick walled , flexuous, more commonally dichotomous branched , tapering down to1-2 mm in width; cystidia; absent;

Basidia clavate, 4- streigmate, oil drops present 20-30-3-6mm , with a basal clamp, basidiospores cylindrical to sub navicular with tapering ends 9-11.5(12)*2-3.5mm, hyaline, thin walled often with few oil drops;

Specimens examined- on dead hard woiod of dolichandrone falcata (mu-285), dolichandrone falcata (mu-116)

Geographical distribution- Cuba, East Indies , Phillippines, Austrelia, Cellon, North America, Brazil, Africa & India, China , Japan , Mexico , Brazil , Java, Cuba, U.K., USSR, Europe.

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CULTIVATION OF *PLEUROTUS FLORIDA*

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ABSTRACT

Pleurotus florida was cultivated on different agro wastes viz. soybean straw, paddy straw, wheat straw, groundnut straw, sunflower stalk and pigeon pea stalk to determine the suitability of these agro waste on yield , biological efficiency, moisture content, total carbohydrate, protein, fat, crude fiber, ash content. Soybean straw showed significantly highest yield (85.06% B.E.) with maximum crude protein (25.33%) content. Significantly maximum moisture and crude fiber content of Pleurotus was recorded on sunflower stalk, i.e. 89.35 and 7.82 % respectively. Maximum total carbohydrate (56.00 %) was recorded on wheat straw, while maximum fat and ash content of Pleurotus was recorded on ground nut straw, i.e. 2.85 and 7.00% respectively.

Key words: *P. florida*, B. E., yield, agro waste, fruiting body,

INTRODUCTION

Mushrooms are the fleshy macro fungi and are rich with protein, vitamins and minerals. More than 2000 species of ediblemushrooms are known, out of which only a few species have been cultivated commercially by preparing beds (Nair, 1994). Among the various edible mushroom types, *Pleurotus* species have become more popular and widely cultivated throughout the world particularly in Asia andEurope as they have simple and low cost production technology shows higher bioefficiency. *Pleurotus* mushroom are commonly called as oyster mushroom, due to its oyster like shape. *Pleurotus* species are rich source of vitamin C, B-complex (thiamin, riboflavin, folic acid and niacin), minerals (Ca, P, Fe,K and Na) and protein (Sturion and Otterer,1995; Justo *et al.,* 1998; Manzi, et al.1999 Caglarirmak, 2007). *Pleurotus* species content high potassium: sodium ratio, which makes mushrooms an ideal food for patients suffering from hyper tension and heart diseases. The cultivation of edible mushroom offers one of the most feasible and economic method for the bioconversion of agro- lignocellulosic wastes Bano *et al.,* 1993; Cohen *et al.,* 2002). The technology can also limit air pollution associated with burning agriculture wastes as well as to decrease environmental pollution due to unutilized agricultural wastes.

MATERIAL AND METHODS

Culture and cultivation:

The pure culture of *Pleurotus florida* was obtained from National Collection of Industrial Microorganisms (NCIM) National chemical laboratory (NCL), Pune, India. The cultures were

maintained on 2% malt extract agar slants at 4 ºC. Sub culturing were done after every 15 days.

Spawn Preparation :

Spawn was prepared in polythene packets. Sorghum whole grains were boiled in water bathfor 10 to 15 min. at the ratio of 1:1 (sorghum grain: water) and mixed with 4% (w/w) CaCo3 and 2 % (w/w) CaSo4. Sorghum grains then packed (250g) in polythene bags (200 x 300mm. size and sterilized in an autoclave at 121 ºC for 30 min. After sterilization, the bags were inoculated with actively growing mycelium of the *Pleurotus* from the malt extract slants and incubated (at 27 ± 2 ºC) for mycelial growth without any light for 10-15 days until the mycelium fully covered the grains.

Cultivation:

The agro waste , soybean straw, paddy straw, wheat straw, groundnut straw, Pigeon pea stalk and sunflower stalk were collected from local farmsand were used as cultivation substrate, following the method prepared by Bano and Shrivastava (1962) with slight modifications. The substrates were chopped to 2-3 cm. pieces and soaked in water over night to moisten it and excess water was drained off. After soaking, the substrate was steam sterilized at 121 ºC for 20 min. in an autoclave. The polythene bags of the size 35 x 45 cm were filled with sterilized substrates and multi layered technique was adopted for spawning. Each bag was filled with 1 kg dry substrate and the spawn was added at the rate of 2% of the wetweight basis of substrate.

After inoculation, the bags were kept in house where the temperature and humidity were maintained around 25 ºC and 80 to 90 % moisture respectively with sufficient light and ventilation for 20 days. The spawn run was completed within 18 days. The polythene bags were tear-off following the spawn run. Formation of fruit bodies was evident within 3-4 days after removal of poly bags. The beds were maintained up to the harvest of the third flush, which was completed in 35 days after spawning. A small layer of substrate was scrapped off from all the side of the beds after each harvest. Each of the six treatments was replicated three times.

Yield and Biological efficiency:

Total weight of all the fruiting bodies harvestedfrom all the three pickings were measured as total yield of mushroom. The biological efficiency (yield of mushroom per kg substrate on dry wt. basis)was calculated by the following formula Chang *etal.* (1981)

$$B.E.\% = \frac{Fresh\ weight\ of\ mushroom}{dry\ weight\ of\ substrate} \times 100$$

Moisture content:

The moisture content of mushroom was also expressed in percent and calculated by the formula-

Moisture content%

Nutritional Analysis:

Protein, fat, ash and total carbohydrate were determined with the procedure recommended

by AOAC (1995) and Wankhede *et al.,* (1976). The crude fiber was determined with procedure recommended by Ranganna (1986). The recorded data in the present work was subjected to statistical analysis as per the procedure given by Panse and Sukhatme (1978).

RESULT AND DISCUSSION

The results reveal the yield, biological efficiency (B.E.) of the *P. florida* cultivated on differentagro wastes (Table 1). Significantly maximum yield of *P. florida* was obtained when it was cultivated on soybean straw (850.66 gm/kg straw) with 85.06 % B.E., this was followed by yield on paddy straw (838.66 gm/kg straw) with 83.86 %

B.E. while the least was recorded with Pigeon pea stalk (717.33 gm/kg straw). Similar results were reported with *P. florida* by Dias *et al.,* (2003). Superiority of soybean straw over paddy, wheat, jowar strawin terms of yield was reported earlier by Patil and Jadhav, (1999). Comparing the six lignocellulosic residues as substrates for the cultivation of *P. florida* shows that, soybean straw supported best growth of *P. florida* as evidenced by completed and heavy colonization of substrates forming a compact white mass of mycelium within 2 weeks of inoculation.

Moisture , total carbohydrate, protein, fat, crude fiber and ash content of mature fruiting bodies of *P.florida* cultivated on different agro wastes are shown in Table 2. Moisture content of *P.florida* was found maximum when cultivated on (89.45 %) sunflower stalk, followed by (89.20 %) paddy straw while least was found on (87.85%) wheat straw. Carbohydrate content of *P. florida* was 56.10 % grown on wheat straw being the highest followed by on (55.60 %) paddy straw. These results are confirmed with the findings of Patil *et al.,* (2008). Protein content of *P. florida* fruiting bodies grown on different substrates ranged from 20.39 to 25.43%. Significantly maximum protein content of mushroom was 25.43 % in fruiting bodies cultivated on soybean straw while least was 20.39 % on sunflower stalk. Highest fat content of *P. florida* fruiting bodies was found on (2.87 %) ground nut straw, and lowest was found on (2.48) Pigeon pea stalk. The % content of protein and fat were similar as reported in earlier studies (Syed Abrar *et al.,* 2009). The crude fiber content of *P.* fruiting bodies was ranged from 6.77 to 7.88 % when grown on different substrates.

Table 1: Effect of different substrate on yield of *P. florida*

Substrate	Yield (gm) / Kg dry straw			Total	B.E.(%)
	Ist Picking	IInd Picking	IIIrd Picking		
Soybean straw	389.00	299.33	162.33	850.66	85.06
Paddy straw	401.00	326.00	111.66	838.66	83.86
Wheat straw	312.33	257.33	153.00	722.66	72.26
Ground nut straw	373.00	321.33	119.00	813.33	81.33

Sunflower stalk	327.33	264.00	170.66	761.99	76.19
Pigeon pea stalk	291.00	239.00	187.33	717.33	71.73
S.E.+-	17.80	6.70	3.88	-	-
C.D. at 5%	55.21	21.42	13.16	-	-

Table 2: Effect of different substrates on Nutritional content of *P.florida.*

Substrate	**Moisture (%)**	**Total carbohydrate (%)**	**Protein(%)**	**Fat (%)**	**Crude fibre (%)**	**Ash (%)**
Soybean straw	88.40	52.30	25.43	2.83	6.77	6.67
Paddy straw	89.20	55.60	23.70	2.65	7.25	6.39
Wheat straw	87.85	56.10	22.20	2.78	6.93	6.17
Ground nut straw	88.65	51.40	23.10	2.87	7.53	7.10
Sunflower stalk	89.45	52.33	20.39	2.68	7.88	5.95
Pigeon pea stalk	88.55	50.23	21.75	2.48	7.69	6.49
S.E.+-	0.28	0.65	0.42	0.04	0.08	0.12
C.D. at 5%	0.99	2.22	1.45	0.18	0.29	0.48

Maximum crude fiber content was observed when mushroom grown on sunflower stalk (7.88 %) , followed by on groundnut straw (7.53%) while minimum crude fiber was noticed when mushroom produced on (6.77%) soybean straw. Ash content of P. florida fruiting bodies was 7.10 % grown on ground nut straw being the highest followed by on soybean (6.67 %) straw and minimum ash content was reported on (5.95%) sunflower stalk. Observed values of crude fiber and ash content in present study are in accordance with the previous studies Khydagi et al., (1997) and Bonatti et al., (2004). The variation in these nutrient content might be due to the quality and quantity of nutrients available in the substrates.

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ANTIMICROBIAL ACTIVITY OF VARIOUS FRACTIONS OF *BRYOPHYLLUMPINNATUM* (LAM.) OKEN. LEAVES

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ABSTRACT:

The agar diffusion technique was used to evaluate the antibacterial effectiveness of various solvent extracts of Bryophyllumpinnatum leaves against Candida albicans, Pseudomonas aeruginosa, and Staphylococcus aureus. This qualitative phytochemical examination of the Bryophyllumpinnatum leaves was conducted using different solvent extracts. Considerable antimicrobial activity was shown by the ethanol extract of Bryophyllumpinnatum leaves fractions at the minimum inhibitory concentration (MIC) against Staphylococcus aureus (138 µg/ml), Candida albicans (144 µg/ml), and Pseudomonas aeruginosa (152 µg/ml). The chloroform extract (312 µg/ml) of Bryophyllumpinnatum leaves fractions showed minimum antimicrobial activity against Candida albicans. The chloroform extract obtained from Bryophyllumpinnatum leaves showed the least efficient antimicrobial agent against Pseudomonas aeruginosa (372 µg/ml) and Staphylococcus aureus (433 µg/ml). Almost every one of the phytochemicals has been found in the majority of leaf extracts according to qualitative examination.

Keywords: *Bryophyllumpinnatum*, antimicrobial activity, Preliminary phytochemical analysis

INTRODUCTION:

One of the fastestgrowing fields of study to reduce the risk of infectious illnesses caused by harmful microorganisms that affect people is the search for compounds with strong antibacterial properties. The majority of medicinal compounds, including antimicrobial medications used to treat infectious disorders, still come from plant extracts.In the past thirty years, the pharmaceutical industry has developed several new antibiotics; yet, microbes have become more resistant to these medications. Generally speaking, medications that are used as therapeutic treatments may be resistant to and transferred genetically by microorganisms. This finding raises concerns owing to the number of hospital patients with reduced immune defense and the emergence of multi-resistant microbial strains. As a consequence, hospitals may experience new illnesses that have a high fatality rate (Bukar et al., 2015).

Bactericidal medicine utilization will remain questionable in the decades to come due to the rising issue of microorganism resistance. Hence, steps must be taken to lessen this issue, such as limiting

the use of antibiotics, conducting studies to further learn about the genetic pathways behind resistance, and carrying out ongoing investigations to produce new medications, whether synthetic or natural. Providing the patient with effective and suitable antimicrobial medications is the main objective. Plants have always been an essential source of natural substances for preserving human health, but in the last 10 years, research into natural medicines has increased significantly. Worldwide, the usage of plant substances for medicinal reasons has been steadily rising. The World Health Organization states that the greatest place to find a wide range of medications is from herbal remedies. Approximately 80% of people in developed nations utilize conventional medicine, which contains substances derived from therapeutic plants. To learn more about these plants' characteristics, safety, as well as effectiveness, further research must be done on plants (Chanda et al., 2010).

MATERIALS AND METHODS:

Plant material:

The taxonomist from SSVPSs., L. K. Dr. P. R. Ghogrey Science College, Dhule, Maharashtra, recognized and validated the *Bryophyllumpinnatum* plant, whose leaves were collected from the deopur region of the District of Dhule.

Preparation of Plant extracts:

We have collected and left the leaves of *Bryophyllumpinnatum* to dry in the shadow. We used the mixer grinder for crushing the dried leaves to a very fine powder. The plant extract was separated from finely ground material using the Soxhlet equipment and various solvents such as water, ethanol, chloroform, ethyl acetate, and others. The resultant concentrated extract was used for several experiments after it was extracted.

Preliminary Phytochemical Analysis:

Using a systematic procedure comprising many solvent extracts, the preliminary phytochemicals of *Bryophyllumpinnatum* leaf extracts were investigated. (Yadav and Agarwala, 2011).

Test microorganisms:

Candida albicans, Staphylococcus aureus, and *Pseudomonas aeruginosa* were the test organisms used in this investigation. They acquired it from the cultural collection facilities center at the School of Life Sciences, S. R. T. M. University, Nanded, Maharashtra. For this experiment, subcultures of the bought cultures were repeatedly used.

Antimicrobial activity:

The efficiency and antibacterial qualities of several solvent extracts made from *Bryophyllumpinnatum* leaves were assessed using the agar diffusion method. To distribute the agar medium, a 100 µl subcultured microbial solution was made. Several various concentrated fractions were employed to assess the antimicrobial capacity level (Concalves et al., 2008). After

the sample was added to the plates, it was left there for an hour so that the extract could permeate the plates. The inhibiting zone of the plates was determined in millimeters (mm) during a twenty-four-hour incubation period at 37 degrees Celsius. The results are then compared with the outcomes of using conventional antibacterial drugs.

RESULTS AND DISCUSSIONS:

The *Bryophyllumpinnatum* leaf extracts were all found to include saponin, phenols, tannins, glycosides, terpenoids, flavonoids, alkaloids, and coumarins, according to a preliminary phytochemical analysis. Apart from the lack of coumarins and tannins in the water extract. phytochemicals found in every portion of *Bryophyllumpinnatum* leaves. The results of the phytochemical analysis are summarized in Table 1. The high concentration of phytochemicals in the plant corresponds to increased biological activity.

Table 2 lists the antibacterial qualities of a number of solvent-based leaf extracts of *Bryophyllumpinnatum*. The highest MIC values (138 µg/ml against Staphylococcus aureus, 144 µg/ml against Candida albicans, and 152 µg/ml against Pseudomonas aeruginosa) were observed in the ethanol extract derived from *Bryophyllumpinnatum* leaves. The various *Bryophyllumpinnatum* leaf extracts demonstrated noteworthy minimum inhibitory concentrations (MIC values) in water extract (201 µg/ml) when tested against Candida albicans. Reference compounds with MIC (63 µg/ml), which were typical fluconazole, were used to compare the findings. The different *Bryophyllumpinnatum* leaf extracts demonstrated significant minimum inhibitory concentrations (MIC) in ethanol extract (189 µg/ml) when tested against Pseudomonas aeruginosa. The results were compared to 46 micrograms/milliliter (MIC) of cephalosporins. The water extract (202 µg/ml), chloroform extract (350 µg/ml), and ethyl acetate extract (433 µg/ml) of *Bryophyllumpinnatum* leaves demonstrated impressive minimum inhibitory concentrations (MICs) when tested against Staphylococcus aureus. Gentamicin, at 39 µg/ml, served as the standard medicine.

Modern medical therapies may be supplemented or replaced with medicinal herbs. There is great structural and biological variety seen in plants. They have phytochemicals in them. The proliferation of infections is significantly inhibited by such phytochemicals (Mohamed et al., 2013). The need for new, efficient, and reasonably priced medications to treat microbiological diseases is a significant obstacle to global healthcare, especially for impoverished nations. Along with microorganisms and members of the Enterobacteriaceae family of bacteria, some strains of *Staphylococcus* and *Streptococcus* are implicated in the pathophysiology of skin and lung infections, as well as urogenital and gastrointestinal illnesses and wound infections. Antibiotics from the past are essentially ineffective against these germs. It is essential to assess the therapeutic potential of medications in order to encourage the use of herbal remedies. A great deal has been made to enhance traditional medicine (Cowan, 1999).

Numerous kinds of secondary metabolites, including alkaloids, polyphenols, flavonoids, coumarins, saponins, tannins, triterpenes, and steroids, were found by phytochemical testing. A number of phytochemicals have an active effect on harmful microbes. The presence of these metabolites in the plant extracts under evaluation might provide a first explanation for their antimicrobial and antibacterial properties. Variations were noted in the extracts' antimicrobial properties. These could result from variations in the active components' mechanisms of action as well as in their chemical makeup. While secondary compounds are abundant in all of the extracts, their quantity and potential interactions with other substances also have a role in the activity of the plant extracts (Dzotam et al., 2016). Since proteins make up bacterial cell walls, tannins' antibacterial action is thought to stem from their capacity to react with proteins to generate stable, insoluble in water components. Alkaloids have an antibacterial impact because they may disrupt cell division and intercalate with the DNA of both Gram-positive and Gram-negative bacteria. The usage of antimicrobial medications is still unknown in the future, and the issue of germ resistance is only becoming worse with time (Loannides, 2002). Consequently, steps need to be taken to address this issue and incorporate therapeutic plants that have antibacterial properties. Numerous chronic disorders caused by various bacteria may be prevented or treated using plant-based medicines. Many communities continue to employ herbal medicine as a means of healing illnesses and overcoming obstacles without suffering any negative health effects. Compared to commercial antibiotics, plant-based medicines have much less adverse consequences when used in excess. Instead of using conventional antibiotics, investigators are using plant-based treatments to prevent lethal infections brought on by various microorganisms.

CONCLUSION:

Based on the findings, the extract of ethanol and water has the most potential; this might be because it has the largest amount of phytochemical substances and bioactive molecules with antibacterial activity. More research on *Bryophyllumpinnatum* leaf extract is required to identify and purify the bioactive chemicals that might be used as natural remedies rather than commercially synthesized medicine.

Acknowledgment:

The authors express their gratitude to the Principal of SSVPSs, L. K. Dr. P. R. Ghogrey Science College, Dhule, as well as the Head, Department of Botany for providing support and facilities.

Table 1. Preliminary phytochemical analysis of *Bryophyllumpinnatum* leaves extracts

Sr. No.	Phytochemical Test	flower extracts of *Bryophyllumpinnatum*			
		Water Extract	Ethanol extract	chloroform extract	Ethyl acetate extract
1	Saponins	+	+	+	+
2	Phenols	+	+	+	+
3	Tannins	-	+	+	+
4	Glycosides	+	+	+	+
5	Terpenoids	+	+	+	+
6	Flavonoids	+	+	+	+
7	Alkaloids	+	+	+	+
8	Coumarins	-	+	+	+

Table 2. Antibacterial activity of *Bryophyllumpinnatum* leaves

Sr. No.	Microorganism	Minimum inhibitory concentration (MIC) leaf extracts of *Bryophyllumpinnatum* (µg/ml)						
		Water extract	Ethanol extract	Chloroform extract	Ethyl acetate extract	Gentamicin (µg/ml)	Cephalosporins (µg/ml)	Fluconazole (µg/ml)
1	*Candida albicans*	201	144	312	263	ND	ND	63
2	*Pseudomonas aeruginosa*	189	152	298	372	ND	46	ND
3	*Staphylococcus aureus*	202	138	350	433	39	ND	ND

The results summarized are the mean values of two parallel experiments. ND- Not determined

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IN VITRO PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITIES OF *MADHUCA LONGIFOLIA (J. KOENIG) J. F. MACBR.*

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Abstract:

Now days, plant research has gained global attention, with evidence demonstrating medicinal plants show immense potential in various traditional systems. Plant-based medicines and cosmetics have been used for centuries to treat illnesses and enhance appearance. In the present work investigate in vitro phytochemical and antioxidant activity of methanolic leaf and flower extracts of Madhuca longifolia (J. Koenig) J. F. Macbr. Phytochemical analysis of plant extracts showed the presence of alkaloids, carbohydrates, proteins, glycosides, flavonoids, steroids, saponins, phenol and terpenoids. In vitro antioxidant activities were conducted at (25, 50, 75, 100, and 125µg/ml) concentrations. By using the 2, 2-diphenyl-1-picrylhydrazyl hydrate (DPPH) scavenging assay. Our findings show that the methanolic leaf and flower extract of* Madhuca longifolia *is a significant source of antioxidants and is helpful for the treatment of a variety of illnesses.

Keywords: *Madhuca longifolia,* phytochemical analysis, *in vitro,* antioxidant.

1. Introduction:

Madhuca longifolia commonly known as Mahua or Indian Butternut is a tropical plant that belongs to the Sapotaceae family. This plant is highly nutritious and can be used as an herbal medication to cure a variety of ailments such as helminths, acute and chronic tonsillitis, bronchitis (Cohen, 1992), chronic tonsillitis and pharyngitis (Kamal, 2014), Skin diseases, rheumatism, headache, laxative and piles (Sinha *et al*., 2017).Fruits are astringent and commonly used as a lotion for ulcers, tonsillitis, and pharyngitis (Kirtikar and Basu, 1995; Khaleque*et al*., 1969).Phytochemicals such as Riboflavin, flavonoids,sterol, triterpene, niacin, carotene,ascorbic acid, biotin, folic acid, inositol and thiamine were recorded in this plant (Dalvi *et al*., 2022). Sugars are the main component of flowers, although they also contain proteins, vitamins, organic acids, and essential oils(Tabassum and Yadav, 2020). Antioxidants prevent free radicals from oxidizing lipids, as the name implies. Antioxidants work by donating electrons to free radicals, making them effective (Kaczmarski *et al*., 1993). Plants have been utilized as folk medicine and pharmacopoeial medications since ancient times. Approximately 80% of the globalpopulation relies on plants and plant product to cure various illnesses.Herbal medication is in high demand globally due to its

safety and affordability. Medicinal herbs are still effective in curing many diseases (Anbukkarasi and Prasanna, 2018).To avoid side effects and resistance to pathogens, it's important to focus on plant-derived biological components (Hassawi and Kharma, 2006).

2. Materials and Methods:

2.1 Collection of plant Material:

Fresh and Disease freeleaves and flowers of Mahua were obtained from my farm located at Belora from Jalna district in Feb-2023. Standard floras (flora of Marathwada by Naik *et al.,*1998)are used in the identification process. The obtained fresh plant materials were washed, shade dried, pulverized and stored in an airtight container for later investigation.

2.2 Preparation of plant Extract:

Soxhlet extractor was used to create a methanol extract. Soxhlet extraction was performed on approximately 10 g of powder using 100 ml of methanol at 55-65 ^{0} C for 72 hours. The solvent was evaporated at 40-50 ^{0} C using a rotary evaporator. The collected powder was weighted and dissolved in 10 % DMSO. The extracts were kept in sterile glass bottles at 4.0 °C temperature for further investigation (Handa *et al*., 2008, Subramanian *et al*., 2016).

2.3 Phytochemical screening:

The phytochemical screening was conducted to identify the active chemicals of plant extracts using simple chemical methods (Yadav and Agarwala, 2011).

2.4 Antioxidant activity:

Methanolic extracts of Mahua leaf were tested for antioxidant activity using the stable DPPH (2, 2-diphenyl-1-picrylhydrazyl) free radical scavenging assay (Blois, 1958). DPPH is a simple and accurate approach for measuring the oxidizable groups of natural or synthesized antioxidants (Cao *et al*., 1997). Threedeferent concentrations of leaf (25, 50, 75, 100 and 125 µg/ml) were tested for antioxidant activity. An antioxidant experiment was also done on standard ascorbic acid to examine the performance of different plant components. All tests were repeated three times, and the findings were averaged.Recently preparedDPPH solution was added in each of these test samples andafter 20 min, the absorbance was taken at 517 nm.

DPPH radical scavenging (%) = [1-(As/Ac)] ×100

Here, Ac= absorbance of control and

As=absorbance of sample solution.

The percentage inhibitions were then plotted against the different concentrations utilized, and from the graph, the IC_{50} was derived.

Result and Discussion:

In the present study methanolic leaf and flower extract of Mahua subjected for *in vitro*phytochemicalscreening and antioxidant activity.

Phytochemical screening:

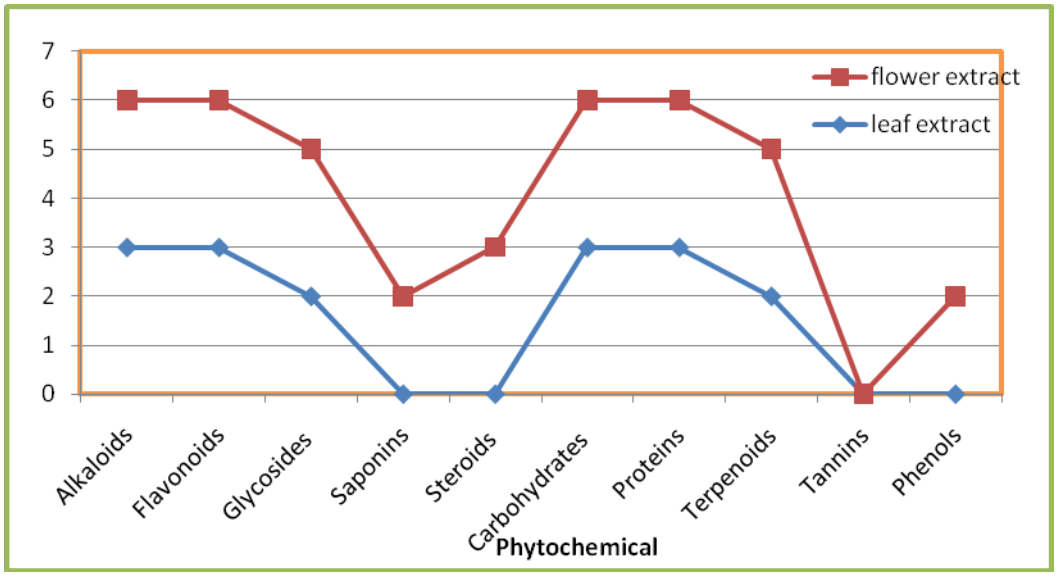
*The phytochemical constituents of methanolic leaf extracttested were summarized in the table-1.*The findings confirmed the existence of medically active chemicals in tested plant extracts. They revealed the presence of alkaloids,flavonoids,glycosides,carbohydrates, proteins, steroids, saponins, phenols and terpenoids. Plants have a rich source of activeingredients in certain sections including leaves, flowers, bark, seeds, fruits, and roots. These compounds have significant pharmacological potential with antioxidant and antibacterial properties (Nair*et al*., 2005).

Table-1:Phytochemical screening of methanolic extract of Mahua.

Sr. No.	*Phytochemical*	leaf extract	Flower extract
1	Alkaloids	+++	+++
2	Flavonoids	+++	+++
3	Glycosides	++	+++
4	Saponins	-	++
5	Steroids	-	+++
6	Carbohydrates	+++	+++
7	Proteins	+++	+++
8	Terpenoids	++	+++
9	Tannins	-	-
10	Phenols	-	++

+++ Strongly present, ++ present, + weekly present, - absent

Figure-1: Phytochemical screening of methanolic extract of Mahua.



DPPH free radical scavenging assay:

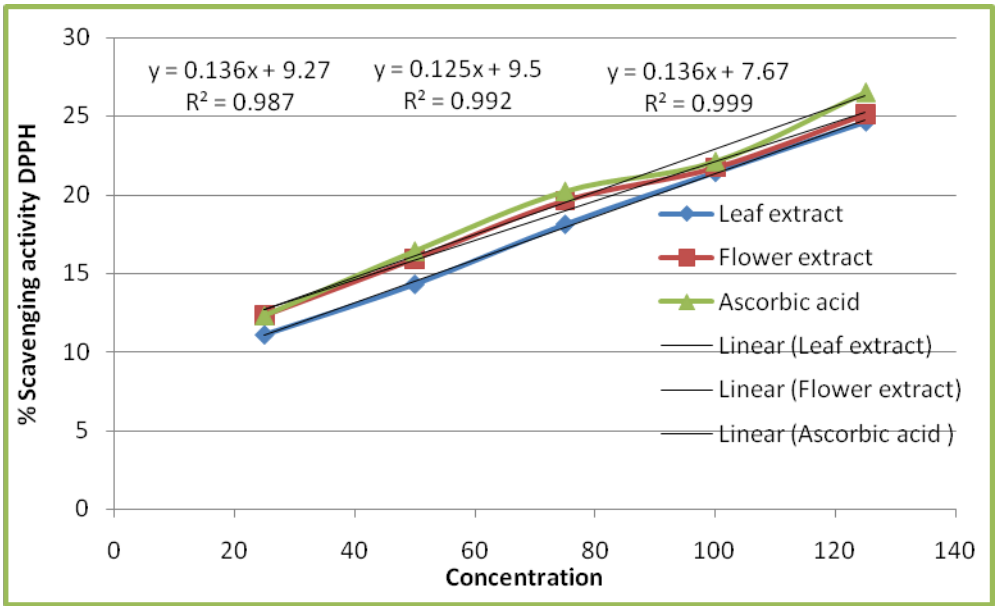
Methanolic leaf extracts of Mahuawere tested for antioxidant activity using ascorbic acid as the reference standard. IC_{50} value for leaf and flower extracts demonstrated 24.6% and 25.1% radical scavenging efficacy at 125 µg/ml while IC_{50} value for ascorbic acid inhibited by 26.5% (Table -2). The IC_{50} values for wood, bark, and leaf extracts were 140µg/ml, 150 µg/ml and 145 µg/ml, indicating potent scavenging action of plant extracts. Standard ascorbic acid has an IC_{50} of 140µg/ml (Havesteen, 1983). Plant-based antioxidants have gained popularity as synthetic antioxidants are deemed unsafe (Sam, 1993).

Table-2:DPPH scavenging activity of Mahua.

Sr. No.	Concentration (µg/ml)	DPPH Scavenging activity in %		
		Plant Extracts		Ascorbic acid
		Leaf	Flower	
1	25	11.1 ± 2.1	12.3± 1.6	12.3 ± 0.5
2	50	14.3 ± 1.7	15.9 ± 1.3	16.4± 1.0
3	75	18.1 ± 1.2	19.6 ± 0.9	20.2 ± 1.9
4	100	21.4 ± 1.8	21.7± 1.1	22.1± 1.0
5	125	24.6± 2.1	25.1 ± 1.8	26.5 ± 0.2
IC_{50} value (µg/ml)		311	324	299

All values are expressed as mean ±S.D for triplicates.

Figure-2: Determination of IC_{50} value for standard and methanol extract of Mahualeaves.



Conclusion:

Madhuca longifolia is highly significant for its excellent secondary metabolites. Plant extracts are efficient at treating a variety of ailments. The study found that plants contain phytochemicals and antioxidants that are particularly effective in controlling certain plant pathogens. The results demonstrate that methanolic floral extract has the strongest antioxidant activity due to the high quantity of phytochemicals.

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PHYTOCHEMICAL AND PHARMACOGNOSTIC EVALUATION OF *BARLERIALUPULINA*LINDL.

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Abstract:

The present evaluation was carried out on an ethnomedicinal plant Barlerialupulina Lindle. belongs to the family Acanthaceae. This plant used ethnomedicinally for various purpose like wound healing, anti-inflammatory against insect bites, remove warts, relief pain, snake bites, herpes simplex virus.

Phytochemical evaluation of leaves extract was carried out in various solvents such as petroleum ether, chloroform, acetone and ethanol. phytochemical screening revealed the presence of Alkaloids, Carbohydrates, Glycosides, Saponins, Tannins and flavonoids. In organoleptic evaluation, fine leaves powder was green in color with a slightly bitter taste, pungent odor and smooth texture. The transverse section of leaf shows uniseriate epidermis. Mesophyll tissue differentiated into palisade and spongy parenchyma. Vascular bundle is horse shoe shaped, which is separated by single celled parenchymatous endodermis. Stomata are numerous confined on lower surface. The present study is helpful in quality control of crude drugs and the authentication of this medicinal plant.

Key words: phytochemical, alkaloids, anatomy, *Barlerialupulina*.

Introduction:

Barlerialupulina Lindl. belongs to the family Acanthaceae. It is native to tropical regions of Asia and Africa with its highest species diversity. Its greatest representation is in Africa and Asia(Balkwill and Balkwill, 1997). *Barleria* is the third largest genus in the family Acanthaceae with 300 species (Vipin Kumar, 2018). Barleria (Acanthaceae) is a large, polymorphic, widespread genus of herbs, shrubs and rarely climbers distributed worldwide (Balkwill and Balkwill, 1998). Barlerialupulina plant used in folkloric Indian medicine is known locally as “Kali Kante-Koranti”.

Barlerialupulina is a small shrub plant and commonly known as Hophead, Philippine violet

in English and Bishalyakarani or Vishalyakarani in Bengali (Ghosh *et al*., 2009). It is also used for its medicinal importance as the leaf juice is given to stop bleeding when cut and the leaf paste is used as poultice to relief pain (Nag *et al.,* 2013). *Barlerialupulina* is also used as on snake bites, insect bites and herpes simplex virus (Kanchanapoom*et al*., 2001). leaves of this plant are used to treat snake bites, dog bites, swelling, bleeding wounds and rheumatism (Reshma *et al*., 2017), a strong inhibitory result against acne-inducing bacteria (Chomnawang*et al*., 2005), use leaves of the plant to remove warts (Samuel *et al*., 2010) and wound healing property (Mandal *et al*., 2015).

Plant-derived natural products, such as flavonoids, terpenoids, alkaloids and steroids have received considerable attention in recent years due to their diverse and effective pharmacological properties including antibacterial, antioxidant and antitumor (Anonomous, 2006). It also helps in standardization and isolation of desired therapeutic compounds from crude drugs for pharmaceuticals and nutraceutical's industries. The present study is helpful in quality control of crude drugs and the authentication of this medicinal plant.

Material and Methods:

Collection and identification of plant material:

The leaves was collected from Botanical garden of Shri Shivaji Arts, Commerce and Science College, Motala district Buldhana of Maharashtra. The plant material was taxonomically identified by using standard flora (Singh, 2001) and herbarium specimens was deposited in Department of Botany, Shri Shivaji Arts, Commerce and Science College, Motala. Leaves material was rinsed under tap water and allowed to dry. Fresh material was used to take section. Shade-dried material was grind into fine powder and kept in an airtight bottle for further use.

Organoleptic Evaluation:

Organoleptic characters such as color, odor taste and texture of leaves were evaluated (Khandelwal, 2008).

Microscopic Evaluation:

The microscopic evaluation of the leaf was done by taking the appropriate section of the leaf. The thin sections was stained with safranin, light green and mounted in DPX for observation.

Extraction of Plant Drugs:

About 25 gm of powdered leaves material was subjected to extraction in a Soxhlet apparatus. The powdered leaves material was successively extracted with petroleum ether, chloroform, acetone and ethanol as a solvent.

Phytochemical Evaluation (Evans, 2005; Kokate, 1986; Khandelwal, 2006):

In preliminary phytochemical evaluation, *Barlerialupulina* leaves powder extract was subjected to various qualitative chemical tests to estimate the presence of various phytoconstituents. The qualitative test for carbohydrates, alkaloids, glycosides, tannins, phytosterols, flavonoids, saponins and proteins was taken.

Results And Discussion:

Evaluation of plant crude drugs is a fundamental part of the establishment of correct identification and detection of adulterants in this plant material.

Organoleptic Evaluation:

The organoleptic characteristics of *Barlerialupulina* was given in Table 1. In organoleptic evaluation, the prepared leaves powder was green in color with a slightly bitter taste, pungent odor and smooth texture.

Table 1. Organoleptic Characteristics of *Barlerialupulina*Leaves.

Sr. No.	Parameters	Observation
1	Color	Green
2	Taste	Bitter
3	Odor	Slightly pungent
4	Texture	smooth

Microscopic Evaluation:

T.S. of Leaf:

The anatomy of a *Barlerialupulina* leaf follows a typical dicotyledonous plant structure, featuring several layers of cells and tissues. The transverse section of leaf shows (Fig. 1: C_1) uniseriate epidermis on both surface. The upper and lower epidermal cells are irregular and a waxy layer covering the epidermis. Epidermis is glabrous. Multicellular and cylindrical.

Mesophyll tissue of the leaf, sandwiched between the upper and lower epidermis. It consists of Palisade and spongy parenchyma. Palisade mesophyll cells are elongated cells located just beneath the upper epidermis. These cells are rich in chloroplasts. Spongy mesophyll cell located beneath the palisade mesophyll, this layer contains irregularly shaped cells with air spaces between them (Fig.1: C_1). Mid-rib showed 5-6 layered thick walled closely packed collenchymatous cell on both the surfaces. Vascular bundle embedded within the mesophyll tissue. Vascular bundle is horse shoe shaped, which is separated by single celled parenchymatous endodermis (Fig.1: C_2). Stomata are typically more numerous on the lower surface of the leaf.

T.S. of Petiole:

Petiole T.S. of the leaf petiole is more or less triangular in outline. Epidermis is the outermost uniseriate layer of cells covering the surface of the petiole and cutinized. Hypodermis is collenchymatous, 5-6 layered thick. Cortex is in between the epidermis and the vascular bundles. It composed primarily of parenchyma cells, which are relatively thin-walled and have large central vacuoles. Vascular bundles are arranged in a half ring in ground tissue. Vascular bundle typically arranged in a ring-like pattern within the cortex. Xylem is located towards the center of the bundle of the petiole, whereas phloem towards the lower side of the petiole. Only one vascular strand is

found on ground tissue. Two leaf traces are present on both side of the petiole (Fig.1: D).

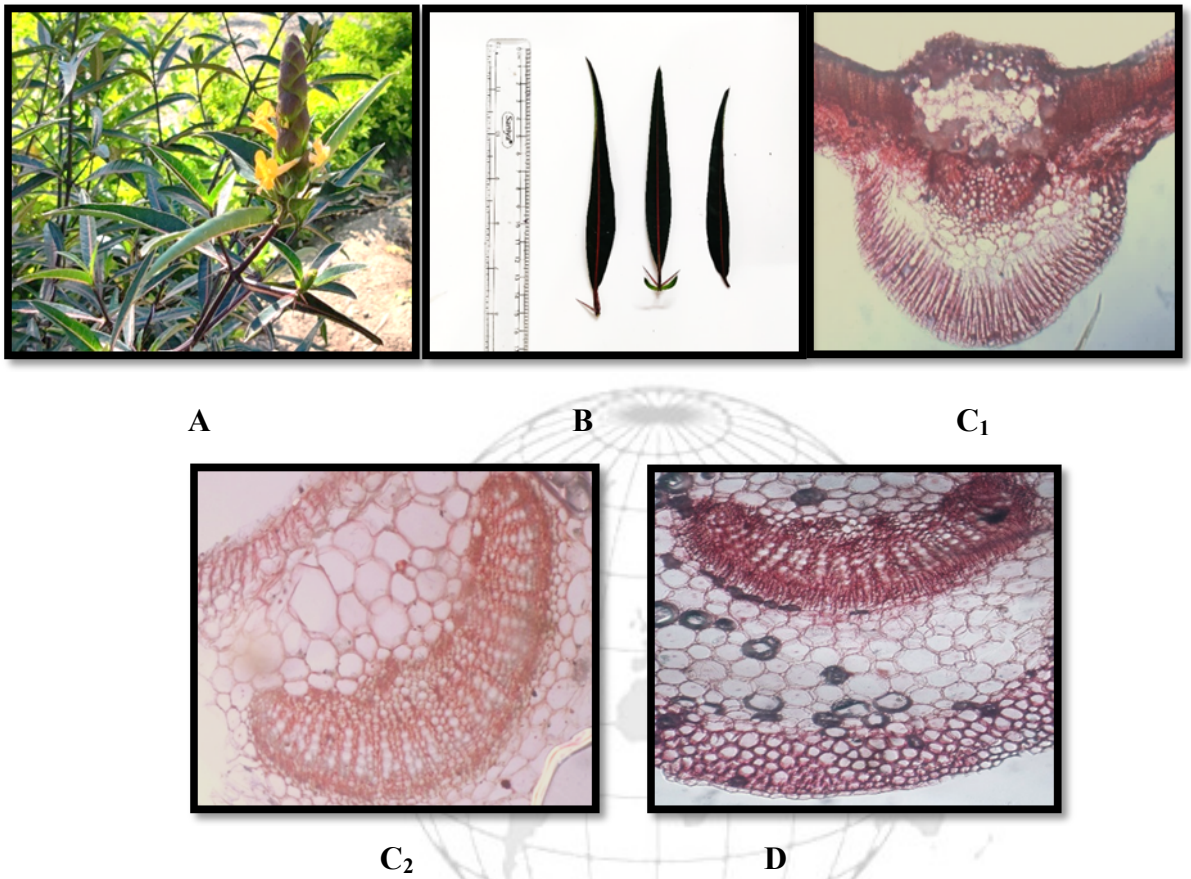

Fig. 1: *Barlerialupulina* Lindl A: Habit of plant, B: Leaf, C_1: T.S. of leaf, C_2: T. S. midrib of leaf and D: T.S. of petiole

Microscopy is useful for the study of internal structure, composition and inclusion of plant cells in detail.

Phytochemical Evaluation:

Phytochemical evaluation of *Barlerialupulina*leaves extract was done for the presence of alkaloids, carbohydrates, glycosides, proteins, amino acids, saponins, tannins and flavonoids. The result of the phytochemical evaluation is mentioned in Table 2.

Table 2: Phytochemical Evaluation of *Barlerialupulina* leaves.

Test for Phytochemicals	Reagents	Solvents			
		Pet. Ether	Chloroform	Acetone	Ethanol
Alkaloid	Dragandorff's	+	+	+	+
	Hager's	+	+	+	+
	Wagner's	-	+	-	+
Carbohydrates	Fehlings Test	+	+	+	+

	Benedicts Test	-	-	+	+
	Molischs Test	-	-	-	-
Glycosides	Keller-Killiani Test	+	+	-	+
Proteins	Biuret's	-	-	-	-
	Millon's	-	-	-	-
Amino Acid	Ninhydrin	-	-	-	-
Saponin	Foam Test	+	-	+	+
Tannin	Ferric Chloride	-	-	+	+
Flavonoids	Lead acetate	+	+	+	+

Phytochemical evaluation of *Barlerialupulina*leaves determines the kind of phytochemicals present in plant material. The leaves powder contains bioactive phytochemicals like Alkaloids, Carbohydrates, Glycosides, Saponins, Tannins and flavonoids. Ethnomedicinal and pharmacological features were expressed by the plant on the basis of the number of secondary metabolites present in it. The result found from preliminary phytochemical Evaluation will be useful in finding out the genuity of the drug.

Conclusion:

The result of this evaluation of *Barlerialupulina*leaves setup the standards which could be beneficial and serves as diagnostic tool for correct authentication of this medicinally important plant.

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Peer Reviewed Refereed Journal **ISSN : 2278 – 5639**
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} **Volume – XIII** **Special Issue – III** **March – 2024**

PHYTO CHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF *TECOMA STANS* (L) FLOWER

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Abstract:

The biological active compounds that are present in plants referred as Phytochemicals. These Phytochemicals derived from different parts of plants such as leaves, barks, flowers, roots. Phytochemistry describes the large number of secondary metabolic compounds present in the plants. The extraction of bioactive compounds from the plants is important for new biomolecules to be used by pharmaceutical industries. The objective of this research was to identify the bio compounds present in Tecoma stans (L) flower.The solvent Ethanol extraction of Tecoma stans flower shows positive results for the phytochemicals i.e. phenols, alkaloids, glycosides, saponin, steroids and terpenoids.The extract show antimicrobial activity.

Key words: *Tecoma stans*, Phytochemicalss Antimicrobial.

Introduction:

Plants have been used to treat or illness recorded historygive many references of medicinal uses of plants. ‘’RigVeda’’is one of the oldest available literatures written around 2000B.C, mentions the use of medicinal plants like cinnamon ,ginger sandalwood etc. not only in religious ceremonies but also in medical preparation. Medicinal plants are of great important to the health of individual and communities in general. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body. Plants and plant- based medicaments are the basis of many of the modern pharmaceuticals we use today for our various ailments. The phytochemicals are non-nutritive, chemical compounds that occur naturally on plants and have diverse protective properties.Adeyemi et al., (2002). Most Phytochemicals like carotenoids, flavonoids and polyphenols have antimicrobial activity and serve as a source of antimicrobial agents against human pathogens. Rohit Kumar Bargah(2017)

The discovery of medicinal plants has usually depends on the experience of the populace based on long dangerous self-experiment. Progress over the centuries towards a better understanding of a plant derived medicine has depended on two factors that have gone hand in hand. One has been the development of increasing strict criteria of proof that a medicine really

does what it is claimed to do and the other has been the identification by chemical analysis of the active compound in the plant Harsha et.al., (2013)

Nature has been a source of medicinal agents for thousands of years and hence consisting number of drugs isolated form nature sources, many of the plants are used as traditional medicine, and even form the ancient period, all plants consist the medicinal values, as they are having the medicinal components. Sunita verma (2016)

Nature has provided a complete store house of remedies to cure all ailment of mankind. Use of plants as a source of medicine has been inherited from the onset of human civilization and is an important component of the healthcare system. The aims of this paper are to evaluate the preliminary phytochemical characters such as determination of pharmacogenetics principals of some medicinal plants of different families. In recent years, chemical analysis and biological assays have begun to play an important role in ethnobotanical studies Dash et.al., (2011)

In Indian system a large number of medicinal plants have been used for many centuries for treating various diseases. Medicinal plants have been as remedies for human diseases because of its chemical contents of therapeutic value. Most traditional medicines are developed from nature. Thus, plants remain a major source of medicinal compounds. As of record around 20,000 plant species are in use for medicinal purposes across the globe and around 70 % of them are from Indian subcontinent. Jyothiprabha and venkatachalam (2016).The present research is carried out from the medicinal plants *Tecoma stans* (L) flower. The plant in India is known by different names as different areas people. Hindi Piliya Pila Kaner Marathi-Ghantiful, Ghantiful-Koranekar, Telugu-Pachagotla, Tamil-Sonnapatti Bengali-Chandraprabha.(Sunita Verma2016)

Taxonomical classification-

Kingdom - Plantae
Division -Tracheophyta
Class - Magnoliopsida
Order - Lamiales
Family -Bignoniaceae
Genus - Tecoma
Species -*Stans*

Morphology of plant: -

Tecoma stans Lis from the Bignoniaceae family is an ornamental shrub or small tree, much branched up to 1.5-5 m tall, but occasionally up to 10m in height. Out of the 14 species, basically the 12 are originated from America and 2 originated in Africa. These flowers can easily find anywhere in India.

Flower: -These flowers are also known as yellow bells, yellow elder and trumpet flower and yellow trumpet bush, they are one of attractive plant, even consist showy and bright golden yellow

trumpet shaped flowers, The most attractive part of this plant i.e. Flower, attracts butterflies, bees and even humming birds, for pollination.

Leaf: - It has sharply toothed and consist the green opposite pinnate leaves which bears 1-9 leaflets, consist very short petiole and are present in clusters with rounded lobes, 6 cm long.

Fruits: -They are narrow, slightly flattened to pointed capsules, up to 20 cm long, containing many winged seeds; green when young, pale brown on ripening and remain on the tree in untidy clusters for many months.

According to the ethno botany even *Tecomastans* also having medicinal values, the flowers of *Tecoma stans* have highly active biological chemicals, its flowers are traditionally used for the diabetes and stomach pain and other intestinal disease and it also have some medicinal value for the treatment of various cancer.

There are some certain medicinal properties and usages of *Tecoma stans*. The root of the plant is reported to be a powerful diuretic, vermifuge and tonic. *Tecoma Stans* leave bark, and roots contain many biologically active chemicals, and extracts from those tissues have been used in traditional folk medicine to treat many diseases and conditions. Leaves are used throughout Mexico and Central America for diabetes and urinary disorder control.Roots are used as diuretic, vermifuge. Boopathi et.al. (2016) the present research work has donethe phytochemicals from flower of plant*tecoma stans* andthe antimicrobial activity of extract obtains against bacteria.

Materials and Methods: -

Selection of the plant's species:

For present investigation on flower of *Tecomastans.*

Collection of plant samples:

The symptomless and apparently healthy individual plant flower wascollected from the School of life sciences S. R. T. M. University Nanded campus The sample was collected in sterilized polythene bags. The collected samples were brought to laboratory and processed within 24 hrs. of collection.

Extraction:

Solvent extraction: -The flower of *Tecoma stans* were rinsed with distilled water, dried in shade then homogenized to obtain fine powder using a mortar and pestle.20 gm. of dry powder of flowers of *Tecoma stans* used for the extraction. The extraction was carried out by Soxhlet method. For the extraction of flower and one solvent are used such as ethanol.The process carried out for 6 hrs. The obtained extracts were evaporated at room temperature to get a dried solid extract stored in airtight bottles. The residual extracts were stored in refrigerator for further use.

Phytochemical screening: -

1. **Detection of Alkaloids.**

-Hager's Test-

-weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 5ml of distilled water. Few drops of picric acid.Yellow ppt formed showing the presence of alkaloids.

2. **Detection of amino acid.**

-weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 5ml of distilled water. Few drops of ninhydrin.Boil the test tube. Purple color formed showing the presence of amino acids.

3. **Detection of tannin.**

weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 2ml of distilled water. Filtrate the solution.Added few drops of feCl3.Yellowish green color formed showing the presence of tannin.

4. **Detection of phenol.**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 2ml of distilled water. Added 1 ml of feCl3. Green color formed showing the presence of phenol.

5. **Detection of glycosides (keller-killiani test).**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 5ml of distilled water. Added 2ml of glacial acetic acid. Added one drop of feCl3.Added 1ml of concentrated sulphuric acid. Greenish ring may form just above the brown ring shows the Presence of glycosides.

6. **Detection of terpenoids and steroids.**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 2ml of chloroform. Added 3ml of concentrated H2SO4.Reddish brown coloration at the interface shows the presence of Terpenoids and steroids.

7. **Detection of saponins.**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 5ml of distilled water. The solution was shaken vigorously. observe the stable persistent froth.The froth was mixed with 3drops of olive oil. Shaken vigorously after which it was observed for the formation of an emulsion shows the presence of saponins.

8. **Detection of anthraquinones.**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Boiled with 10ml of sulphuric acid. Filtrate while hot.Filtrate was shaken with 5ml of chloroform.

The chloroform layer was pipette into another test tube and 1 ml of dilute ammonia was added.The resulting solution observed for color changes.

9. **Detection of flavonoids.**

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added NaOH solution. Yellow color formed. Added the dilute HClIt shows the colorless solution which shows the presence of flavonoids.

10. Detection of protein.

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. With 10% NaOH solution. Few drops of CuSO4.It shows the pink/ violet coloration which shows the presence of protein.

11. Detection of Oils and fats.

-Test sample on paper. Pressed gently. Paper appears translucent in light which shows the presence of oils and fats.

12. Detection of Carbohydrate.

- weigh 0.5 to 0.6 g of the powdered plant samples in test tube. Added 2ml of Benedict's reagent. Keep it for water bath. Reddish brown coloration observed it shows the presence of carbohydrate.

Antimicrobial activity:

The important multi-drug resistant bacterial strains as test organisms were used for in-vitro antibacterial screening. The bacterial strains *Escherichia coli* and *Staphylococcus aureus* were obtained from bacterial culture collection in school of life science S. R. T. M. University, Nanded.

Antibacterial activity: -

The flower extract of *Tecoma stans* and their antibacterial activity against bacteria using agar well diffusion method.

Test Organism: bacteria were used in study *Staphylococcus aureus, Bacillus subtilis*, *Escherichia coli*and *Pseudomonas aeruginosa*

Agar well diffusion method:

The agar well diffusion method was for screening of flowerextract against selected bacteria. Plates were prepared with the Nutrient Agar and a 100 µl of bacterial liquid culture in an exponential growth phase was spread on the surface of Nutrient Agar plate by using sterile glass rodspreder. All the culture plates were allowed to dry for five min. about 5 mm diameter wells were cut out using cork borer and filled with 100 µl of *Tecoma stans* flower ethanolic extract. Standard antibiotics like such as streptomycin is used as positive control. The plates were incubated at 37± 1℃ for 24 hrs. the zone of inhibition is measured.

RESULTS AND DISCUSSION

RESULTS: - Phytochemical analysis was done to determine the Phyto-components present in the flower extract. The solvent Ethanol extraction of *Tecoma stans* shows positive results for the phytochemicals i.e. phenols, alkaloids, glycosides, saponins, steroids and terpenoids,. Ethanolic extract of flower shows positive results for number of tests indicates this concluded that the ethanol is best solvent for extraction of phytochemical properties of flower.

Table: Showing Phytochemicals test of flower extract:

Sr.No.	Phytochemicals	Results
1	Alkaloid	+
2	Amino acid	-
3	Tannin	-
4	Phenol	+
5	Glycosides	+
6	Terpenoids and steroids	+
7	Saponins	+
8	Anthraquinones	+
9	Flavonoid	+
10	Protein	-
11	Oils and fats	+
12	Carbohydrate	+

Anti-microbial activity:-

Antibacterial activity of extracts:-

The antibacterial screening was carried out on the crude extracts of the *Tecoma stans* flower extract tested against the bacteria *Staphylococcus aureus, Bacillussubtillis, Escherichia coli, Pseudomonas aeruginosa*by using agar well method.

The antibacterial effect of the extract is shown in the table, the inhibition zone values were variable , ranging between 7-30mm.

Antibacterial activity of extract *Tecoma stans*

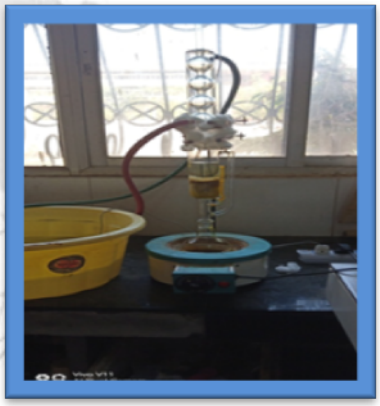
	Zone of inhibition (mm)			
Sample	*Staphylococcusaureus*	*E-coli*	*Bacillussubtillis,*	*Pseudomonas aeruginosa*
Flower extract	22 mm	20mm	10mm	No zone

PLANT SAMPLE

Plant

Dried flowers

Powdered



Soxhlet extraction

Discussion

In recent year the search for secondary metabolites possessing antimicrobial properties. Phytochemicals use in the therapy of various diseases. The phytochemical screening of *Tecoma stans*proves that there is presence of chemical components and even its shows a activity against the human pathogen and hence its shows its medicinal importance. (Ekpe Ini P2018) The present work has shown that the ethanol extract of *T.stans*flowerhave active Phytochemicals.The presence of tannins in the extracts may explain its potent bioactivities known to possess potent antioxidants. The saponins from plant extracts already have antioxidant activity The presence of phytoconstituents like phytosterol, triterpene, glycosides, phenols, flavonoids, saponins, and tannins either individually or combined together may exhibit the synergistic effect towards healing of wounds (Sunita Verma2016).Result of our finding the use of *T.stans*flower as traditional medicine. we found phytochemical constituents ethanolic extract showed alkaloids,flavonoid ,saponins, flavonoids phenol,glycosides terpenoids steroids,AnthraquinonesandCarbohydrate.

Antibacterial activities of crude extract *T.stans*were the methanolic crude extract of flower showed antibacterial activity against the *staphylococcus aureus, bacillus* and escherichia coli bacteria (Sowjanyapullipati and Srinivasa babu 2017) our In this study, the antimicrobial activities of the ethanol extract of *Tecoma stans* flower gave different zone of inhibition on the organism tested. The extract exhibited strong antibacterial activity against the three bacterial strains used with diameter of inhibition zone.

Conclusion: -

Plants are the best source of chemical compounds that shows resistance against the number of microorganisms that cause disease.The present investigation also suggests that in the flower of *Tecoma stans* the presence of alkaloid , phenol, glycosides , terpenoids and steroids , saponins, anthroquinones , oils and fats and carbohydrate.The extracts of *Tecoma stans* flower were found to be effective antibacterial activity against. *Staphylococcus aureus*, *E-coliBacillussubtillis.* The present investigation also suggests that flower of *Tecoma stans* may be utilized as effective and safe natural source for anti bacterial agents.These activities could be due to strong occurrence of compound.

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QUANTITATIVE ANALYSIS OF THREE CAESALPINIACEAE MEMBERS BY HPLC AND GCMS TECHNIQUES

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Abstract

Caesalpiniaceae has about 180 genera and 3000 species; most of these are tropical, subtropical trees and shrubs. In this study we have analyzed the plant extract of Caesalpiniaceae members using GC-MS and HPLC analysis techniques . The plants analysis showed the presence of phenol, phytol and gallic acid compounds present in the plants and HPLC analysis confirmed the presence of bioactive compounds in the plants. This showed that the plants could be employed for various applications such as antioxidants, antimicrobials compounds, flavones and for synthesis of vitamins.

Key words –– Caesalpiniaceae, GC-MS,HPLC,analysis techniques

1. Introduction

From an economic point of view, plants of the Caesalpiniaceae family play a very important role (Kumar, G. Phani, et al.2011). This plant has ornamental,nutritional medicinal valueetc. Plants of this family are also used in food and beverage, food, medicine, industry, ornaments, chutney, wood, fiber, oil, etc. used for purposes. The leaves of the Senna alata (L.) Roxb. are used to cure ring worm and skin diseases,leaf juice of Senna tora (L.) Roxbused in malaria treatment while the bark of Saraca indica L. is used to treat uterine diseases and the fruits of Tamarindus indica L. have carminative and laxative properties (Bhuvaneswari, R., & Gobalakrishnan, R. 2014)..

The Caesalpiniaceae members has been credited with a wide range of pharmacological actions, including those that are anti-diabetic, anti-inflammatory, antioxidant, anti-fungal, anthelmintic, cytotoxic, hepatoprotective, wound-healing, analgesic, anticonvulsant, insecticidal, and antiplasmodial. *C. bonduc* has been use in the treatment of inflammation and impaired blood circulation in addition to its more well-known uses as an anthelmintic and antimalarial (Pinto et al., 1995; Srinivas et al., 2003; Nagumo et al., 2009). However, analysis of the functions of plants is very important for understanding the value of plants and requires urgent attention. Plants have been a source of medicine and many medicines are now available directly or indirectly from plants. The Indian traditional system of knowledge known as Ayurveda is known for its medicinal properties. There are about 7000 plant species in India. Although many have a long history in folk medicine, there is no record of their efficacy and safety, especially in human studies. The aim of this study is to reveal the phytochemical components in the extracts of three plants i.e. *Cassia javanica*, L.,*Browneacoccinea*,Jeep., *Caesalpinia coriaria*,Willd belonging to the family Caesalpiniaceae. The analysis is done using GS-MS and HPLC

2. Material and Method

2.1 Methodology

Research was conducted on the pre-distribution of family Caesalpiniaceae. *Cassia javanica*, L.,*Browneacoccinea,*Jeep., *Caesalpinia coriaria*,Willd were collected from K.J Somaiya College of Science and commerce and Veermata Jijabai Bhosale Botanical Udyan Mumbai

2.2 Characterization

Three species *Cassia javanica*,L.(C1), *Browneacoccinea*,Jeep. (C2), *Caesalpinia coriaria* ,Willd (C3), were analyzed by GC-MS to identify the bioactive constituents of these plants and these were further confirmed by HPLC analyses.

HPLC ,GC-MS analysis of the extracts was performed on a Perkin Elmer GC Clarus 500MS system to identify the different compounds present in the extract as follows: Column - Dimethylpolysiloxane DB-1 fused silica capillary (30m x 0.25 mm) × 0.1 µm film thickness); carrier gas - helium (1mL/min); injector temperature - 250o C; detector temperature - 200 ° C; column temperature - 35-180^{o}C, 4^{o} C/min - then 180 - 250^{o} C, 10^{o} C/min; MS electron effect 70 eV. Product identification is based on comparison of mass spectra with the mass library (NIST Ver.2.1).

3. Result and Discussion

3.1 GC-MS analysis

*3.1.1 Cassia Javanica,*L.

The bioactive compounds identified in GC-MS analysis are reported in Table 1. This study concluded that extracts of *Cassia javanica*,L. have a wide range of bioactive compounds and have antimicrobial activity against all human pathogens, hence the extracts of

Cassia javanica,L. can find potential for development of new drugs.(Bhuvaneswari, R., &Gobalakrishnan, R. 2014).

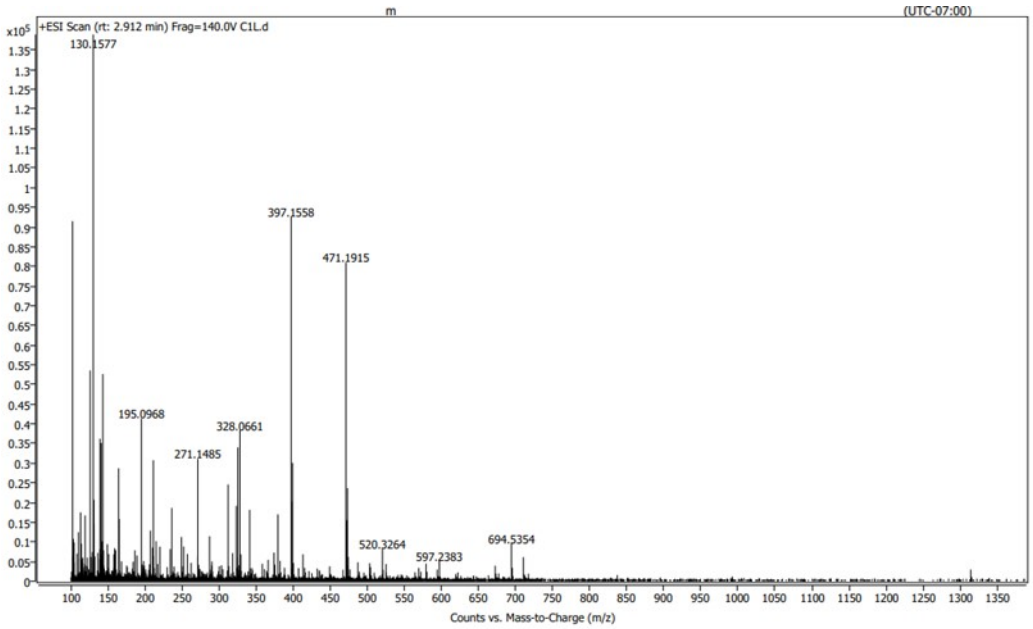

Figure 1: GC-MS of *Cassia javanica* ,L.(C1)

Table 1: Compounds present in *Cassia javanica,*L. *(C1)*

Compounds	**Peak**	**Mol.wt**
phenol,4-propyl-	130.577	100-150
propanal,2-(4-ethoxyphenyl)-2-methyl,	195.09	150-200
myo-Inositol, 4-C-methyl-		
Phytol	271.148	250-300
9,12-octadecadienoic acid-methyl ester (E,E)-		
n-hexadecanoicacid		
hexadecanoic acid, ethyl ester		
octadecanoic acid-ethylester, phenol, 4-amino-3-methyl- (syn:m-cersol,4-amino-),1,2-benzenedicarboxylic acid-diisooctyl ester	328.06	300-350

3.1.2 *Browneacoccinea,*Jeep. *(C2)*

The bioactive components present in the plant *Browneacoccinea* ,Jeep.*(C2)* as analyzed by GC-MS are presented in Table 2 .

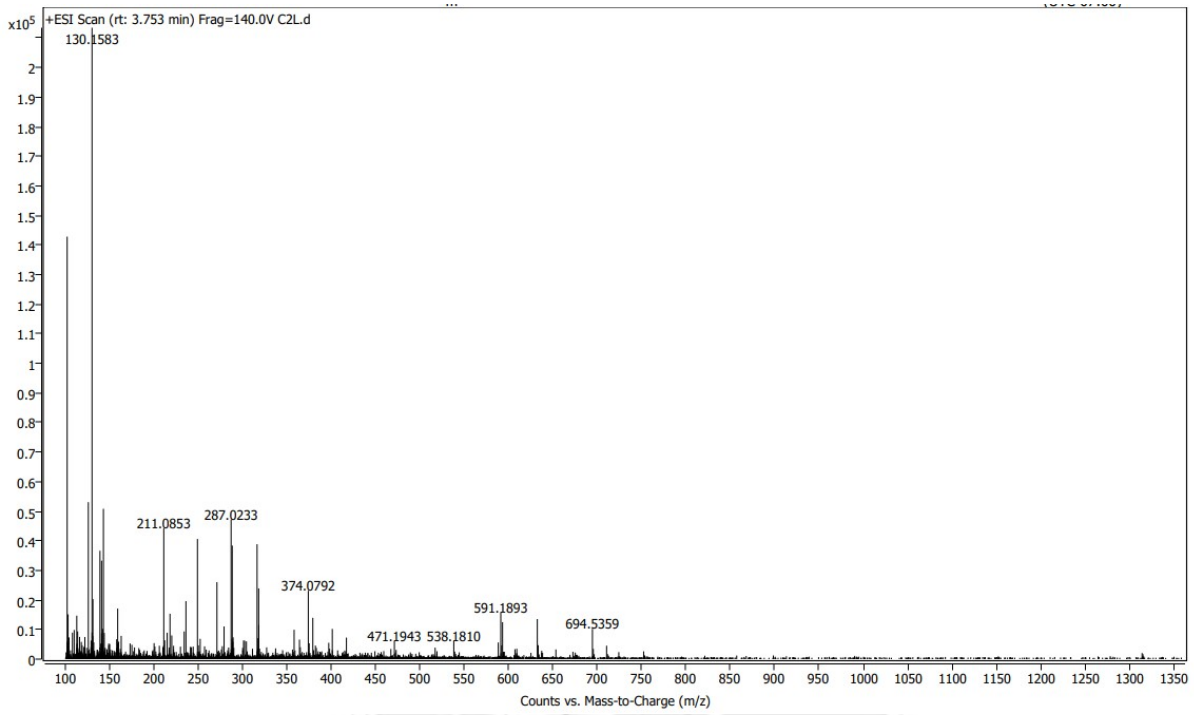

Figure 2 GC-MS of *Browneacoccinea,*Jeep. *(C2)*

Table 2 Components present in *Browneacoccinea,*Jeep. *(C2)*

Compounds	Peak	Mol.wt
C – Dodecadien – 1-ol,	130	150-200
E – Tridecanoic acid	211	200-300
Phytol	287	
J- Octadecatrienoic acid		
hexadecanoic acid, ethyl ester		
Tetradecanoic acid		
thyl Ester	374	300-400
K – Squalene	471	400-480

3.1.3 *Caesalpinia coriaria,*Willd (C3)

The bioactive components present in the plant Caesalpinia coriaria,Willd (C3) as analyzed by GC-MS . The compounds present are C – Dodecadien – 1-ol, D- n- Hexadecanoic acid, -Hexadecanoic ethyl ester, E – Tridecanoic acid, Phytol, H – 2 7 –demethyloct-5-yn7-en-4-yl ester, J- Octadecatrienoic acid, I – 3-Cyclopentylpropionamide,N-methallyl, K – Squalene, L- Vitamin E and are presented in Table 3. Caesalpinia coriaria,Willd (C3)

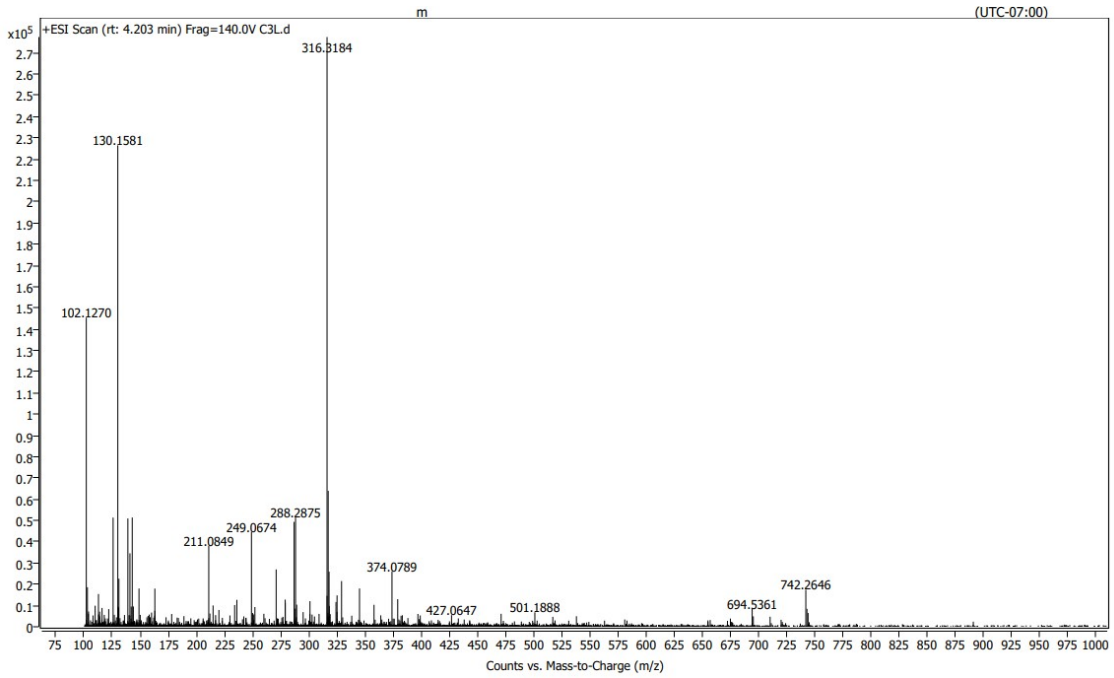

Figure 3: GC-MS of *Caesalpinia coriaria* ,Willd(C3)

Table 3: Components present in *Caesalpinia coriaria* ,Willd(C3)

Compounds	Peak	Mol.wt
C – Dodecadien – 1-ol,	130	150-200
I – 3-Cyclopentylpropionamide,N-methallyl		
Methyl gallate		
Gallic Acid		
E – Tridecanoic acid	211	200-300
D- n- Hexadecanoic acid	249	
- Hexadecanoic ethyl ester	288	
Phytol		
H – 2 7 –demethyloct-5-yn7-en-4-yl ester		
J- Octadecatrienoic acid		
K – Squalene	427	400-450
L- Vitamin E		

3.2 HPLC Analysis

HPLC is a versatile, powerful and widely used separation technique for natural products; HPLC is a chromatographic technique that separates compounds and is used in phytochemistry and analytical chemistry to identify, quantify, and purify individual components. HPLC is a versatile, reproducible chromatographic technique for estimating metabolites in plants. It has many applications in the separation, quantification and analysis of active molecules.

3.2.1 *Cassia javanica,L.*(C1)

HPLC analysis was conducted to confirm the presence of the components detected by GC-MS. Figure 5 shows the HPLC analysis of the compounds that can be isolated from plants. The peaks confirmed the presence of phenols that can be isolated and purified from Cassia Javanica. This showed the anti-oxidant activity of the plant.

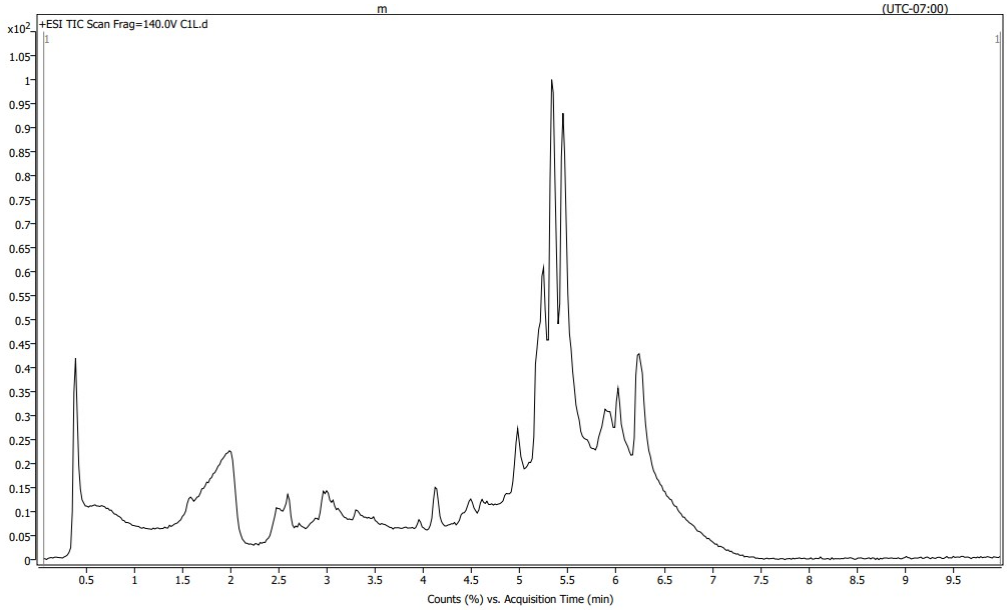

Figure 5: HPLC spectra of *Cassia javanica*,L. (C1)

3.2.2 *BrowneaCoccinea*,Jeep. (C2)

HPLC analysis was conducted to confirm the presence of the components detected by GC-MS. Figure 6 shows the HPLC analysis of the compounds that can be isolated from plants. The peaks confirmed the presence of phytols that can be isolated and purified from Brownea Coccinea. This showed phytols can be isolated from *BrowneaCoccinea*,Jeep. which is used as an organic compound for synthesis of vitamins E and K1.

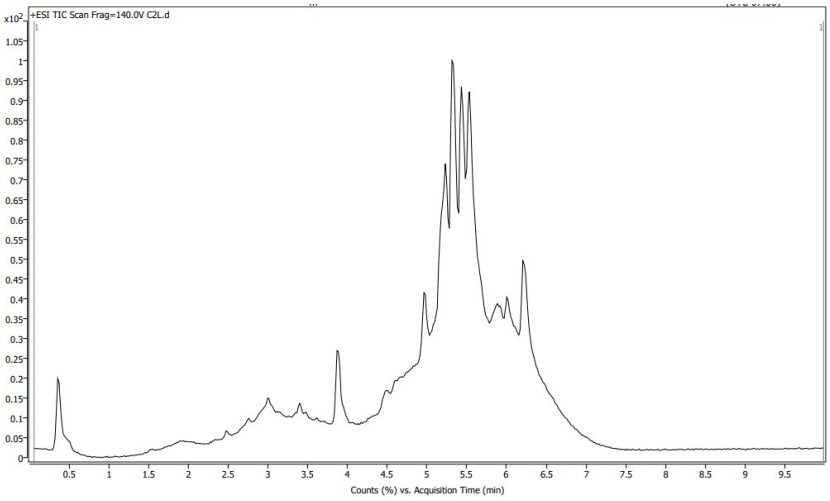

Figure 6: HPLC spectra of *Browneacoccinea*,Jeep. (C2)

3.2.3 *Caesalpinia coriaria*,Willd(C3)

HPLC analysis was conducted to confirm the presence of the components detected by GC-MS. Figure 7 shows the HPLC analysis of the compounds that can be isolated from plants. The peaks confirmed the presence of phytols that can be isolated and purified from Caesalpinia coriaria,Willd. This showed methyl gallate and gallic acid can be isolated from Caesalpinia coriaria ,Willd .which is used as an antimicrobial compound. Caesalpinia coriaria ,Willd(C3)

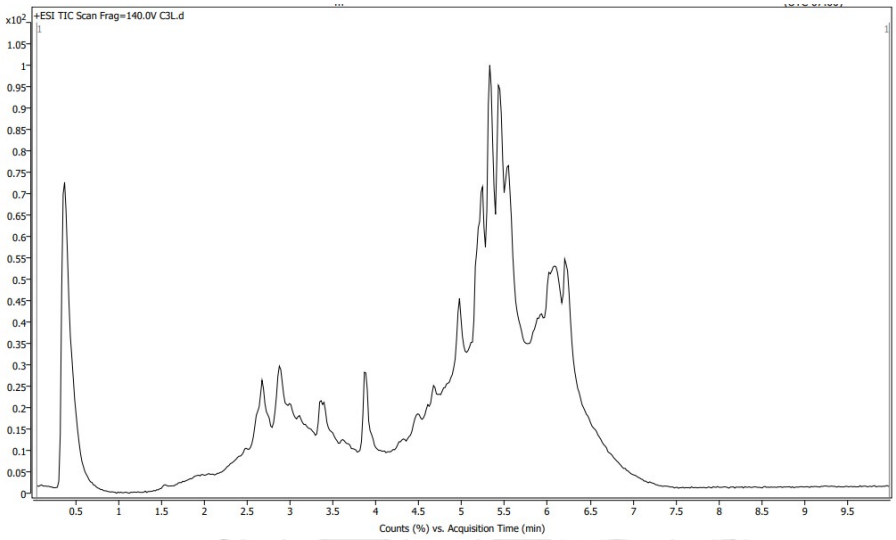

Figure 7: HPLC spectra of *Caesalpinia coriaria*,Willd (C3)

Conclusions

GC-MS analysis showed the presence of bioactive compounds present in the *Cassia javanica*L., *Caesalpiniacoriaria*willd, *Brownea coccinea* Jeep. and HPLC analysis confirmed the presence of compounds in the said plants. This showed that the plants could be employed for various applications such as antioxidants, antimicrobials compounds, flavones and for synthesis of vitamins etc

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SOME MEDICINAL PLANTS WITH ANTIASTHMATIC PROSPECTIVE: A CURRENT STATUS

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Abstract-

The asthma, a disease categorized as a chronic inflammatory disorder stimulated by airway inflammation, is triggered by a heritable predisposition or antigen sensitization. The worldwide, this disturbing disease influences more or less 300 million people. Since olden times, different therapeutic plants had previously been recognized as conventionally and employed by medical practices for managing asthma in several nations.Conventional anti-asthmatic medicines are connected with several unfavorable consequence as well as non-compliance and non-adherence to intricate drug procedures. Consequently, to reduce these adverse effects and to progress patient conformity, there is an unmet medical requirement for complementary therapies for asthma. However Ayurveda has suggested a number of remedies from indigenous plant supply for the management of bronchial asthma and allergic disorders. Different independent literature searches were carry out and randomized medical testing were included. The information were extracted in a standardized, predefined way and evaluated critically. Reflecting on the reputation of herbal medication with asthma patients, there is burning need for rigorously planned, clinically applicable randomized scientific examinations for herbal provision in the management of asthma.

Keywords: Asthma; herbal medicine, ayurveda, conventional, remedies

Introduction:

Asthma can be defined as a chronic inflammatory disorder that affects the lower airways, promoting an increase of bronchial reactivity, hypersensitivity, and a decrease in the airflow (Lambrecht and Hammad, 2015). Moreover, due to a complex interaction among the genetic predisposition and environmental parameters, besides numerous connected phenotypes, this disease may be considered as a heterogeneous disorder (Richards et al., 2018). The asthma is a widespread ailment that is increasing in incidence globally, with the maximum prevalence in developed nations. The disease influence about 300 million public worldwide and it has been

predictable that a further 100 million will be affected by 2025 (Masoli et al., 2004; Bousquet et al., 2005). Low and lower-middle-income country reported for 80% of asthma fatalities (Braman, 2006). The disease can be triggered by several reasons such as viral respiratory infections, certain chemicals, certain prescription, airborne allergens, working sensitizers, smoke, air contaminant. The stress and anxiety or an severe emotional arousal could also activate asthmatic attacks (Raveena et al., 2021).The symptoms of asthma are not similar for everyone. It comprises : wheezing when exhaling, difficulty sleeping caused by shortness of breath, chest tightness, coughing and pain on chest. Since 1970s, the worldwide incidence, morbidity, mortality, and financial trouble of asthma have enlarged specifically in children (Braman, 2006).

At some stage in asthma attack the modifications lead to stop air moving easily through airways, recurring indication, reversible airflow hindrance, bronchospasm, It is characterized by airways inflammation cold cough, wheeze, chest tension and dysponea. There are several herbs that are valuable as pharmaceutical drug in the management of asthma. The secondary plant metabolites have an massive chemical mixture and enormous antiasthmatic potential, so that the major classes of drugs presently employed in the management of asthma, such as muscarinic receptor antagonists, β-adrenergic receptor agonists, membrane stabilizers and phosphodiesterase inhibitors, were obtained directly or inspired by compounds of natural source (Correa et al., 2008). In India, a variety of herbs were depicted in the Ayurvedic and Unani systems of medicine for the care of asthma. Correspondingly, indigenous informations arose independently in several regions of the globe and was utilized by ethnic societies to treat various ailments (Jain and Sharma, 2000). Asthma is a lung disorder that presently has no stable treatment and can only be handled by caring its symptoms. Although synthetic prescriptions reveal notable value against asthma, their long-term usage elevates several concerns. The several lung diseases related to respiratory tract are creating very much trouble in all over world. The mainly frequent respiratory diseases are asthma, chronic obstructive pulmonary disease, cystic fibrosis, lung cancer, tuberculosis, bronchitis, corona virus and pneumonia. The various respiratory diseases are sensitive, like an infection that will find recovered with handling, while others are or become persistent and should to be supervised.

Symptoms of asthma :

The frequent indications of asthma comprise cough, dyspnea, wheezing, tachycardia, respiratory acidosis, tachypnea, upper airway hyper-responsiveness, inflammation of mucous membranes, and enlarged mucus discharge (Fig. 1).

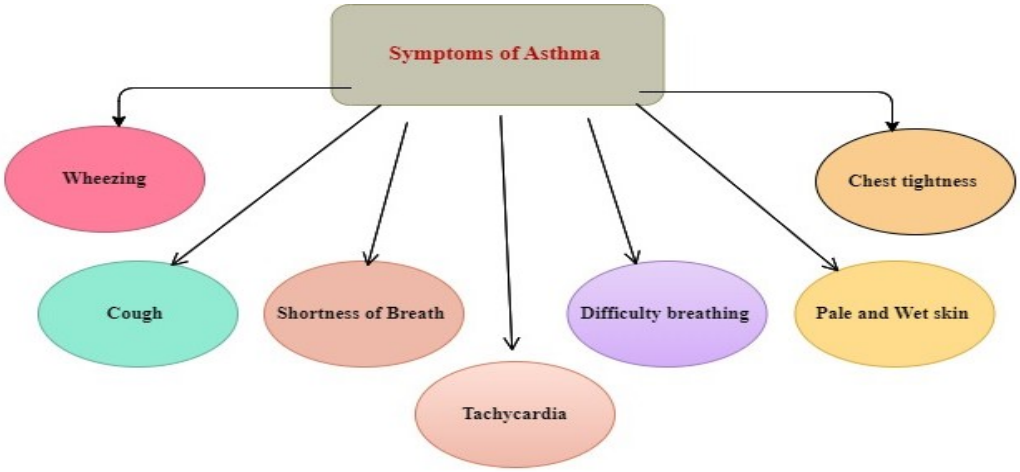

Fig. 1 Symptoms of Asthma

Causative factors of asthma :

The environmental tobacco smoke, particularly maternal cigarette smoking, is connected with high hazard of asthma incidence and asthma morbidity, wheeze, and respiratory infections. However poor air quality, from travel contamination or elevated ozone levels, has been frequently connected with enlarged asthma morbidity and has a recommended relationship with asthma development that desires further investigation (Gold and Wright 2005; Choudhry et al. 2007). The second cause related to hereditary complications that may another reason. The 100 genes have been linked with asthma in at least single genetic association study. However, such investigations must be constant to make certain the findings are not due to chance. Through the ending of 2005, 25 genes had been connected with asthma in six or extra separate populations (Ober andHoffjan, 2006).

Medicinal plants used in asthma :

1. *Argemone mexicana* (Papaveraceae)

The *Argemone mexicana*is common everywhere by road-sides and fields in India. It possesses antiallergic and antistress activity of aqueous extracts of *A. mexicana* stem at dose 50 mg/kg, i.p.using milk-stimulated leucocytosis and milk-induced eosinophilia(Bhalke and Gosavi, 2009).

2. *Bacopa monnieri* L. (Scrophulariaceae)

Bacopa monnieri: Samiulla, et al. assessed petroleum ether, chloroform, methanol and water extracts of *B. monnieri*leaves at doses 10 mg/mL for mast cell stabilizingactivity in rats. The outcome of investigation examined that everyextract considerably restrains mast cell degranulation (Samiulla et al., 2001).

3. *Euphorbia hirta* (Euphorbiaceae)

Popularly known as asthma weed, *Euphorbia hirta*is an herbaceous wild plant which grows in the hotter parts of India. The ethanol extract of entire aerial part of the plant at doses (100-1000

mg/kg) exhibited antihistaminic and antiallergic activity by restraining the passive cutaneous anaphylaxis and paw anaphylaxis reaction; protection of mast cell from degranulation (Youssouf et al., 2007).

4. *Ficus bengalensis* Linn (Moraceae)

The ethyl acetate, ethanol and aqueous extracts as well as fractions extracted from aqueous extract of *F. bengalensis*bark possesses antihistaminic action by restraining clonidine stimulated catalepsy in mice at dose 50 mg/kg. These activity may be due to incidence of flavonoids (Taur et al. 2007; Taur and Patil, 2009).

5. *Curculigoorchioides* Gaertn (Amaryllidaceae)

Alcoholic extract of *C. orchioides*rhizomes at doses (100-400 mg/kg) displayed mast cell stabilizing and antihistaminic activity on compound 48/80-induced mast cell degranulation and systemic anaphylaxis (Venkatesh et al. 2009). It also inhibited histamineinduced reduction in goat trachea, guinea pig ileum and bronchoconstriction in guinea pigs; egg albumin stimulated passive paw anaphylaxis in rats; milk stimulated leucocytosis and eosinophilia; clonidine induced catalepsy in mice (Pandit et al., 2008).

6. *Cynodondactylon* (Poaceae)

The perennial grass *Cynodondactylon* is one of the most common in India, commonly identified as Dhub.The petroleum ether, chloroform and methanol extracts of whole plant and fractions isolated from chloroform extract possess antianaphylactic activity however fractions extracted possesses more strong activity at doses 10, 25, 50 and 100 mg/ kg using compound 48/80-stimulated mast cell degranulation, determination of level of nitric acid in serum, compound 48/80-induced anaphylaxis (Savali et al., 2010).

7. *Piper longum* (Piperaceae)

The fruit exhibited anti-inflammatory action against carrgenin stimulated rat paw edema. It displayed a relaxant activity. The ethanol extract o*f P. longum* fruit and its constituent majorly piperine investigated for their anti- asthmatic activity and immunomodulator activity (Zaveri et al., 2010).

8. *Tamarindus indica* (Fabaceae)

It is locally known as Tamarind, which possesses a powerful anti-inflammatory property and assist to ease pain and inflammation in respiratory tract and lungs. A bark of this tree is extremely valuable in the management of asthma and eye inflammation (Rivers and Mark, 2020).

9. *Zingiber officinale* (Zingiberaceae)

It is usually familiar with the name ginger, which is found on Southern China, Malaysia and India is the major producer of ginger, it attributes taste and aroma. It is a influential in treating cold, cough, bronchitis. It holds some essential oils, gingerols and sesquiterpene hydrocarbon; it possesses antiviral, anti-inflammatory, anti-asthmatic activities (Mali and Dhake, 2011).

10. ***Allium sativum*** **(*Amaryllidaceae)***

The garlic has been used for long time to avoid the disease like flu menstrual cramp, sinusitis, cold. It has been valuable herbal remedy for whooping, cough, bronchitis including asthma also. It can be used in the form of garlic capsule or tablet, garlic oil, garlic juice (Awais et al., 2009).

11. ***Tinospora cordifolia*** **(Menispermaceae)**

The ethanolic extract of dry roots of plant was used in the dose of 100 and 200mg mg/kg; (p.o.). In-vivo models like histamine stimulated bronchospasm in rats, and acetylcholine induced contraction in animal preparations were used for assessing anti-asthamatic action of the drug. The extract of drug exhibited a considerable bronchodilatory and anti-histaminic, anti-inflammatory, mast cell stabilization, and anticholinergic activity in histamine induced bronchospasm in wistar rats (Ghori et al., 2020).

12. ***Vitis vinifera*** **(Vitaceae)**

Treatment of sensitized animals with dexamethasone or twice doses of *V. vinifera* fruits extract inhibited recruitment of inflammatory cytokines, IgE, nitrites and circulating cells specifically eosinophils in blood/serum and bronchoalveolar fluid ($p < 0.001$, $p < 0.01$ and $p < 0.05$). Dexamethasone and *V. vinifera* fruits extract management also standardized lung functions and histamine levels compared to ovalbumin-sensitized controls ($p < 0.05$ and $p < 0.01$). Additionally, both drugs displayed protection against airway inflammation in lung histology (Arora et al., 2016).

13. ***Syzygiumcumini*****(Myrtaceae)**

The ethanolic extract of *S. cumini* was evaluated for anti inflammatory and anti asthmatic activity with their phyto ingredients in animal models. The extract has an anti-inflammatory effect confirmed by its inhibitory outcome in carrageenan stimulated paw edema. Furthermore it produced significant decline in bronchoconstriction in histamine induced bronchoconstriction (in-vivo) and mast cell degradation method (in-vitro) (Chilivari and Alagarsamy, 2020).

14. ***Adhatodavasica*** **(Acanthaceae)**

Investigation was conducted on thebronchodilating effect by examining the consequence of ethanolic extract of *A. vasica*on acetylcholine and histamine aerosol activated broncho-constriction in guinea pigs. The plantwas found to be dose dependently withdrawn ileum contractions stimulated by histamine and Ach. The probable mechanism of action may be blocked of H_2 and Ach receptors leading to inability of smooth muscle to respond to histamine and Ach induced spasm leading to inhibition of bronco-constriction. It confirms that the plant has impending activity in ethanolic extracts and exhibited superior action for anti-asthmatic activity (Dangi et al., 2015).

15. ***Moringa oleifera* (*Moringaceae)***

The study was conducted for verifying *M. oleifera* Lam. leaves extract's effect on reducing the eosinophil count and mast cells in asthmatic mice. The experiments were carried out on four group of animal. After completion of 25 days, the leaves extract was proven to decrease the eosinophil count with a p-value <0.05 and could stabilize bronchiolar mast cells with a p-value <0.05 (Palupi et al., 2021).

16. ***Luffa cylindrica* (*Cucurbitaceae)***

Pretreatment with hydroalcoholic extract of *L. cylindrica* extensively withdrawn clonidine activated catalepsy, declined milk induced eosinophilia, inhibited passive paw anaphylaxis and reduced number of eosinophil and macrophage count in the BALF in OVA induced airway inflammation. With treatment, suppressed the infiltration of inflammatory cells and the hyperplasia of goblet cells. Thus, it confirmed anti-asthmatic potential of plant *(*Ingale et al., 2020).

17. ***Calotropis procera*(Asclepiadaceae)**

In the *in-vitro* and *in-vivo* models, the oral dose of both Methanolic extract of roots and Aqueous extract of roots of plant showed significant outcomes as compared to control. The *in-vitro* models included isolated goat tracheal chain and guinea pig ileum preparation. Among both extracts, Methanolic extract exhibited superior activity in the prevention of asthma (Beniwal and Mittal, 2022).

18. ***Crocus sativus* (Iridaceae)**

With five groups of forty rats, the experiments were carried out for the treatment through different doses of *C. sativus* extracts. The WBC count, neutrophil, and eosinophil % in lung lavage fluid were enlarged in sensitized animals. Treatment of sensitized animals with the entire doses of the extract significantly reduced WBC number and the % of neutrophil and eosinophil compared with the sensitized animals (p0.01-0.001). Consequently the extract could be efficient on alleviating lung inflammatory cells in lung lavage of sensitized animals which may indicated a protective outcome of this plant on lung inflammation in asthma (Mahmoudabady et al., 2013).

19. ***Aegle marmelos*(Rutaceae)**

Its leaf residue is being used in Indian system of medicine as an antidiabetic agent and conventional text of India recommend it in the management of asthma. Therefore the outcome of the alcoholic extract of the leaves of *A. marmelos*on guinea pig isolated ileum and tracheal chain was examined using the isolated organ bath technique. The 1mg/ml and 2mg/ml amount of the extract of plant produced a encouraging relaxant results in isolated guinea pig ileum and tracheal chain, correspondingly (Arul et al., 2004).

20. ***Clerodendrum serratum Linn* (Verbenaceae)**

It is conventionally helpful in managing pain, inflammation, rheumatism, respiratory diseases, and malarial fever. The ethanol extract of roots of *C. serratum*exhibited antiasthmatic

activity using isolated goat tracheal chain preparation, clonidine induced catalepsy; Milk stimulated leucocytosis and eosinophilia in mice at doses 50,100 and 200 mg/kg (Bhujbal et al., 2009).

Conclusion :

Nearly 70 percent of the recommendation medicines that are being used for several diseasesmanagement is derived from plants and natural supplies. The pharmacologists, medical practitioner, scientists and pharmaceutical companies study the plants and herbs that are conventionally used for handling of different diseases. Subsequent to vigorous investigations they recognize the specific molecule that has therapeutic properties. These molecules do undergo different alterations and transformations in laboratories. And then, it is mass produced in factories and methodically promoted (Taur and Patil, 2011). This assessment highlights the need of herbal formulation to be used in the supervision of respiratory disease. The conventional technique of treating asthma has been confirmed helpful as compared to pharmaceutical drugs, as the above-mentioned herbs/plants displayed anti-asthmatic, and anti-oxidant properties which assist to control the indications associated to respiratory tract properly.In short, effort should be made to widen polyherbal formulations which hold different herbs substitute at specific sites of the pathophysiological cascade of asthma for prophylaxis as well as for the cure of asthma and succeeding clinical studies on them.

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ETHANOPHARMACOLOGICAL STUDY ON RARE AND WILD MEDICINAL PLANTS IN DHARMABAD REGION OF NANDED DIST. (M.S) INDIA

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Abstract

A variety of rare and wild medicinal plants has been widely used by different indigenous people in Dharmabad taluka for many humanbeings.

Dharmabad taluka is one of the Nanded district of Marathwada which is located near to telanganaborder. It has rich biodiversity of flowering plants as well as rare and wild medicinal plants. This present paper is based on an ethanopharmacological investigation that focused on ethanomedicinal rare and wild plants occur in this region particularly in telangana border areas of Dharmabad taluka.

Keywords: Ethanopharmacological plants, investigation, biodiversity.

1. Introduction

Dharmabad taluka is located in the Nanded district of Marathwada along the region of Telangna. Usually the rural open and west land areas like Balapur, Naigaon, Bellur, Aloor, Ratnali, Banali, Yeoti etc.

In this area people have traditional self-developed system of folk medicine. In this area the art of herbal healing is deep rooted in folk medicine. Ever today in most of the rural areas, the Vaidu people depend upon local traditional healing system for their primary health.

2. Aim of the Study:

This study aims to identify the rare and wild medicinal plants collected for medicinal purposes by locals of Dharmabad region which is located in the Telangna border, & to identify the uses and local names of these rare and wild medicinal plants.

3. Materials and Methods:

The field was conducted in Dharmabad talukas region, in Nanded district. Ethanomedicinally rare and wild plants were collected from July -2023 to Feb. 2024 in the different villages.

Medicinal plant species which were not identified in the field of villages were pressed and dried for voucher specimen to identified authentically by standard herbarium of the department of Botany school of life science, SRTMU, Nanded, as well as the flora of Marathwada Vol. I & Vol. II (Dr. V.N. Naik)

The information about rare & wild medicinal plant, its uses was obtained from local Vaidu or people through the interview's & questionnaires.

Important ethanomedicinal plants found in Nanded District

Sr. No.	Scientific Name	Local Name	Family	Parts Used	Ethanomedicinal Uses
1	Acacia nilotica (L)	Babul	Mimosaceae	Gum, Bark, Wood	Traditionally in ayurveda for a no. of afflictions
2	Achyranthus aspera (L)	Aghada	Amaranthaceae	Leaves, Seed, Root	Remedy for a no. of Diseases
3	AdhatodaVasica Nees	Adulsa	Acanthaceae	Leaves, Flower, Seed, Root	Relief in bronchitis
4	Aegle MormelosRoxb	Bel	Rutaceae	Leaves, Fruits, root, Bark	Decoction in diarrhea & dysentery
5	Abrus precatorious (L)	Gunj	Fabaceae	Leaves, Seed, Root	Used to treat hoar senses
6	Allium Sativum (L)	Garlic	Liliaceae	Bulbs	Antibacterial properties
7	Aloe vera (L)	Korphad	Liliaceae	Leaves	In Piles, fever, face skin smoothing
8	Abutilon indicum	Pethari	Malvaceae	Leaves and stem	To treat boils
9	Asparagus racemosus wild	Shatavari	Liliaceac	Root, leaves	Dielectric, anti-dysentric & demulcent
10	Butea monosperma (L)	Palas	Fabaceae	Flower, leaves, gum, root, bark, seeds	Astringent, pimples, fibers, dysentry, geonorrhoea
11	Boerhaviadiffusa (L)	Punarnava	Nyctaginacese	All part of the plant	To treat Asthma, dropsy, jaundice and laxative
12	Brassica juncea	Rai	Brassicaceae	seed	Rubefacient, vesicant, emetic prensentative

13	Catharanthus roseus	Sadabahar	Apocynaceae	Leaves, root	To treating oliguria, diabetics, hypertentionleukaemia
14	Caesalpinia bonduc (L)	Kantkarej	Caesalpiniaceae	Root, bark, leaves, seeds	Febrifuse, expectorant, stomactic, leucoderma
15	Calortropisprocera	Ruchaki	Asclepiadaceae	Flower, root, leaf, bark	Malaria, cholera and elephantiasis
16	Zingiber officinale	Adrak	Zingibaraceae	Rhizome	Laxative aphrodisiac, throat asthama
17	Tamaarindus indica	Chinch	Fabaceae	Bark/Fruit	Paralysis, ulcers and cough
18	Sapindusmukrossi	Ritta	Sapindaceae	Fruit	Epilepsy, Cure burnt
19	Ricinus communis	Eranda	Euphorbiaceae	Leaves and root	Headache, boils, dysentery jaundice
20	Tinosporacordifilia	Gulwel	Menispermaceae	Stamp root	Diabetic

4. Result:

We have find out in our study the rural and tribal peoples of this region are unknowing about the medicinal plant and economic status of these plant out of twenty rare and wild medicinal plants, eighteen species were known to local or Vaidu people, rural and tribal groups and remain only two species were unknown to these people.

5. Conclusion:

These species diversity of rare & common medicinal plants used in Dharmabad Taluka region in the study area was very rich.

Awareness is also needed to be raised among the local areas focusing on sustainable utilization & management of rare and wild medicinal plants and traditional knowledge.

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IMPACT OF ENVIRONMENTAL FACTORS ON THE DEVELOPMENT OF SOFT ROT OF PAPAYA

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Abstract

It was found that development of soft rot** of **papaya** fruit **was very less at low temperature and low R.H. while it was maximum at 25^0 C and at 100% R.H.

Key Words: Soft rot, Disease development, Temperature, Humidity, Papaya.

Introduction

Soft rot disease is common post harvest fungal disease in papaya fruit. It is caused by *Rhizopus stolonifer.* Climatic factors such as temperature and Relative Humidity (R.H.) play an important role in development of post–harvested fungal diseases of fruits (Chrys, 2006; Cherian and Mani, 2007, Gadgile and Chavan, 2010, Gadgile and Pawar, 2020, Gadgile, 2023). However, there are few references about the impact of temperature and relative humidity on post-harvest fungal disease development of papaya fruit. Therefore the attempts were made to study the impact of ecological factors on soft rot of Papaya fruit.

Material and Methods

Healthy papaya fruits were collected from Palam fruit market (M.S.), India and were surface sterilized then which were pricked and washed with sterile distilled water after that which were dipped in spore suspension of *Rhizopus stolonifer* for 5 min. Then the fruits were placed in sterilized polythene bags and incubated to different level of temperature and RH percentage adjusted level were maintained (Buxton and Mellanby, 1934). Development of diseases was recorded on 7th day of incubation on the basis of percent fruit area infected. Effect of temperature and R.H. on spore germination of *Rhizopus stolonifer was* studied by placing spores on glass-slide placed to different levels of temperature and R.H.

Results and Discussion

It is found that papaya soft rot development was maximum at 25^{0}C and 100% R.H. while there was no severity at 10^{0}C and at low humidity. Severity was increased from 30 to 100% R.H. Spore germination of *Rhizopus stolonifer* was absent at 10^{0}C (table 1 and 2)

Many plant pathologists find more or less similar findings about the effects of environmental factors on disease development of post-harvest fungal diseases in different fruits (Bagwan and Meshram; 2003, Patel and Rathod; 2005, Chrys; 2006 and Gadgile and Chavan; 2010, Gadgile;

2020 and Gadgile and Pawar; 2020, Gadgile, 2023).

Table 1 Effect of temperature on disease severity and spore germination of soft rot of papaya

Temp. (^{0}C)	Disease severity %	Spore germination % after 24 hours
10	0.0	0.0
25	64.4	73.9
30	55.5	71.4
40	39.3	33.3

Table 2 Effect of humidity on disease severity and spore germination of soft rot of papaya

R.H. (%)	Disease severity %	Spore germination % after 24 hours
30	22.2	17.2
50	33.5	36.6
80	42.5	71.2
100	66.3	76.3

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