K.L.E. Society's

G. I. Bagewadi Arts, Science and Commerce College, Nipani - 591237

Accredited at 'A' level by NAAC with CGPA 3.35

"College with Potential of Excellence"

INTERNAL QUALITY ASSURANCE CELL

Initiative

Self Financed

ONE DAY NATIONAL CONFERENCE

ON

"RECENT TRENDS IN PLANT SCIENCE"

Organized by

DEPARTMENT OF BOTANY

On 24th MARCH, 2019

PROCEEDINGS

(RTPS 2019)

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KLE Society's G. I. Bagewadi Arts, Science and Commerce College, Nipani – 591 237

2019

“SAPTARSHIS”

Founders of KLE Society, Belagavi

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Shri M R Sakhare

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Shri P R Chikodi

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Shri V V Patil

Proceedings of IQAC Initiative Self Financed One Day National Conference on **'Recent Trends in Plant Science'** held on 24.03.2019, organized by **Department of Botany.**

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FROM PRINCIPAL'S DESK

Ours is a College with 60 years of history laden rural institution which has crossed its Silver Jubilee mile stone, is imparting quality education in Arts, Commerce and Science streams with a good number of short-term value added certificate courses basically to the wards of peasant families and economically weaker and backward sections of our hinter land. Our College belongs to the family of globally acknowledged K.L.E. Society that has under its Banyon like coverage, of more than 270 institutions in India and abroad imparting education of renowned standard in practically every imaginable area of knowledge. It is a matter of great pleasure for We the KLEans that our educational, democratic, charitable trust was founded by seven self-less highly educated teachers called by us reverentially as 'Saptarshis'.

Post-accreditation of our institution has witnessed marvelous growth in all spheres of its functioning be they academic, infrastructure, ICT adoption or co-curricular or extra-curricular activities. As part of quality sustenance activities, Department of Botany has organized an IQAC Initiative Self Financed One Day National Conference on **'Recent Trends in Plant Science'** on 24.03.2019**.**

I am happy to say that more than 25 papers have been presented on various aspects related to the seminar theme. The same papers are now getting published in the form of Conference Proceedings with ISBN. The conference was aimed to cover the contemporary research in the broad areas of plant science such as bio-technology, tissue culture, taxonomy, herbal medicine, environmental science, crop management, phyto-chemistry, nano-technology, microbiology etc., so as to provide a common platform for the exchange of most recent discoveries and developments in the field of plant science and their applications for the progress of the society.

The primary objective of the conference is to assemble young researchers of multidiscipline of life science, chemical science, and to take up the challenging areas with an aim of practical applications useful for the benefit of mankind. Research Scholars and students were also provided platform to share their findings, opinion through oral/poster presentations and interact with the scientific fraternity.

I am pleased to present before you the proceedings of the said conference.

With regards,

Dr. M. B. Kothale
Principal

24.03.2019

BRIEF REPORT OF THE CONFERENCE

KLE Society's G. I. Bagewadi College, Nipani has organized Self Financed One Day National Conference On "Recent Trends in Plant Science" on 24th March, 2019.

The National conference "Recent Trends in Plant Science" is aimed to cover the contemporary research in the broad areas of plant science such as biotechnology, tissue culture, environmental science, crop management, phytochemistry, taxonomy, herbal medicine, nanotechnology, microbiology etc., so as to provide a common platform for the exchange of most recent discoveries and developments in the field of plant science and their applications for the progress of the society. The primary objective of the conference is to assemble young researchers of multidiscipline of life science, chemical science, and to take up the challenging areas with an aim of practical applications useful for the benefit of mankind.

Inaugural Function:

The function began with the invocation song by Miss Shrushti Halagadagi. Smt. S. B. Patil, Head, Department of Botany welcomed the dignitaries, delegates and other participants of the conference. An introductory speech was delivered by Smt. J. R. Tikke. The introduction of guests was given by Dr. S. D. Payamalle. The function was officially inaugurated by watering the potted plant. The meritorious students of the Department of Botany for the academic year 2018-19, Miss Shraddha Sangane and Mr. Vijay Karoshi were felicitated by the dignitaries.

The key note address of the conference was delivered by Dr. S. R. Yadav of Department of Botany, Shivaji University, Kolhapur. In his address he said that the plants are the only good old engineers who fulfill the requirement of the whole world and only they can synthesize food for everyone. Plants are not only concerned to Botanists, but also to common people who should think of plants protection and their conservation. It is the duty of every person on the earth to take care of plants.

Principal Dr. M. B. Kothale, presiding over the function, in his presidential remarks said, at present, world is very much depending on the basic sciences and hence, students should learn and develop knowledge in basic sciences. He also said that vanamahotsava should not be restricted to a single day but should be celebrated every day that is it should be nityamahotsava, so that we can bring balance in various climatic factors and control the global warming.

The inaugural session ended with the vote of thanks proposed by Miss A. Y. Maniyar, and Miss Priya Patil and Miss A.Y. Maniyar Compeered the function.

Technical Session-I

Topic: **Role of Taxonomy in Conservation and Utilization of Biodiversity"**

Resource Person: **Dr. S. R. Yadav**, Shivaji University, Kolhapur.

Dr. S. R.Yadav said, Western Ghats given room for lot many types of plants of which some are under the verge of extinction and need the attention to identify and conserve. The conservation of such plants is important as many of those plants are having medicinal properties and therefore it is the duty of every one of us to protect and conserve them. Taxonomy is the base to the understanding of biodiversity. Our knowledge of biodiversity is negligible and we have just documented 10% of our total biodiversity, remaining 90% diversity is yet to be studied. The role of taxonomy include, implementation of the Convention on Biological Diversity (CBD), Floras and conservation, gardening of the earth: the contribution of botanical gardens to plant conservation and habitat restoration, Wild seed banks and taxonomy, supporting the infrastructure for taxonomy and conservation.

The session was chaired by Dr. Smt. Neeta Jadav, Dept. of Botany, B. K. College, Belagavi.

Technical Session-II

Topic: "**Biotechnological Approaches for the Production of Pharmaceutically Important Phyto-chemicals**

Resource Person**: Prof. Niranjana Murthy Hosakatte,** P.G. Department of Studies in Botany, Karnatak University, Dharwad, Karnataka – 580003

E-mail: hnmurthy60@gmail.com

Dr. Murthy narrated the importance of plants especially of medicinal plants. The function or importance of secondary metabolites in plants is ecological. It is for interactions between the plants and their environment. He detailed about the techniques of isolation and processing of secondary metabolites from Ginseng, Artemisia, Garcinia, Ashwagandha, Brahmi, Shankapushpi etc. He also gave detailed information of Ginseng, its multi-utility in human health, helps in looking young, it can be used in shampoo, soaps etc.

The session was chaired by Dr. P. D. Shiragave, Dept. of Botany, Devchand College, Arjunnagar, Maharashtra.

Technical Session-III: **Paper and Poster Presentation**

Participants from various colleges both students and faculty presented their papers and posters.

Valedictory Function:

The function began with the welcome address by Smt. S. S. Sunnal. Mr. Dhananjay and Akash presented their opinions on behalf of all participants. The Chief Guest of the function Dr. P. D. Shiragave, addressing the gathering gave call to all that they should study the ongoing research activities and work for the well being of the society. He said seminars and conferences should not run only for discussion but also to reach to the common people. Dr. M. B. Kothale presided over the function and said everyone should love the plants and develop the habit of planting a sapling at least one per year and take oath for growing and protecting them. The conference ended with the vote of thanks proposed by Smt. S. B. Patil.

24 teachers, 07 research scholars and 63 students from various colleges and Universities have participated in the conference.

ORGANISING COMMITTEE

Chief Patron: **Shri. Ashokanna G. Bagewadi**
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Prof. Dept. of Botany, K. C. Dharwad

Dr. Sunil Jalalpure
Deputy Director and Scientist, Dr. P. K. BSRC KLES, Belagavi

Conference Schedule

Registration and Breakfast	:	**09.00 am to 10.00 am**
Inauguration	:	**10.00 am to 10.45 am**
Key note Address	:	**10.45 am to 11.15 am**
Chief Guest	:	**Dr. S. R. Yadav** Fellow of INSA and Dept. of Botany Shivaji University Kolhapur
President	:	**Dr. M. B. Kothale** Principal KLES GIB College Nipani
Tea Break	:	**11.15 am to 11.30 am**
Technical Session I	:	**11.30 am to 12.15 pm**
Resource Person	:	**Dr. S. R. Yadav** Fellow of INSA and UGC-BSR Dept. of Botany Shivaji University Kolhapur
Topic	:	**"Role of Taxanomy and Taxanomists in 21st Century"**
Technical Session II	:	**12.15 pm to 1.15 pm**
Resource Person	:	**Dr. H. Niranjana Murthy** Professor Dept. of Botany Karnatak University Dharwad
Topic	:	**"Biotechnological approaches for the production of useful phytochemicals"**
Lunch Break	:	**1.15 pm to 2.00 pm**
Technical Session III	:	**2.00 pm to 3.30 pm**

Paper Presentation by Delegates and Students

Valedictory	:	**3.30 pm to 4.30 pm**
Chief Guest	:	**Dr. P. D. Shiragave** Asst. Prof. Dept. of Botany Devachand College Arjunnagar, Kolhapur
President	:	**Dr. M. B. Kothale** Principal KLES GIB College Nipani

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Dr. M. B. Kothale, Presidential Remarks

Dr. Niranjan Murthy, Resouece Person

Dr. P. D. Shiragave, Chief Guest

Delegates

Prize Distribution

Inauguration

A Record on Distribution of *Vignaindica* Dixit et al. (Fabaceae) in Karnataka, India

Sidanand V. Kambhar, Rahul R. Patil and Shivanand S. Jadagoudar

Post Graduate Department of Botany, KLE Society's, Basavaprabhu Kore Art's, Science and Commerce College, Chikodi, Belagavi- 591201, Karnataka
*Email- sidanand.kambhar@gmail.com

ABSTRACT:

The species of Vignaindica Dixit et al., belonging subgenus Ceratotropis comes under section Aconitifoliaewas recorded from Vijayapur and Chikoditahshil of Belagavi District, Karnataka. Previously, This Vigna species was placed under V. trilobata (L.) Verdc, as it variety(var. pusilla)by Naik and Poklereported from Marathawada, Maharashtra. The same taxon has been raised to the rank of species by Dixit et al. This species is widely distributed in semiarid zone of Rajasthan,Gujarat, Madhya Pradesh and Maharashtra. The present collection of this species found new distribution record for Karnataka state. This species can be easily recognized by their leaflet which is up to 3 cm long, deeply 3 lobed and pods 1.5-2 cm long with 5-10 seeds.Therefore, the present wild collection of this species may helpful to understand the issue of parental identification ofcultivated Vigna species and which may behelpful to establish a new cultivated variety of Vigna through breeding programmes.

Keywords: Vigna, Fabaceae, Chikodi, Belagavi

Antifungal Activity of *Pleocaulus Ritchiei:* An Endemic Plant from Western Ghats of India

Sujata V. Patil

Department of Agrochemicals & Pest Management, Devchand College, Arjunnagar 591237.
Presenting author email: sujata.shiragave@gmail.com

ABSTRACT:

[*At present there has been an increasing interest in the use of natural plant products especially for the bioactive compounds of these natural products. It is because of residual effects of synthetic compounds which are associated with food crops after its harvesting and hence the screening of different plant species for antimicrobial activities is the need of time. Hence during present study Pleocaulis ritchiei (Acanthaceae) an endemic flowering plant of Western Ghats is screened in-vitro for its antimicrobial activities. The antifungal activities were screened for different fungal strains by using different solvent extracts like acetone, ethanol, methanol and aqueous extracts. The in-vitro studies noted that in all four solvent extracts of Pleocaulis ritchiei showed significant antifungal activities against Aspergillus flavus, Alternaria alternata and Fusarium oxysporum. Also it was noted that among the different studied solvent extracts the methanolic plant extract of Pleocaulis ritchiei showed 100 % zone of inhibition at 150 ppm concentrations for Alternaria alternata and Fusarium oxysporum fungal strains. Aspergillus flavus showed maximum inhibition against aqueous extract. All these results are presented and discussed in the present communication.*]

Keywords: Antifungal screening, *Pleocaulis ritchiei*, different solvent extracts.

Bioaccumulation and effect of Zn nanoparticles on seedling growth and biochemical responses of *Cyamopsis tetragonoloba* (L.) Taub

I. B. Gokak*, T. C. Taranath and P. A. Sangappagol

S.S Arts & T.P.Science Institute, Sankeshwar ,
*Corresponding author email: irawwagokak19@gmail.com

ABSTRACT

[*The present investigation was taken up to investigate the effect of various concentrations of Zn NPs on growth and biochemical responses of Cyamopsis tetragonoloba (L.) Taub. Seeds were treated with Zn NPs at the concentrations of 50, 100, 200 and 500 ppm. The initial growth responses such as percentage of germination, germination rate were estimated. Root length, shoot length, number of leaves and number of root hairs were recorded as the morphological responses at 30 and 60 days. Chlorophyll, protein, carbohydrate and proline contents in both 30 and 60 days old treated and control plants were estimated in order to study the biochemical responses. Zn NPs treatment executed positive effect on percentage of seed germination but the negative effect was observed on mean germination time and germination rate. Proline, protein and carbohydrate content increased in all treatments but no significant effect was observed on chlorophyll content. Bioaccumulation of Zn NPs in to the root tissues of 30 days old plants were observed with transmission electron microscope, this revealed the accumulation of NP's on cell wall and inside the cells.*]

KEY WORDS: Zn NPs, ROS and TEM

INTRODUCTION

Nanotechnology has the potential to revolutionize the agricultural and food industry with new tools for the molecular treatment of diseases, rapid disease detection and enhancing plant ability to absorb nutrients. Smart sensors and smart delivery systems will help the agricultural industry to fight viruses and other crop pathogens (Joseph and Morrison 2007). However, the novel size-dependent properties of nanomaterials, that make them desirable in technical and commercial uses, also create concerns in terms of environmental and toxicological impact (Auffan et al. 2009). Nanotoxicology is emerging as an important sub discipline of nanotechnology and involves the study of the interactions of nanostructures with biological systems. Nanotoxicology aims on elucidating the relationship between the physical and chemical properties of nanostructures with the induction of toxic biological responses (Fischer and Chan 2007). This information is important to characterize nanomaterials in biotechnology, ecosystems, agriculture and biomedical applications (Saez et al. 2010).

Higher plants strongly interact with their atmospheric and terrestrial environments and are expected to be affected as a result of their exposure to ENPs. Studies on the toxicity of nanomaterials are still emerging and basically evidence several negative effects on growth and development of plantlets. The interactions of nanomaterials with plants have not been fully elucidated. However, there have been different and often conflicting reports on the absorption, translocation, accumulation, biotransformation, and toxicity of nanoparticles in various plant species. The reports on the effects of metal oxide nanoparticles such as CuO, ZnO, TiO_2 and silver on medicinal and crop plants are numerous, but there are meager reports on the effect of metallic zinc nanoparticles (Zn NPs) on crop plants.

In biological systems, zinc plays significant roles in a wide variety of metabolic processes such as carbohydrate, lipid, nucleic acid, and protein synthesis as well as their degradation. In view of these the present investigation was taken up to study the effects of Zn NPs on seedling growth and biochemical responses of *Cyamopsis tetragonoloba* (L.) Taub. an economic plant grown as vegetable.

MATERIALS AND METHODS

Description of the materials

The seeds of *Cyamopsis tetragonoloba* (L.) Taub. Var. Pusa Navabahar were obtained from Seed Unit, Department of Seed Technology, University of Agricultural Sciences, Dharwad. The Zinc nanoparticles of size <50nm and purity ≥ 99% trace metal basis were procured from Sigma Alderich Co. The nanoparticles were subjected for HR-SEM imaging for confirmation of shape and size. The EDAX analysis was performed to confirm the purity and elemental nature of the nanoparticles. HR-SEM imaging revealed the hexagonal shape of the nanoparticles and EDAX analysis confirmed the purity of nanoparticles.

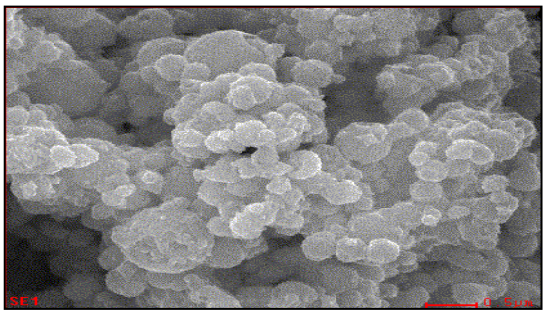

Fig.1. HR SEM Image of nanoparticles

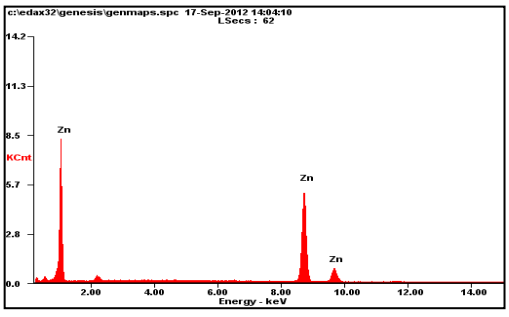

Fig.2. EDAX Spectrum of Zn nanoparticles

Experimental Design and Data observation

Seed treatment and Germination experiments

To study the effect of different concentrations of Zinc nanoparticles on germination of *Cyamopsis tetragonoloba* seeds, a complete randomized design with three replicates was employed. The experimental treatments included four concentrations viz, 50,100,200 and 500ppm of Zinc nanoparticles and distilled water as control. The experiments were conducted in laboratory conditions at Environmental Biology Laboratory P. G. Dept. of Botany. Karnatak University, Dharwad.

Seeds of uniform size were selected and surface sterilized using 0.2% Mercurous Chloride. The surfaces sterilized and seeds were soaked in nanoparticles suspensions and in distilled water for 24 hours. Imbibed seeds were then transferred to the petriplates containing wet filter papers. Ten milliliters of treatment (Zn NP's suspension) was added to each petridish and distilled water for control. The germination tests were conducted according to the rules of International Seed Testing Association, ISTA (2009).The seeds were considered to be germinated when the radical attained a length of 1mm and the plumule has just unfolded.

Assessment of Morphological and Biochemical responses

Imbibed seeds (10seeds/pot) were transferred to study the morphological and biochemical responses. The pots were irrigated with the nanoparticles suspensions of respective concentration and a control (Distilled water) on alternate days. After 30 and 60 days of growth, the plants were uprooted for morphometric analysis like measurement of root length, shoot length, number of root hairs and number of leaves. To study the biochemical responses the leaves of treated and control plants were used for estimation of Chlorophyll, Protein, Proline and Carbohydrate content. The Chlorophyll content was estimated by the Arnon's method (Arnon 1949), Protein content by Bradford's method (Bradford 1976), Proline content by Bates method (Bates et al.1973) and the Carbohydrate content was estimated by Anthrone method (Yemm and Willis 1954).

Transmission Electron Microscopic Study:

Roots of 30days old plants were cut into small pieces of 2×2 mm and fixed in 2.5% glutaraldehyde and 2% paraformaldehyde in 0.1 M sodium phosphate buffer (pH 7.3) for 12

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hours at 40ºC. After wash in buffer, the samples were post fixed in 1% OsO_4 for 1 hour at 40ºC. The samples were dehydrated in an ascending grade of acetone, infiltrated and embedded in araldite CY 212 (TAAB, UK). Sections (1 µm) were cut with an ultra microtome, mounted on to glass slides, stained with aqueous toluidine blue and observed under a light microscope for gross observation of the area and quality of the tissue fixation. For electron microscope examination, thin sections of grey-silver color interference (70-80 nm) were cut and mounted onto 300 mesh-copper grids. Sections were stained with alcoholic uranyl acetate and alkaline lead citrate, washed gently with distilled water and observed under a Morgagni 268D transmission electron microscope (Fei Company, Netherland) at an operating voltage 80 kV. Images were digitally acquired by a CCD camera (Mega view III, Fei Company) using iTEM software (Sift Imaging System, Munster, Germany) attached to the microscope.

Statistical analysis:

All the experiments were conducted in triplicate and the values are expressed as Mean±SD. The values were statistically analyzed by two way ANOVA followed Duncan's Post-hoc test using statistical software SPSS ver.16.

RESULTS AND DISCUSSION

Effect of Zn NPs on seed germination

The experiments were conducted to evaluate the effect of Zn NPs on seed germination of *Cyamopsis tetragonoloba* revealed the positive effect of Zn NPs treatment over seed germination. Percentage of seed germination enhanced in the treatments of 50, 100 and 200 ppm but, it showed decrease in higher concentration of 500 ppm compared to control. However, it is reported that Zn NPs treatment increased the seed germination percentage of *Abelmoschus esculantus* irrespective of its concentration (Gokak and Taranath 2015b). The highest germination percentage 97.5 was achieved in 200 ppm treatment. This enhanced germination may be attributed to the photo sterilization and photo generation of active oxygen species such as superoxide and hydroxide anions that enhance seed stress resistance and encourage capsule penetration for intake of water and oxygen needed for quick germination (Khot et al.2012). Zn NPs treatment executed negative impact over mean germination time and germination rate. Both mean germination time and the germination rate decreased in all treatments (Table No.1). Similarly, Zn NPs treatment delayed the mean germination time and germination rate of *Macrotyloma uniflorum* seeds (Gokak and Taranath 2015a).

Hassan *et al.* 2012 reported the same phenomenon in *Foeniculum vulgare* where the percentage of seed germination increased in 1,2,10 and 100 ppm of TiO_2 NPs. However 500 ppm of TiO_2 NPs treatment did not show any significant effect over the germination. Similarly the Anatase TiO_2 NPs treatment increased percentage of seed germination in *Petroselinum crispum* in-vitro. The highest percentage (92.46%) was achieved in 40 mg/ml of Anatase TiO_2 NPs which was almost double than the control. (Dehkourdi and Mosavi, 2013). The multiwalled carbon nanotubes (MWCNT) treatment also increased the germination of mustard seeds indicating their beneficial role(Anindita et al.2011).

Table No.1: Effect of different concentrations of Zn NP's on seed germination of Cyamopsis *tetragonoloba* (L.) Taub.

Concentration (ppm)	Treatment	*Cyamopsis tetragonoloba*		
		% G	**MGT**	**GR**
Control	**Zn NP's**	82.5±2.5 ^{a}	2.02±0.02^{b}	9.28±0.25^{a}
50		87.5±2.5 ^{ab}	1.96±0.07^{b}	8.78±2.12^{a}
100		92.5±2.5 ^{bc}	1.53±0.03^{a}	8.83±1.04^{a}
200		97.5±2.5 ^{c}	1.55±0.03^{a}	8.83±0.58^{a}
500		80±4.082 ^{a}	1.51±0.02^{a}	9.5±0.50^{a}

Note: Values represent Mean±SD of three replicates. Means in each column followed by similar letters are not significantly different at the 5% probability level using Duncan's test

Effect of nanoparticles on plants growth

The growth responses of *Cyamopsis tetragonoloba* to Zn NPs treatment in terms of root length shoot length, seedling length, number of root hairs, number of leaves and leaf surface area are shown in Table 2. Zn NPs treatment executed a negative effect over the root length in all treatments. Root length decreased in all treatments in both 30 and 60 days plants as compared to control. However a little increases of 0.3cm was observed in 30 days old plants treated with 100 ppm of Zn NPs. No significant effect of Zn *NPs* treatment on shoot length was observed in all treated plants.

The maximum shoot length 9.07 cm and a minimum 7.43 cm were achieved in 30 days old plants at 50 and 100 ppm concentration of Zn NPs respectively and a shoot length of 8.67cm was achieved in control. However the opposite results were observed in 60 days old plants where the shoot length increased in 100 and 500 ppm treatment. Similarly no significant effect of Zn

NPs treatment was observed on root and shoot growth in *Cucumis sativus* (Kim et al. 2011). The seedling growth of rye grass was retarded with shorter root and shoots on treatment with Zn^{2+} and ZnO NPs at the concentration higher than 50mg/L. Toxic symptoms were more severe in Zn^{2+} treatment compared to ZnO NPs. The shoots became yellow in Zn^{2+} with concentration higher than 50mg/L and the seedlings almost withered to death at 1000mg/L of Zn^{2+} (Lin and Xing 2008). Similarly seedling length of *Cyamopsis tetragonoloba* decreased in all concentration showing the negative effect of Zn NPs on seedling growth however length of 60 days old seedling increased in 500 ppm treatment. Number of root hairs decreased in all treatments both in 30 and 60 days old seedling indicating the negative effect of Zn NPs over the absorption machinery of the plants system. This negative effect of Zn NPs on absorption machinery can be attributed to the retardness in the growth of seedlings due to poor absorption machinery. Zn NPs treatment executed negative effect on the leaf surface area. Leaf surface area reduced in all treatments in 30 days old plants compared to control. However, no significant effect of this was observed in 60 days old plants.

Effect of Zn NPs on biochemical constituents

The biochemical responses of *Cyamopsis tetragonoloba* treated with different concentrations of Zn NPs were presented in Table. 3. The presented biochemical responses include chlorophyll, protein, carbohydrate and proline contents in the leaves of 30 and 60 days old treated and control plants. Protein content increased in all treatments of Zn NPs except 200 ppm in 30 days old plants which is similar to control. Similarly the Zn NPs treatment enhanced the protein production in *Abelmoschus esculantus* (Gokak and Taranath 2015b). Protein content decreased in al treatments in case of 60 days old plants evidencing the negative effect of Zn NPs treatment over the protein synthesis. The proline content increased significantly in all treatments of Zn NPs in 30 days old plants except 500 ppm treatment where proline content decreased. Similarly the enhanced proline content was found in 60 days old plants in all treatments except 200 ppm treatment which is the lowest 0.02 µmoles/gm compared to control 0.03 µmoles/gm. The highest proline content of 2.55 µmoles/gm was observed in 30 days old plants treated with 200 ppm Zn NPs. This enhancement in the proline content can be attributed to the stress on the plants.

The carbohydrate content increased in all treatments, both in 30 and 60 days old plants except 60 days old plants with 500 ppm treatment. The highest carbohydrate content 41.65 mg/gm was achieved in 30 days old plants with 50 ppm treatment and the lowest 15.52 mg/gm in 60 days old plants with 500 ppm treatment. Similar phenomenon was observed in *Phaseolus vulgare* and *Zea mays* (Hediat MHS., 2012) but the negative effect of Zn NPs was observed in *Abelmoschus esculantus* (Gokak and Taranath 2015b) where the carbohydrate content decreased drastically on exposure to Zn NPs. The carbohydrate content enhanced on exposure to Ag NPs with concentrations of 20, 40 and 60 ppm. The chlorophyll content decreased in all treatment compared to control in case of 30 days old plants whereas the enhancement is observed in 60 days old treated plants. This enhancement in chlorophyll content can be attributed to the enchanced uptake of Zn NPs over time.

Bioaccumulation of Zn NPs

TEM images of the cross sections of roots of 30 days old *Cyamopsis tetragonoloba* plants treated with 200 ppm and 500 ppm of Zn NPs showed the accumulation of Zn NPs on cell wall, intercellular space as well as inside the cells (Fig. 3). TEM images of higher magnification revealed the accumulation of Zn NPs inside the cell organelles like mitochondria (Fig.3.E).

Table No. 2. Effect of different concentrations of Zn NP's on growth of *Cyamopsis tetragonoloba* (L.) Taub.

Duration (days)	Treatment	Concentration (ppm)	Root length (cm)	Shoot length (cm)	Seedling length (cm)	No. of root hairs	No. of leaves	Leaf area (cm^2)
30	Zn NP's	Control	4.40±0.26^{b}	8.67±1.99^{a}	13.07±2.14^{a}	8.00±1.00^{a}	4.67±0.58^{a}	3.75±0.50^{b}
		50	3.37±0.15^{ab}	9.07±0.96^{a}	12.43±0.85^{a}	4.67±2.52^{a}	4.67±0.58^{a}	3.58±0.29^{b}
		100	4.70±0.60^{ab}	7.43±0.32^{a}	12.13±0.87^{a}	6.33±1.53^{a}	5.00±0.00^{a}	2.92±0.58^{b}
		200	2.70±0.70^{a}	8.70±1.13^{a}	11.40±1.51^{a}	6.00±1.00^{a}	4.00±0.00^{a}	2.50±0.66^{a}
		500	3.57±0.15^{ab}	8.33±1.63^{a}	11.90±1.61^{a}	6.33±0.58^{a}	4.33±0.58^{a}	3.68±0.54^{b}
60		Control	9.37±3.73^{b}	39.03±17.52^{a}	48.40±19.92^{a}	18.00±11.36^{a}	11.00±4.58^{a}	4.80±0.49^{b}
		50	8.47±1.96^{ab}	37.30±1.55^{a}	45.77±3.09^{a}	11.33±5.69^{a}	10.00±1.00^{a}	4.03±0.15^{b}
		100	8.13±1.70^{ab}	40.87±11.52^{a}	49.00±13.22^{a}	12.33±9.29^{a}	11.00±3.46^{a}	4.40±0.77^{b}
		200	5.27±1.19^{a}	31.33±11.32^{a}	36.60±12.50^{a}	7.33±3.51^{a}	10.33±3.06^{a}	3.45±0.64^{a}
		500	8.37±3.71^{ab}	43.90±12.32^{a}	52.27±14.66^{a}	15.00±11.36^{a}	10.00±3.61^{a}	4.90±0.69^{b}

Note: Values represent Mean±SD of three replicates. Means in each column followed by similar letters are not significantly different at the 5% probability level using Duncan's test.

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Table No. 3: Effect of Zn NP's treatment on biochemical traits of *Cyamopsis tetragonoloba* (L.) Taub.

Duration (days)	Treatment	Concentration (ppm)	Protein (mg/gm)	Proline (mg/gm)	Carbohydrate (mg/gm)	Chl a (mg/gm)	Chl b (mg/gm)	Total Chl (mg/gm)
30	Zn NP's	Control	7.54±0.16^{d}	0.78±0.033^{b}	22.59±0.051^{a}	0.94±0.005^{a}	0.35±0.007^{a}	1.29±0.12^{a}
		50	11.54±0.16^{e}	1.91±0.025^{d}	41.65±0.051^{d}	0.95±0.015^{c}	0.32±0.005^{a}	1.27±0.010^{c}
		100	9.22±0.23^{b}	1.61±0.055^{c}	37.08±0.551^{c}	0.91±0.00^{d}	0.03±0.00^{c}	1.21±0.00^{e}
		200	7.53±0.003^{a}	2.55±0.037^{e}	37.41±0.102^{c}	0.82±0.002^{b}	0.27±0.00^{b}	1.09±0.002^{b}
		500	8.92±0.55^{c}	0.48±0.003^{a}	34.96±0.051^{b}	1.03±0.00^{c}	0.36±0.003^{c}	1.40±0.003^{d}
60		Control	14.22±0.12^{d}	0.03±0.00^{b}	16.70±0.088^{a}	0.93±0.001^{a}	0.36±0.001^{a}	1.28±0.001^{a}
		50	10.54±0.07^{e}	0.64±0.00^{d}	30.34±1.032^{d}	1.13±0.001^{c}	0.40±0.001^{a}	1.53±0.001^{c}
		100	10.24±0.19^{b}	0.16±0.00^{c}	19.97±0.00^{c}	1.26±0.00^{d}	0.48±0.00^{c}	1.75±0.00^{e}
		200	10.36±0.32^{a}	0.02±0.00^{e}	19.82±0.051^{c}	1.12±0.001^{b}	0.48±0.001^{b}	1.60±0.001^{b}
		500	11.65±0.24^{c}	0.20±0.00^{a}	15.52±0.051^{b}	1.05±0.00^{c}	0.42±0.002^{c}	1.47±0.002^{d}

Note: Values represent Mean±SD of three replicates. Means in each column followed by similar letters are not significantly different at the 5% probability level using Duncan's test.

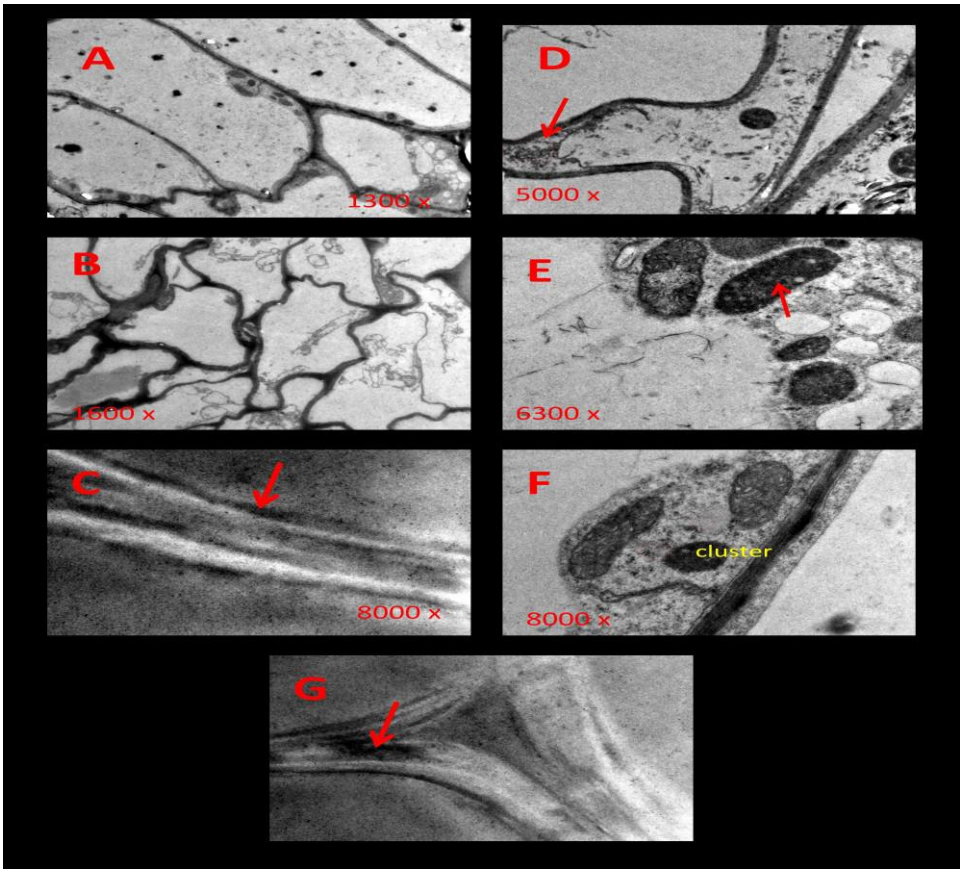

Fig.3. TEM images of *C. tetragonoloba* root cells upon treatment with control (A&B), 200 ppm (C&D) of Zn NPS 500 ppm (E, F&G) of Zn NPS

CONCLUSION

The investigation carried out to evaluate biouptake of Zn NPs and its effect on morphological, biochemical and antioxidative responses of *Cyamopsis tetragonoloba* revealed the positive effect of treatment over the seed germination , percentage of seed germination enhanced in all treatments but it had a negative effect over the mean germination time and germination rate. Zn NPs treatment has shown negative effect on the root growth in all treatments. However, no significant effect of treatment was observed on shoot and seedling growth. The number of root hair also reduced in all treated plants indicating the negative effect of Zn NPs over the absorption machinery of the plants system. The protein content decreased in all treatments evidencing the negative effect of Zn NPs treatment over the protein synthesis. The carbohydrate content increased in all treatments both in case of 30 and 60 days old plants indicating the positive effect of treatment over carbohydrate synthesis. The proline content increased in all treatments both in 30 and 60 days old plants indicating the stress of Zn NPs on the plants. TEM images of the cross sections of 30 days old plants treated with 200 and 500 ppm of Zn NPs revealed the biouptake and accumulation of Zn NPs on cell walls, intercellular space as well as inside the cells. The higher magnification TEM images revealed their accumulation inside the cell organelles like mitochondria. Further it is suggested to undertake the necessary investigations to examine the interaction of nanoparticles resulting in phytotoxic as well as positive effect on growth of plants.

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Diversity of Medicinal Plants in Murgud City, Tal. Kagal, Dist. Kolhapur, (M.S.), India

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ABSTRACT:

[The present work is carried out to study the Medicinal Plants diversity of Murgud City, Kolhapur district, Maharashtra.The present survey was conducted during the month of January, 2019.The Standard keys and references were used for identification of different Medicinal Plants species.The total 101 species of Medicinal plants were recorded during the study.]

KEY WORDS: Medicinal Plants, Diversity, Murgud City.

INTRODUCTION:

Biodiversity plays a key role in the livelihoods of tribes and other people to meet their needs in day-to-day life. The plant kingdom is directly connected with human beings from the beginning of its origination in the universe (Elizabeth, M. and Dowde Swell, D. 1995)

Plants are one of the most important sources of medicines. The application of plants as medicines dates back to prehistoric period. In India the references to the curative properties of some herbs in the Rig-Veda seems to be the earliest records of use of plants in medicines. The medicinal plants are extensively utilized throughout the world in two distinct areas of health management; traditional system of medicine and modern system of medicine. The traditional system of medicine mainly functions through two distinct streams (Holley J, Cherla K. 1998) Local or folk or tribal stream and, (IUCN) Codified and organized Indian system of medicines like Ayurveda Siddha and Unanni etc. Medicinal plants are used at the household level by women taking care of their families at the village level. Recent estimates suggests the over 9,000 plants have known medicinal applications in various cultures and countries, and this is without having conducted comprehensive research amongst several indigenous and other communities (Farnsworth NR, Soejarto DD.1991).

According to Schippmann et al. (2002) more than 50000 species are used for medicinal purposes worldwide, of which almost 13% are flowering plants. Over 8000 plant species are used in traditional and modern medicine in India (Planning Commission 2000), and 90-95% collection

of medicinal plants is from the wild, of which more than 70% collection involves destructive and unscientific extraction. Over exploitation of trade species, destructive way of collection, vulnerability due to anthropogenic pressure are some of the major threats to medicinal plants. In order to achieve sustainable harvest of medicinal plants and other non-timber forest products (food (wild edibles), fuel, fodder, timber, making agricultural tools, fiber, religious and various other purposes), a multi-disciplinary approach must be considered which include ecological, biological, socio-cultural and economical aspects of the species 48 (Grimier et al. 2004).

MATERIALS AND METHODS:

The Murgud city area has a wide distribution of medicinal plants which was made as the main objective of the present study. The present survey was conducted during the month of January, 2019. The distribution of these medicinal plants/tree were identified the aid of taxonomists from Dept. of Botany, Sadashivrao Mandlik Mahavidhyala Murgud college. An effective analysis has been performed to identify the available medicinal plants along with their distribution and their medicinal uses.

STUDY AREA: Murgud is located at 16.4°N 74.2°E. It has an average elevation of 556 meters (1824 feet). Murgud is having 11.71 km2 area.

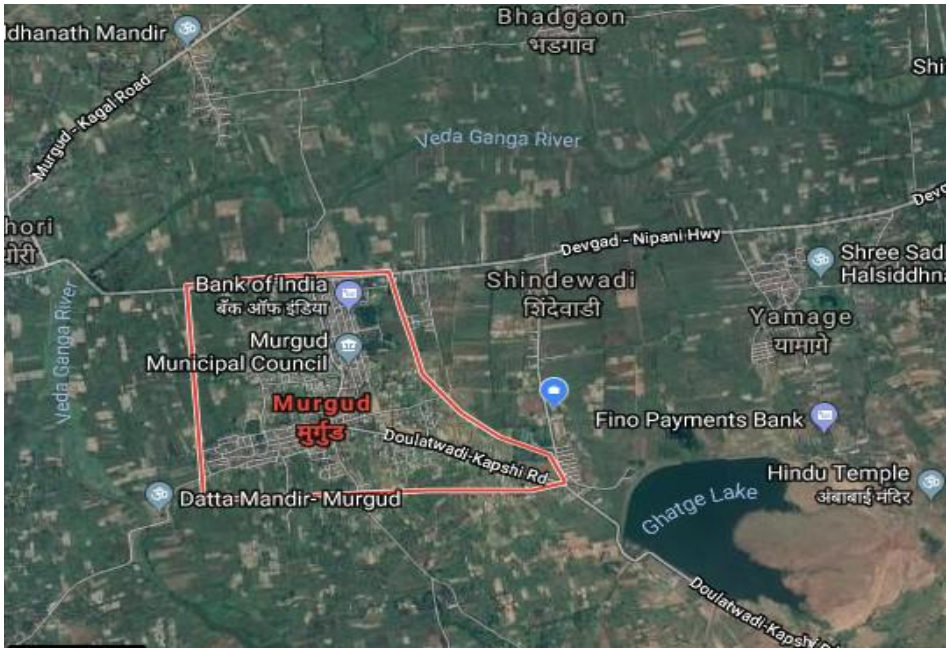

Fig 1:- Location of Murgud City Kolhapur, Maharashtra, India.

RESULT AND DISCUSSION:

Table No.1: List of medicinal plant There family and Common Name

Sr. No.	Family	Botanical Name	Common Name
1	Acanthaceae	*Justiciaadhatoda L.*	Adulsa
2	Acantheaceae	*Tylophoraindica*	Pitmary
3	Amaranthaceae	*Achyranthesaspera L*	Aghada
4		*Amaranthus viridis*	Math
5	Anacardiaceae	*MangiferaIndica*	Mango
6	Annonaceae	*Annonasquamosa L.*	Sitaphal
7		*AnnonaSquamosa*	Custurd Apple
8	Apocyanaceae	*Vincarosea/Catharanthusrosea*	Sadabahar
9		*Carissa carandus*	Karvand
10		*HemidesmusIndicus*	Anandmul
11		*Nerium oleander*	Kanery
12	Arecaceae	*Cocosenucifere*	Coconut
13	Asclepiadaceae	*Calotropisgigantia (L.)*	Rui/Baddavan
14	Asphodelaceae	*Aloe vera*	Korphad
15	Asteraceae	*Tridaxprocumbens*	Coat Button
16		*Ecliptaprostrata*	Maka
17	Bignoniaceae	*Spathodeacampanulata*	Shevaga
18		*Cassia occidentalis L*	Kasod
19		*Cassia fistula*	Bahava
20	Ceasalpiniaceae	*Cassia tora L.*	Puma
21		*Carica papaya*	Papaya
22		*Bauhinioacuminale*	Rakta-Kanchan
23	Cleomaceae	*Cleimegunandea*	
24	Combretaceae	*Termaniaarjuna*	Sadaru
25		*Terminaliacatappa*	Tropical Amond
26	Convolvulaceae	*Cunvolvulusarvensis*	Chandvel
27	Crassulaceae	*Bryophyllumcalycinum*	Parnphuti
28	Cucurbitacaeae	*Cocciniagrandis*	Tondli
29	Cyperaceae	*cyperusrotundus*	Lavhale
30	Euphorbiaceae	*Croton bonplandianum*	Ban Tulsi
31		*Ricinumcommunis*	Arandi
32		*Emblicaofficinalis*	Amla
33		*Phyllanthousamarus*	BhumiAmla
34		*Euphobriahirta*	Dudhi
35		*Jatrophacurcas*	Bharanda
36	Fabaceae	*Sarakaasoca*	Sita Ashok
37		*Tamarindusindica*	Chich
38		*Indigoferalinnaei*	Bhigule
39		*Desmodiumtriflorum*	Ran Methi

40		*TrigonellaFoenumGracum*	Methi
41		*Sesbaniagrandiflora*	Hadaga
42		*Trigonallafoenum – graecum*	Fenugreek
43		*Acacea Arabica*	Reetha
44		*Acacia concinna*	Shikakai
45	Lamiaceae	*Tectonograndic*	Teak
46		*Ocimum Santum*	Tulsi
47		*Menthapiperita*	Pippermint
48		*MenthaLongifolie*	Pudina
49	Leguminaceae	*Acacia nilotica*	Babul
50		*Buteamonosperma*	Palas
51	Liliaceae	*Allium sativum L.*	Lasun
52		*Asparagus racemosusWilld.*	Satavari
53	Lythraceae	*Lawsonnioiermis*	Henna
54		*PunicaGranatum*	Pomegranate
55		*LagerstromiaIndica*	Savani
56		*Lawsoniainermis L*	Mehndi
57	Magnoliaceae	*Micheliachampaca*	Chapha
58	Malveceae	*HibicusrosaSinensis*	Jasvand
59		*BombaxCeiba*	Kate Savar
60	Meliaceae	*Azaribactaindica*	Neem
61	Menispermaceae	*Tinosporacordifolia (L.)*	Gulvel
62	Mimosaceae	*Acacia nilotica (L.)*	Babul.
63		*Mimosa pudica*	Lajalu
64	Moraceae	*Ficusbenjamia*	Fig
65	Moraceae	*Ficusreligiosa*	Peepal
66	Moringaceae	*Moringaoleifera*	Drumstick
67	Musaceae	*Ficushispida L*	Dumur
68		*Ficusracemosa L.*	Gular
69		*Musa paradisiaca L.*	Kela
70	Myrtaceae	*Syzygiumcumini*	Janbole
71		*SyzygiumCumini*	Jambul
72		*Psidiumguajava*	Guava
73		*Eucalyptus globulus*	Nilgiri
74	Nyctanthaceae	*Boerhaviadifusa*	Ghetoli
75		*Bougainvinneaglabra*	Booganvel
76		*Nyctanthes arbor-tristis L*	Parijatak
77	Oxalidaceae	*Oxalis corniculate*	Amboshi
78	Papaveraceae	*Argemone Mexicana*	PivlaDhotra
79	Passifloraceae	*Ficusbenghalensis*	Banyan Tree
80	Poaceae	*Cymbopogon citrus*	Lemon Grass
81		*Bambusa vulgaris*	Bamboo
82	Portulaceae	*Portulocaoneracea*	Ghol

83	Rhamnaceae	*Ziziphus jujube*	Ber
84	Rosaceae	*Rose L.*	Gulab
85	Rubiaceae	*Ixoracoccinea*	Ixora
86	Rutaceae	*Citrus maxima L*	Idlimbu
87		*Aeglemarmelous*	Bael
88		*Murrayakoenigii*	Curry
89	Santalaceae	*Santalum album L.*	Chandan
90	Sapotaceae	*ManilkaraZapota*	Chikoo
91	Solanaceae	*Daturastramonium L*	Dhotra
92		*SolonumNigrum*	Laghukavali
93		*Daturasuareolens*	Dhatura
94		*Daturafastuosa*	Dhatura
95		*Withania somniferous (L.)*	Aswagandha
96	Verbinaceae	*Lantana camera*	Tantani
97		*Vitexnegundo*	Nirgundi
98		*Clerodendromfriagrans*	Bhandira
99	Vitaceae	Cissus quadrangularis	Harjora
100	Zingiberaceae	*Curcuma Longa*	Halad
101		*Zinjiberofficinale*	Ale

Table 2: List of medicinal plant its Habitat, Part Used and medicinal important.

Sr. No.	Habitat of The Plant	Botanical Name	Part Used	Medicinal Imp
1	Tree	*Acacea Arabica*	Fruit, Leaves, Seeds	Diabetes, Skin Dieses and Cancer
2	Shrub	*Acacia concinna*	Fruit , Seed	Shine And Softness To Hairs, Delays Grey Hair, Heals Minor Wounds.
3	Tree	*Acacia nilotica*	Stem Bark, Fruit, Gum, Seeds	To Treat Fever, Gonorrhea, Diarrhea, Diabetes
4	Tree	*Acacia nilotica (L.)*	Leaves And Seeds	Immunization: Handful Immature Seeds Crushed And Given With Water For Seven Days.
5	Shrub	*Achyranthesaspera L*	Seed, Root, Shoot	Cramps: Handfull Crushed Roots Given With Fodder Twice A Day For Two Days.
6	Tree	*Aeglemarmelous*	Leaves	Diarrhea, Dysentery, Constipation
7	Herb	*Allium sativum L.*	Bulb	Fever And Cough: 2-3 Bulbs Crushed And Given Along With Fodder Twice A Day

				For Seven Days. Postnatal Swelling & Injuries: Garlic Boiled In Coconut Oil And Oil Is Applied Over Accessible Delivery Passage.
8	Herb	*Aloe vera*	Stem	Treat Constipation, Skin Condition Acne, Antibiotic And Antiseptic In Wound Healing, Anti-Oxidant, Reduce Itchiness And Inflammation.
9	Herb	*Amaranthus viridis*	Leaves	Diarrhea, Dysentery, Fever, Malaria Night Blindness
10	Tree	*AnnonaSquamosa*	Fruit, Leaves	Treating Diarrhea, Dysentery, Colds, Chills, Sleeplessness, Anticancer, Levels In The Blood
11	Small Tree Or Shrub	*Annonasquamosa L.*	Leaves, Fruit	Use: Wounds: Paste Of Fresh Leaves Applied.
12	Herb	*Argemone Mexicana*	Leaves, Flower, Seed	Ear Inflammation, Used In Alcoholic And Non-Alcoholic Drinks For Their Psycho-Active Properties
13	Herb	*Asparagus racemosusWilld.*	Roots	Use: To Improve Lactation: Handful Roots Crushed And Given To Cattle For Seven Days.
14	Tree	*Azaribactaindica*	Leaves, Flower, Seed	Skin Disease, Healthy Hair, Improve Liver Function, and Detoxify The Blood, Pest And Disease Control, Fever Reduction, Dental Treatment, Cough, Asthma, Ulcer, Piles, Intestinal Worms, Urinary Diseases.
15	Tree	*Bambusa vulgaris*	Leaves, Fruit	Protection Against Oxidative Stress, Inflammation, Lipotpxicity
16	Tree	*Bauhinioacuminale*	Stem	Throat Infection, Effective In Cold An Cough, Respiratory Ailments, Skin Disease
17	Herb	*Boerhaviadiffusa*	Leaves, Seeds	Treatment Of Anemia, Liver Diseases
18	Tree	*BombaxCeiba*	Leaves, Flowers, Seeds	Chronic Inflammation Of Bladder, Kidney, Skin

				Irruption, Boils, Acne, Pimples, Chickenpox, Smallpox Used In Diarrhea, Dysentery, Bleeding Piles
19	Shrub	*Bougainvinneaglabra*	Leaves, Flower	Diarrhea, Reduce Stomach Acidity, Used For Cough, Cure Diabetes, Stems Help In Hepatitis
20	Herb	*Bryophyllumcalycinum*	Leaves	Treatment Of Cough, Used To Treat High Blood Pressure, Prevent Any Kind Of Cardiac Problem, Treatment Of Constipation, Treatment Of Boil, Treatment Of Roundworms natural Remedy For Ear Pain, Anti-Diabetic Property.
21	Tree	*Buteamonosperma*	Leaves, Flower	General Health Tonic, Treatment Of Liver Disorder
22	Shrub	*Calotropisprocera L.*	Root, Stem Bark, Latex, Leaves, Flowers	Effective In Treating Skin, Digestive, Respiratory, Circulatory And Neurological Disorders, Fever, Nausea, Vomiting, Diarrhea, Cancer
23	Tree	*Carica papaya*	Fruit, Leaves	Constipation, Glandular Tumors, Blood Pressure, Dyspepsia, Malaria, Cancer Cell Growth, Diabetes
24	Shrub	*Carissa carandus*	Leaves, Flowers, Fruit	Constipation, Diarrhea
25	Tree	*Cassia fistula*	Leaves, Flowers	Treatment Of Inflammatory Swellings And As A Cleaning Agent For Ulcer, Antiseptic
26	Herb	*Cassia occidentalis L*	Leaves, Seeds, Roots	Skin Whitening, Liver Tonic, Digestive
27	Herb	*Cassia tora L.*	Leaves, Seed, Root	Use: To Improve Lactation: Handful Seeds Crushed And Are Soaked In Water For Overnight And Given In The Morning For Fifteen Days.
28	Small Tree Or Shrub	*Citrus maxima L*	Leaves, Fruits	Improve Digestive Health, Maintain Blood Pressure, Help Individual Fight Infection, Slow Down Aging, Improve Heart Health. Help With Blood Formation.

29	Shrub	*Cleimegunandea*	Leaves	It also contains vitamin E, iron, and oxalic acid. Generally, the leaves are about 4.0% protein. The leaves also have ant oxidative properties that can help with inflammatory diseases.
30	Shrub	*Clerodendromfriagrans*	Leaves, Stem	Cold, Hyperpyrexia, Asthma, Dysentery, Hypertension, Toothache, Leprosy, Leucoderma
31	Herb	*Cocciniagrandis*	Leaves	Used To Treat Leprosy, Fever Asthma, Bronchitis And Jaundice
32	Tree	*Cocosenucifere*	Fruit	Anti-Bacterial, Anti-Fungal, Anti-Viral, Anti-Parasitic, Anti-Dermatophytic, Immune stimulant, Hepatoprotective
33	Herb	*Croton bonplandianum*	Leaves	Gallbladder Problems, Blocked Intestine, Malaria
34	Herb	*Cunvolvulusarvensis*	Leaves, Flower	Used As A Wash For Spider Bites, Treatment Of Fever, And Wound reduce Excessive Menstrual Flow
35	Herb	*Curcuma Longa*	Roots	Remedy For Cough, Diabetes, Hepatic Disorder, Anti-Cancer
36	Herb	*Cymbopogon citrus*	Leaves	Lowering Cholesterol, Preventing Infection, Boosting Oral Health, Relieving Pain Boosting RBC Level
37	Herb	*cyperusrotundus*	Leaves	Treating Fevers, Digestive System Disorders, Treat Nausea, Used For Pain Reduction, Muscle Relaxation
38	Shrub	*Daturasuareolens*	Leaves, Flower	Insecticidal, Antifungal, Anti-Inflammatory, Useful In Reliving Pain
39	Shrub	*Daturafastuosa*	Leaves, Flowers	Used To Treat Spasm Of Bronchitis In Asthma , Anti asthmatic, Hypnotic, Narcotic
40	Herb	*Daturastramonium L*	Seed, Leaves	Nausea, Dizziness, Asthma, Relieve Pain, Anti asthmatic, Antispasmodic, Narcotic, Stimulate Growth Of Hair,

				Diarrhea
41	Herb	*Desmodiumtriflorum*	Leaves, Seeds	Inducing Sweat, Promoting Digestion, Anti-Oxidant, Anti-Inflammatory, Anti-Bacterial Action
42	Herb	*Ecliptaprostrata*	Leaves, Flowers	Treatment Of Liver Disease, Liver Tonic
43	Tree	*Emblicaofficinalis*	Fruit	Immune Modulatory, Anti-Inflammatory, Antiulcer, Hepatoprotective, Anticancer.
44	Tree	*Eucalyptus globulus*	Seeds, Leaves	Asthma, Bronchitis, Head Lice, Toe Nail Fungus, Gingivitis
45	Herb	*Euphobriahirta*	Leaves	Used For Female Disorders, Respiratory Ailments, Worm Infestations in Children, Dysentery, Jaundice, Pimples, Digestive Problems
46	Tree	*Ficusbenghalensis*	Leaves, Roots	Widely Used In Diabetes, Ulcer, Omitting, Fever Inflammation, Leprosy
47	Tree	*Ficusbenjamia*	Fruit, Leaves	Antimicrobial, Ant nociceptive, Antipyretic, Hypotension, Antidisentery
48	Tree	*Ficushispida L*	Fruit	Easy And Safe Delivery: Fresh Green Leaves Along Fresh Leaves Of Bamboo Given To Cattle For Quick Expulsion Of Fetus.
49	Tree	*Ficusracemosa L.*	Fruit	To Improve Lactation: Fresh Fruits Given For Seven Days.
50	Tree	*Ficusreligiosa*	Leaves, Roots	Asthma , Diabetes, Inflammatory Disorder, Gastric Problems, Sexual Disorders
51	Herb	*HemidesmusIndicus*	Leaves, Root	Diuretic, Tonic, Anti-Pyretic, Blood Purifier, Fever, Asthma, Bronchitis, Urinary Disorder
52	Shrub	*HibicusrosaSinensis*	Flower, Leaves	Anti-Diarrhea, Used For Fertility Treatment
53	Shrub	*Indigoferalinnaei*	Leaves	Treat Sores, Nervous Disorders, To Heals Sores, Ulcers
54	Shrub	*Ixoracoccinea*	Leaves, Flowers	Used To Treat Fever, Headache And Colic

55	Shrub	*Jatrophacurcas L.*	Bharanda	Wound Inside Nose: The Latex Collected From Twigs And Applied Externally Till Cure.
56	Shrub	*Justiciaadhatoda L.*	Leaves, Root, Flower. Fruits	Swelling: Half Liter Decoction Of Stem Bark Given Orally In The Night For Two To Three Days.
57	Shrub	*LagerstromiaIndica*	Leaves, Stem	Used To Applied Externally To Wound Cuts, Treatment Of Cold
58	Shrub	*Lantana camera*	Leaves, Seeds, Flowers	Treating Variety Of Ailments, Including Cancer, Skin Itches, Leprosy, Chicken Pox, Asthma, Ulcer
59	Tree	*Lawsoniainermis L*	Leaves	Joint Pain: Paste Of Leaves Wormed And Applied Over Joints Twice A Day For 7 – 8 Days. Throat Swelling: Leaf Paste Warmed And Applied From Outside Over Throat Of Cattle.
60	Shrub	*Lawsonnioiermis*	Leaves	Dye Skin, Hair, Antiseptic For Fungal Or Bacterial Skin Infection, Help To Improve Hair Health.
61	Tree	*Mangifera indica*	Leaves, Fruit	Treatment Of Diarrhea, Hemorrhoids, Curing Dysentery,
62	Tree	*ManilkaraZapota*	Fruit, Leaves	To Treat Coughs And Colds, Diuretic, Antidiarrheal, Antibiotic, Anti-Hyperglycemic.
63	Herb	*MenthaLongifolie*	Leaves	Good for wind and colic in the stomach,helps the King's evil or kernels in the throat. etc.
64	Herb	*Menthapiperita*	Leaves	Used for the treatment of indigestion, pain in joints, diarrhea, cough, dysmenorrhea and fever
65	Tree	*Micheliachampaca*	Flowers	Diabetes, Quick Wound Healing, Cardiac Disorder, Gout, Dysuria
66	Herb	*Mimosa pudica*	Leaves, Flower	Treatment Of Urino Genital Disorders, Piles, Dysentery, Sinus, Applied On Wounds

67	Tree	*Moringaoleifera*	Leaves, Fruit	Diabetes, Cardio Vascular System Protection, Brain Heath, Protect The Liver
68	Tree	*Murrayakoenigii*	Leaves, Flower	Fight Diabetes, Improve Digestion, Lower Cholesterol, Prevents Greying Of Hair,
69	Herb	*Musa paradisiaca L.*	Fruit	Diarrhea: Fresh Leaves Given As Fodder Twice A Day For Three Days.
70	Tree	*Musa sapientum*	Fruit	Hypertension, Migraine, Cancer Treatment, Diarrhea, Cholesterol, Diabetes
71	Small Tree	*Nerium oleander*	Leaves, Flower	Used For Heart Condition, Ringworm, Malaria, Cancer, Painful Menstrual Periods, Epilepsy, Asthma, Indigestion
72	Shrub Or Tree	*Nyctanthes arbor-tristis L*	Flowers, Leaves	Intestinal Worms: Fresh Handful Leaves Given Orally In The Morning For 8-10 Days
73	Herb	*Ocimum Santum*	Leaves	Recommended For The Treatment Of Bronchitis, Malaria, Diarrhea, Dysentery, Skin Disease, Arthritis, Eye Disease, Insect Bites.
74	Herb	*Oxalis corniculate*	Leaves	Used As Stringent, Antiscorbutic, Diuretic, Stomachic, Febrifuge, Urinary Tract Infection, Diarrhea
75	Tree	*Phyllanthousamarus*	Leaves, Roots, Fruit	Immuno modulatory, Anti-Inflammatory, Antiulcer, Hepatoprotective, Anticancer. Joundice
76	Herb	*Portulocaoneracea*	Entire Plant	Cardiac Tonic, Emollient, Muscle Relaxant, Anti-Inflammatory, Diuretic Treatment
77	Tree	*Psidiumguajava*	Fruit, Leaves, Flowers	Diarrhea, Dysentery, Gastroenteritis, Hypertension, Diabetes, Pain Relief, Cough, Oral Ulcer, To Improve Coordination, Liver Damage Inflammation
78	Tree	*PunicaGranatum*	Leaves, Fruit, Flower	Treat Sore Throats, Coughs, Urinary Infection, Digestive Disorders, Skin Disorders,

				Arthritis, To Expel Tapeworms, Cancer Treatment
79	Shrub	*Ricinumcommunis*	Seeds, Leaves	Abdominal Disorder, Arthritis, Backache, Muscle Aches, Gallbladder Pain, Period Pain, Sleeplessness
80	Shrub	*Rose L.*	Leaves, Flower	Provides Cooling, Soothing Effect To Eyes, Tear Eye Infection
81	Tree	*Santalum album L.*	Heart Wood, Leaves,	Treatment Of Common Cold, Bronchitis, Skin Disorder, Fever, Genera Weakness, Infection Of Urinary Tract, Inflammation Of Mouth And Pharynx, Liver And Gallbladder.
82	Tree	*Sarakaasoca*	Leaves, Flower	Great Benefit To Irritation And Burning Sensation In The Skin And Complexion , Cure Diabetes
83	Herb	*Sesbaniagrandiflora*	Leaves, Flowers	Swelling, Dysentery, Sinus Congestion, Malaria, Fever, Diabetes
84	Herb	*SolonumNigrum*	Whole Plant	Anti-Tumorigenic, Antioxidant, Anti-Inflammatory, Hepatoprotective, Diuretic, Antipyretic.
85	Tree	*Spathodeacampanulata*	Leaves, Fruit	Malaria, HIV, Diabetes Mellitus, Edema, Dysentery, Constipation, Gastrointestinal Disorders, Ulcer, Skin Disease, Wounds Fevers, Urethral Infection, Liver Complaints
86	Tree	*Syzygiumcumini*	Leaves, Fruit	Treatment Of Chronic Diarrhea, Good For Diabetes, Strengthening The Teeth
87	Tree	*SyzygiumCumini*	Fruit, Leaves	Medicine For Diabetes, Stomach Problems, Treatment Of Lung Problems, Dysentery
88	Tree	*Tamarindusindica*	Leaves, Fruit	Promotes Digestion, Constipation, Promote Cardiovascular Health, Treat Anemia, Prompts Eye Sight,

				Cures Scurvy, Cures Thyroid Disorders, Help In Diabetes Management, Anti-Toxicant, Rich Source Of Vitamin And Minerals, Help In Weight Management, Cures Skin Infection
89	Tree	*Tectonograndic*	Leaves, Flower	Treatment Of Piles, Leucoderma And Dysentery
90	Tree	*Termaniaarjuna*	Leaves	Used For Asthma, Bile Duct Disorders, Scorpion Stings, Poisoning, Heart Remedy
91	Tree	*Terminaliacatappa*	Fruit, Leaves	Treatment Of Hepatitis, Acute Liver Injury, Dermatological Use, Rheumatoid Disease
92	Shrub	*Tinosporacordifolia (L.)*	Leaves	Gout, Pile, General Debility, Fever, Jaundice
93	Shrub	*Tridaxprocumbens*	Coat Button	Wound Healing, Anti-Coagulant, Anti-Fungal, Insect Repellent, Used For Skin Infection, Applied On Wounds
94	Herb	*Trigonallafoenum – graecum*	Seeds, Leaves	Balance Cholesterol, Digestive Problems, Reduce Appetite, Reduce Fat Mass, Maintain Liver And Kidney Health, Reduce Fever
95	Herb	*TrigonellaFoenumGracum*	Flowers, Seed	Balance Cholesterol, Digestive Problems, Reduce Appetite, Reduce Fat Mass, Maintain Liver And Kidney Health, Reduce Fever
96	Herb	*Tylophoraindica*	Leaves	Bronchial Asthma, Cancer, Inflammation, Rheumatism, Arthritis, Dermatitis
97	Herb	*Vincarosea/Catharanthusrosea*	Leaves, Flowers	Reliving Muscle Pain, Depression Of Central Nervous System, Used For Applying To Wasp Stings And To Heal Wound, Prevention Of Diabetes, To Treatment Of Stomach Ache.
98	Shrub	*Vitexnegundo*	Nirgundi	Muscle Relaxant, Pain Relieving Herb
99	Shrub	*Withania somniferous (L.)*	Leaves, Root, Bark	Restorative Tonic, Stress, Nerves Disorder, Aphrodisiac.

100	Herb	*Zinjiberofficinale*	Root	Act As An Antispasmodic And Improve The Tone Of Intestinal Muscles
101	Tree	*Ziziphus jujube*	Leaves, Fruit	Improving Muscle Strength, Weight, For Preventing Liver And Bladder Disease, Stress Ulcer.

The results on the survey of the Medicinal plant diversity in the Murgud city showed nearly 101 species of trees, Shrubs Small Trees and herbs. Among these, 101 genera belonged to 50 families. The most dominant family in the present study was Fabaceae with 09 species. Next to that, Euphorbiaceae 7 species, Solanaceae include 5 species. The overall habitat is dominated by Trees in the Murgud city. The treatments of different types of stomach disorders are considered analgesic, in case of different types of ulcers and various types of cardiovascular issues as well as, different diseases like cancer, insomnia and diabetes etc.

CONCLUSION:

The present study is relevant to plant Science study especially diversity of medicinal Plants in Murgud City. This study explains that Murgud area is rich with diversity of Medicinal plants and need to conservation in future. During the study 101 medicinal plant species of 50 families used for medicinal purposes have been documented. Majority of the species used are from families Fabaceae (09), Euphorbiaceae(06) and Solanaceae (05). The majority of habit of the plants are trees (39), Herbs (34), Shrubs (25) and Small Trees (03) etc.

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Dyeing of cotton fabric with natural dye obtained from pods of *Senna siamea* Lam.

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ABSTRACT:

[The synthetic dyes which are of wide commercial importance cause severe atmospheric and environmental pollution. Recently the use of natural dye has increased several folds in the past few years due to environmental approach of the people. Natural dyes are used in the colouring of cosmetics, drugs, food products and textiles. In the present study natural dye was extracted and isolated from pod husk of S. siamea and dyeing on cotton fabrics was evaluated. The dyeing was carried out using different mordant such as Alum, Stannous chloride, Copper sulphate and Potassium dichromate. Effect of different concentration of mordant for dyeing of cotton was investigated. The results confirmed that the obtained dye shows variety of colours with different mordant, shades of dye were light to dark yellowish brown. With increasing concentration of mordant colour strength of dye on cotton fabrics was increased. Thus the dye obtained from S. siamea might be used for dyeing of fabrics.]

Key words: Natural dye, Cotton, Mordant, *Senna siamea* Lam.

In the early period, primitive man went in search of food and ate at random plants or their parts like tubers, fruits, leaves, etc. As no harmful effects were observed he considered them as edible materials and used them as food. If he observed other effects by their eating they were considered them as inedible, and according to the actions he used them in treating symptoms or diseases. If it caused diarrhoea it was used as purgative, if vomiting it was used as emetic and if it was found poisonous and death was caused, he used it as arrow-poison. The knowledge was empirical and was obtained by trial and error. He used drugs as such or as their infusions and decoctions. The results were passed on from one generation to the other and new knowledge was added in the same way. Traditional medicine has a long history of serving people all over the world. The use of natural products with therapeutic properties is as ancient as human civilization and for a long time, mineral, plant and animal products were the main source of drugs (De Pasqual., 1984). There is an evidence of herbs being used in the treatment of diseases and for revitalizing body systems in almost all ancient civilizations. The Vedas form the earliest literature in India. They are Rigveda, Yajurveda, Samaveda and Atharvanaveda. There is no definite evidence that suggests their exact period of origin. The Vedic period in Indian history

dates back to over 5000 years. The history of medicine in India can be traced to such a remote past. The earliest mention of the medicinal use of plants was found in the Rigveda and in the Atharvanaveda (3,500-1,500 B.C.) from which Ayurveda, the ancient Indian system of medicine has developed. The Ayurvedic writings can be divided in to three main ones (Charaka Samhita, Susruta Samhita, Astanga Hrdayam Samhita) and three minor ones (Sarngadhara Samhita, Bhava Prakasa Samhita, Madhava Nidanam Samhita). Ayurveda is the term for the traditional medicine of ancient India. Ayur means “life” and veda means “the study” of which is the origin of the term. The oldest writing-Charaka Samhita- is believed to date.

Ethno -Medicinal Plants of Ramling Hill – A Sacred Grove of Sankeshwar Thasil of Belagavi District

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ABSTRACT:

[Ramling Hill is a historic holy place with beautiful temple of god Prabhu Ramchandra situated near NH - 4 highway, ten kilometers from Nipani towards south and 12 kilometers from Sankeshwar towards its north. It is located midway of the hill . This area is surrounded by hundreds of acre of land of the forest department, government of Karnataka. The area is covered with semi deciduous type of forest and very rich in phytodiversity including lower group of plants such Bryophytes, Pteridophytes and mostly dominated by an Angiosperms. This place is also rich in ethno medicinal plants. In the present study number of plants of ethno medicinal importance have been studied and listed.]

Key Words: Sacred grove**,** Ethno medicinal plants, Phytodiversity, Angiosperms

INTRODUCTION:

The conservation of the nature and natural resources is an ancient practice of the human society. They believe in nature and related things as they thought that they are related with the deity. The religious and cultural belief in god in an ancient time has protected the patches of forests and land areas and circuitously conservation of natural resources took place (Gadgil and Vartak, 1972). Sacred groves are one form of nature worship, are considered as "Sacred Natural Sites" (Oviedo, 2005). Hughes and Chandran (1997)defined the sacred groves are "segments of landscape containing vegetation, life forms and geographical features, delimited and protected by human societies under the belief that to keep them in a relatively undisturbed state is expression of an important relationship of humans with the divine or with nature." In other words sacred groves are the relic forest segments preserved in the name of religion and culture. These groves are culturally important as they are associated with temples and they manifest the spiritual and ecological ethos of rural indigenous communities which forms the way of conservation of nature (Islam et al., 1998). Sacred groves are well protected and conserved in Africa, Asia, Europe and the America. More than one lack sacred groves have been recorded from India especially from the Himalayan region, Western and Eastern Ghats, Coastal Region, Central Indian Plateau, and Western Desert (Malhotra et al., 1998). The Sacred groves are highly essential to maintain balance

of the and in the ecosystem and play an important role in air, soil, and water conservation, flora and fauna conservation, carbon sequestration, temperature control, and conservation of traditional knowledge(Sing et al., 2017)

Ramling Hill station is a holy place and is believed that once upon a time Prabhu Ramchandra visited this place .In the memories of god the temple has been created. This is a beautiful place located at the mid way of the Ramling hill. The temple is surrounded by a forest covering an area more than hundred acres and is under the supervision of forest department, Government of Karnataka. The present work emphasize on the survey of ethno medicinal plants from Ramling Hill.

MATERIALS AND METHODS:

Study area.

The present paper describes a case study of Ramling Hill sacred groves situated at tail parts of western ghat near NH-4 highway on the way to Amboli.

Latitude: 16.2333

Altitude: 74.599

Annual Rainfall: 826.64mm

Average Temperature: 29^0C

Geology:

Soil and Climate

The soil texture is sandy loam, light grey to brown in color and acidic in nature, with a pH range between 6 and 6.5. Four distinct seasons are observed in the study area, summer (March -May), Monsoon (June –mid-September), autumn (October-January), and long winter

Sampling Procedures

A preliminary survey was conducted in the area.The specimens were collected and discussed with the elderly persons and local ayurvedic practioners regarding the ethnomedicinal property of different plants and their parts used. The specimens collected were verified with the experts and with the Flora of Bombay presidency (T.Cooke, 1958) and Flora of Kolhapur District (Yadav and Sardesai, 2002).

RESULT AND DISCUSSION:

During the survey more than hundred plants were recorded and information on their ethnomedicinal uses was also recorded. Only few plants are listed in the Observation table.1. The

plants listed are almost same with few new plants mentioned from other surrounding Tahasils (Shiragave, 2015).further study is required to understand more number of medicinal plants and their uses.

Table-1 List of Ethnomedicinal plants recorded from ramling hill of sankeshwar Tahasil of Belgavi District.

Sr. No.	Botanical Name	Family	Local Name	Part Used	Uses
1	*Abrus precatorius* L.	Fabaceae	Gunj	Leaves	Leaf Chewing in case of Appetizer and Mouth ulcer
2	*Abutilon indicum* (L) Sweet	Malvaceae	Karandi / Mudra	Leaves	Eat the four to five leaves for regularity in menstrual cycle. The ten to fifteen leaves Karandi leaves (*Abutilon indicum)* and Shendvel (*Euphorbia tirucalli)* are eaten and intake of one glass of buttermilk in case of piles
3	*Accacia nilotica* (L) Willd. ex Del	Mimosaceae	Babhul	Leaves Tender shoot	Use like brush in case of tooth pains or toothache
4	*Acorus calamus*	Araceae	Vekhand	Rhizome	In case of headache the equal amount of *Acorus* and *Zingiber* rhizome pounded in paste and applied on head.
5	*Adiantum lunulatum* Burm.	Adiantaceae	Morpisi	Leaves	Leaves are taken in case of white discharge of women
6	*Aegle marmelos* L.	Rutaceae	Bel	Leaves	Crushed leaves applied on knee joint pain. One leaf of *Aegle* chewed with *Piper betle* pouch in day in case of illness or sickness
7	*Agave angustifolia* Haw.	Agavaceae	Ghaypat	Leaves	Leaves extract externally applied in case of pimples and skin diseases.
8	*Allophylus cobbe* (L) Raeusch	Sapindaceae	Hadsandhi	Stem bark	Equal amount of Powder of Hadsandhi (*Allophylus cobbe)* stem bark and Finger millet (*Eleusine coracana*) flour boil in same quantity of water and used on swelling body and rheumatism
9	*Aloe vera* (L) Burm.f.	Liliaceae	Korphad	Leaves	Leaf is warm in fire and then inner portion eaten with small amount of sugar in case of Stomachache, latex is used to remove dead skin.
10	*Andrographis paniculata* (Burm.F.) wall	Acanthaceae	Kadechirayat	Leaves Tender shoot	Smell the leaves or shoot in case of fever.
11	*Atriplex hortensis* (L)	Chinopodiaceae	Chandanbatva	Leaves	Equal amount leaves of Chandanbatava (*Atriplex*) leaves and Alu (*Colocasia*) leaves extracted one cup of juice and taken at morning for total cover of piles/ not use for children

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12	*Barleria cristata* var. *dichotama* L.	Acanthaceae	Pandhari Koranti	Leaves Flower	Chewing the leaves in tooth pain and mouth diseases Cooked flower juice is used in mouth diseases
13	*Basella alba* L.	Basellaceae	Pittache pan	Leaves Seed oil	Leaves are eaten in case of all type of acidities, omitting Seeds cooked with rice and eaten in fever
14	*Bauhinia racemosa* Lam.	Caesalpinaceae	Apata	Leaves	One leaf chewing can cure cough
15	*Butea monosperma* L.	Fabaceae	Palas	Fruit Leaves Flower	Fruit juice with honey taken for intestinal worms.The leaves extract used for curing urine stone.The flower of *Butea monosperma* used in case of diabetes
16	*Caesulia axillaris* Roxb.	Astraceae	Maka	Leaves or tender shoot	Extract of leaves is used to cure cough, it is also used in hair oil in case of dandruff
17	*Calotropis procera* (L) R.Br	Apocynaceae	Rui	Latex Leaves	One drop of latex mix with one cup of curd and surve in one time in week in case of Piles (hemorrhoid) Green leaves ash or latex used to remove thorn from leg or heel
18	*Cassia fistula*	Fabaceae	Bahava	Leaves	Two leaves with alum chewed or take in teeth in case of tooth pain
19	*Cassia tora* L.	Caesalpinaceae	Kali takali	Tender shoot	The young shoots are packed in copper pot or iron pot at night and in morning these are cooked in rice and eat in case of rheumatism
20	*Celastrus paniculata* Willd	Celastraceae	Jyotismati	Seed oil	One drop of oil daily in nose to increase brain power and capturing capacity
21	*Clerodendrum serratum* (L)Moon.	Verbenaceae	Ran Bhangira, bharangi	Stem bark	Stem bark of *Clerodendrum serratum, Mangifera indica* and *Syzygium cumini* taken in case of snake bite, antidote in poison and also in apatite
22	*Colocasia esculanta* (L.) Schott	Araceae	Alu	Leaves	Half leaf eat with curd in case of Hepatitis B
23	*Costus speciosus* (Koen) J.E. Smith	Zingiberaceae	Katekoisara	Leaves	Leaves paste or extract apply externally to remove thorn from leg or heel
24	*Cryptolepis buchananii* R.Br.ex R. & S.	Periplocaceae	Kavali	Leaves	Ash of green leaves mix in coconut oil and applied on Piles (hemorrhoid)
25	*Curcuma longa* L.	Zingibaraceae	Halad	Rhizome	Half part of Halad powder (*Curcuma longa*) and one part of alum powder mix it and boil in equal amount of water and paste on the swelling or oedma and edematous
26	*Cynodon*	Poaceae	Harali	Stem with	Rice and Harali (*Cynodon*

	dactylon (L) Pers.			leaves	*dactylon)* soaked in water for twelve hour then pounded in to paste and applied on herpes zoster
27	*Derris scandens*	Fabaceae	Garudvel	Leaves and stem	Leaves and stem are used for the protein and blood purification
28	*Dodonea angustifolia* L.f.	Sapindaceae	Bandukicha Pala	Leaves	Crushedleaves applied on knee joint pain
29	*Dolichandrone falcate* (wall. Ex DC.)	Bignoniaceae	Medshingi	Leave or tender shoot	Leaves extract or chewing the leaves in case of intestine blot and diarrhoea
30	*Eupatorium odoratum* L.	Astraceae	Ranmadi	Leaves	The extract applied on the white patches of skin
31	*Ficus racemosa* L.	Moraceae	Umbar	Latex	Latex used for curing mumps
32	*Hibiscus esculantus*	Malvaceae	Bhendi	Fruits	Soaked in water overnight and one cup of extract taken in case of dibeties
33	*Hygrophila schulli* (Buch-Ham)	Acanthaceae	Talimkhana	leaves	Leaves extract used as poison antidote
34	*Jatropa curcus* L.	Euphorbiaceae	Mogali Erand	Tender shoot latex	Chewing the tender shoot and use like brush in case of tooth pains (don't drink the extract after chewing) applied on injury and It also used to wash tooth in case of loosing teeth
35	*Justicia adhatoda* L.	Acanthaceae	Adulsa	Leaves	One teaspoon leaves extract with one teaspoon of honey used in case of asthma
36	*Kalanchoe pinnata* (Lamk) Pers.	Crassulaceae	Panfuti	Leaves	Leaves are eaten to avoid Urine stone formation. Crushed leaves are used in case of wound healing
37	*Lantena camera* L.	Verbenaceae	Ghaneri	Leaves	Four leaves of both plant *Vitex* and *Lantena* chewing in case of stomach ache
38	*Lawsonia inermis* L.	Lythraceae	Mehandi	Leaves	Pounded leaves applied on leg heat and heel cracks
39	*Madhuka longifolia* (Koen) Macbr	Sapotaceae	Moh	Stem bark	Two centimeter of stem bark powdersoaked in water fortwelve hour and atthemorning one glass ofsoaked water mix withpinch of white pepperpowderandCumin seed powder taken ina day in case of urinestone.
40	*Mirabilis jalapa* L.	Nyctaginacee	Gulmus	Root or rhizome	Rhizomes are eatenfor curingskindiseases
41	*Mucuna pruriens* (L) DC	Fabaceae	Khaj-khujali	Seed	Seed is used in case ofweak people
42	*Ocimum americanum* L.	Lamiaceae	Ran Tulas	Leaves	One to two teaspoonleaf extract taken andextract externallyapplied on nose and

					head in case of cold
43	*Ocimum tenuiflorum* L.	Lamiaceae	Krishna Tulas	Leaves	Ten to fifteen leaves are taken in case of cough, cold and fever
44	*Piper beetle* L.	Piperaceae	Khauche Pan	Leaves	Five pouch of betal leaves and one cm slice of alum and one cm slice of Alu root (*Colocasia esculanta*) one by one at time in day for complete cure of pile
45	*Pongamia pinnata* (L) Pierre.	Ceaesalpinaceae	Karanj	Root (broad) Root (small or finger like) Seed oil	The root is pounded in to paste in the goat milk and apply to remove thorn. Half teaspoon fine powder of dry root mix in water and drink in one time in day in skin diseases. Also in case of mice bite two to three teaspoon in day. Seed oil externally use in skin diseases .Seed oil also used in case of hair fall, whitening of hair and for long hair
46	*Psidium guajava* L.	Myretaceae	Peru	Ripen fruit	Ripen fruit cut from center and cover with Alum powder then after twelve hour eat for piles
47	*Ruta chalepensis* L.	Rutaceae	Satapa	Leaves	Smell the leaves in case of fever
48	*Santalum album* L.	Santalaceae	Chandan	Leaves	Dry the leaves in shade condition and then mix with equal amount of soncow soil. These mixture taken two time in day to cure Hepatitis A,Four leaves chewing in a day in case of fever
49	*Semecarpus anacardium* L.f.	Anacardiaceae	Bibba	Seed	In case of half headache the seed is smash with help of needle and seed oil smear on the eyebrows.
50	*Spilanthus oleraceae* L.	Astraceae	Akkalkara	Inflorescence	It is used to increase brain power
51	*Sterculia urens* Roxb.	Sterculiaceae	Bhutya	Leaves	Green leaves dried in shade condition and make the powder these are applied on injury
52	*Syzygium cumini* (L)	Myrtaceae	Jambhul	Stem bark	Stem bark of *Clerodendrumserratum, Mangifera indica* and *Syzygium cumini* taken in case of snake bite, poisonous infection and also in apatite
53	*Tamarandus indica* L.	Caesalpinaceae	Chinch	Stem bark	Equal amount of both plant *Tamarandus indica* and *Ficus racemosa* stem bark powder mix in coconut oil and applied on just burned skin with help of feathers of hen
54	*Tinospora cordifolia* (Willd.) Miers ex Hook.f. & S	Menispermiaceae	Gulvel	Stem	The boiled or cooked stem extract is used in case of body hit Two centimeter of stem with one teaspoon of aloe vera juice taken for curing swine flue

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55	*Vitex negundo* L.	Verbenaceae	Nirgudi	Leaves	Nine leaves extract taken for cough and cold and externally used for freshness and in fever
56	*Wrightia tinctoria*	Apocyanaceae	Kala-kuda	Leaves	Leaves extract used in case of eyes white spot
57	*Zingiber officinale*	Zingiberaceae	Aal, Aadrk, ginger	Rhizome	The pounded rhizome with milk is used in case of cough and skin diseases

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Conservation of diversity of medicinal plants in Karnataka

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ABSTRACT

*[Plants are the basic resource for Ayurveda and other Indian systems of medicine, and also basic requirement for establishment of herbal pharmaceutical industry. The emerging field of herbal products industry holds a great potential to the economic development of the Indian region. Usage of herbs as a source of food, medicine, fragrance, flavour, dyes and other items in Indian systems of medicine is in increasing trend. It is estimated that, 95% of the medicinal plants used in Indian herbal industry today are collected from wild. Although there are around 8,000 medicinal plant species used by different communities in India across different ecosystems, only around 10% of them are in active trade. In India, about 2500 plant species are being used in indigenous system of medicine. The red data book lists 427 Indian Medicinal plant entries on endangered species, of which 28 are considered extinct, 124 endangered, 81 rare and 34 insufficiently known.The dedicated medicinal plants are used by various tribal's and local people to cure different ailments ranging from simple injuries, wounds, cuts, fever, diarrhoea, ulcers, swelling, bone fractures, potency, antidote, skin care, night blindness, toothache, **asthma**, cough & cold. Medicinal plants occupy a vital sector of health care system in India and represent a major national resource. Hence, there is an immense need for conservation of diversity of medicinal plant wealth for the present and fore coming generations, by adapting the suitable strategy with most appropriate method of conservation.]*

Key words: Biodiversity, Endangered species, in-situ and Ex-situ conservation.

INTRODUCTION

Indian system of medicine (Ayurveda) is playing a vital role in control and management of various health disorders and it depends on plant resources. Karnataka state is having a number of traditional healers and they are using available plant resources for the preparation of various herbal medicines. Most of the procedures and preparations are recorded in the text of Ayurveda. Western Ghats of Karnataka is having a rich floristic biodiversity of medicinal plants, which supports the livelihood of foot hills districts of Karnataka. Of which old Mysore district is one of an important source for medicinal plants used by various folk healers. This is the time to enlist and analyse the phytochemicals which are responsible for therapeutic values found in medicinal plants and scientific validation of folk claims. It may also prove to be a new discovery of unique biomolecule to cure alarming health disorders.

Western Ghats forest area is a one of the world known biodiversity hotspot of Karnataka, supplies enormous amount of crude drug to pharmaceutical industry which is located in and around the foot hills of the Ghats. Endemic floristic species and their rare phytochemical constituents grasping a lot of attention from researchers to document the plants which are used to cure lethal diseases. Exploration of 51 plant drugs utilisation, chemical constituents and therapeutic properties observed in the field of Ayurveda from Chikmagalur district, Karnataka

Collection of information on 44 medicinal plants from Kumar Parvatha, Kukke Subramanya, Mangalore. Enlisting of 100 medicinal plants with botanical name, family, local name, sanskrit name, part used and uses in primary healthcare by tribal and rural people in hilly regions of Western Ghats districts of Karnataka Exploration of 93 medicinal plant species with botanical name, family, habit, local name, distribution and uses from kaan forests of Sagar taluk in Central Western Ghats Karnataka.

Exploration of 28 medicinal legumes with botanical name, subfamily, distribution, part used, medicinal uses and mode of preparations from the districts which are in the foot hills of Western Ghats. Old Mysore district is an impressive place for the natural resources, with its luster, thick green forest and plant life, due to moist deciduous and dry deciduous which provided an opportunity to researcher to enlist medicinal plants with their therapeutic values, such as Documentation of 177 Ayurvedic medicinal plants with therapeutic properties, preparations and uses from Gopalswamy hills, Chamundi hills, Bandipur sanctuary. It directly helps to know the availability of plant raw material in the growth of pharmaceutical industry to prepare herbal medicines for the benefit of mankind.

Endangered medicinal plants

Plant parts like leaves, bark, roots, fruits, seeds or even whole plant is indiscriminately collected from wild sources without taking care of saving the plants. Many of the important useful species are on the verge of extinction due to over-exploitation and habitat destruction. More than 95% of the medicinal plants are collected from the wild; a number of them have become endangered in their natural habitats. There is need to encourage multiplication and cultivation of these plants. Collection of the following species from wild sources should be prohibited.

Brunium persicum (Kala Zeera), *Chlorophytum* spp (Safed Musli), *Colchicum luteum*(Tara-Tutiya, Suranjan-1- Talah, Golden Collyrium), *Commiophora wightii* (Guggul), *Concinum fariestatum* (Jeevanti), *Coptis teeta* (Halad-Vachnag, Gold Thread, Mamira), *Curculigo*

orchioides (Kali Musli), *Didymocarpus pedicellata* (Shila-Pushpa), *Dorsera* sp. (Sundew), *Anchusa strigosa* (Gaozaban), *Aristolochia bracteata* (Kiramar), *Artemisia annua* (Worm wood), *Atropa acuminata* (Indian belladonna), *Berberis aristata* (Indian Berbery, Daru Haridra),*Aconitum* sp. (Monk's Hood, Bachang), *Acorus* spp.(Sweet Flag,Vekhand) etc.

LOSS OF BIODIVERSITY OF MEDICINAL PLANTS

Environmental factors

Rainfall: For the past few years the annual rainfall has decreased resulting in the health of many herbaceous species during summer months.

Deforestations: Deforestations have been reported over the last two decades. The spread of agriculture, logging, fire wood collection, heavy wood collection, heavy grazing, etc., are the main reasons for reduction in area under valuable forests. Many valuable wild medicinal plant species are eradicated or minimized every year due to the deforestation activities.

Siltation of water bodies: Siltation of water bodies in the forests has resulted in the reduction of water holding capacity heading to depletion of underground water.

Lack of pollinators: Honey bee colonies have declined in numbers to the extent of 50- 60%, in forests and other areas. Loss of pollinators has resulted in reduced seed set and dispersal of seeds.

Developmental activities

Submersion: Loss of many species of medicinal plants has been noticed in forests due to submersion, eg., the Maradavally forest is the catchments of Linganamakki Dam, the main reservoir of Karnataka for irrigation and power generation. Submersion of nearly 10 sq. km of forest area during monsoons has resulted in loss of valuable medicinal plant species.

Infrastructure: Expansion of roads, installation of power lines and construction of buildings has caused extensive damage to forests and medicinal plants, eg., Devanarayandurga forest in Karnataka etc

Medicinal Plant Conservation:

Medicinal Plants are the main ingredients of local medicines and are of vital importance in traditional health care. People use medicinal plants species for sustenance of their traditional health care system both logistically as well as economically. But due to more

inclination towards modern Technology and over extraction of many of these plants has resulted in considerable depletion of the population of such species and some have become extinct. In Karnataka according to the study of the Botanical Survey of India there are 3924 species belonging to 1323 genera and 199 families in the forests, of which 1493 species are of medicinal value. These belong to 808 genera and 108 families. They occur in different vegetation types across the Western Ghats.

Karnataka State Medicinal Plants Authority (KaMPA) was established in the year 2002 with an objective of conservation, utilisation and development of the medicinal plants sector in the state. The main activity of KaMPA consists of implementation of the National Medicinal Plants Board (NMPB), Government of India, schemes through different institutions in the state. KaMPA provides guidance to various departments of government of Karnataka and any developmental organizations on policy matters relating to projects, schemes and programmes for the conservation, utilization and development of medicinal plants in Karnataka state. The authority also encourage and sponsor research related to medicinal plants, its management, harvest, utilization and take up pilot projects in the conservation, utilization and development of medicinal plants.

Mainly there are two methods of conservation of medicinal plants

1. Legislation 2. In-situ conservation 3. Ex-situ conservation

• **Legislation**

• Forest Act, 1927

• Wildlife (Protection) Act 1972 and Wildlife (Protection) Amendment Act 1991

• Forest (Conservation) Act, 1980

• Environment Protection Act, 1986

***In-situ* conservation**

a. Conservation of a given species in its natural habitat or in the area where it grows naturally is known as *in-situ* conservation.
b. It includes, Biosphere reserves, national parks, sacred sites, Sacred grooves etc.
c. It is only in nature that plant diversity at the genetic, species and eco-system level can be conserved on long-term basis.

The **most commonly referred *in situ* conservation methods are highlighted below:**

1. **Biosphere Reserves**: The Ministry of Environment and Forest, Government of India, had identified 18 biosphere reserves based on survey data and 7 of them have already been made operational. Ex: Niligiri biosphere reserves etc.
2. **National Parks**: Karnataka is blessed with 5 national parks, 18 wild life sanctuaries and 9 birds' sanctuaries. Ex: Bandipur tiger reserves, Nagarahole national park, Bannerghatta national park etc. It is necessary to conserve in distinct, representative biogeographic zones inter and intra-specific genetic variation.
3. **Sacred groves:** Sacred groves are small or large patches of vegetation protected on the basis of cultural and traditional practices on the religious background.Ex: kodagu district in Karnataka meant for largest shade grown coffee farms but also the land with high density of sacred forest. Sacred grove are called Devakad, and associated traditional ancestral houses are the foundations of a unique Kodava culture which is now recognized world over as one of the most nature friendly practices.

Outlines for in-situ management

• The Parks Department should prepare a policy at national level on the conservation and utilization of medicinal plants in protected areas.

• The policy should include:

- Identifying which of the protected areas are most important for medicinal plants;
- Targets and techniques for recording and monitoring medicinal plants in protected areas;
- Techniques and procedures for collection of medicinal plants within protected areas.

• The Parks Department should assess the extent to which the protected areas system covers the medicinal plants of the country. It should then create new protected areas and extend existing ones to ensure that all the medicinal plants of the country are conserved.

• The Parks Department should devise economic and social incentives for maintaining natural habitats and wild species.

• Park managers should ensure that the conservation and exploitation of medicinal plants are incorporated into site management plans.

• Species that are heavily depleted by over-collection should be re-introduced into areas where they once grew wild.

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Ex-Situ Conservation:

Conservation of medicinal plants can be accomplished by the ex-situ i.e. outside natural habitat by cultivating and maintaining plants in artificial area.

Seed gene bank

Germplasm conservation in Seed Gene Bank is more economical. The NBPGR, houses National Gene Bank (NGB) which is primarily responsible for conservation of germplasm of agri-horticultural crops and their wild relatives for long-term seed storage for posterity. These are referred to as "Base Collection" stored in modules maintained at -20°C. The seeds are dried to attain 4-6 per cent moisture content and hermetically sealed in moisture proof aluminium foil packets. These stored seeds remain viable for 50 to 100 years. **National active germplasm sites**

The national active germplasm sites (NAGS) are the integral component of the network. The NAGS are entrusted with the responsibility of multiplication, evaluation, maintenance and the conservation of active collection and their distribution to bonafide users both at the national and international levels. These active/working collections are stored in modules maintained at +4°C and 35-40 per cent relative humidity (RH). Under these temperatures, seeds are expected to remain viable for 15 to 50 years.

Cryopreservation (in liquid nitrogen at-165°C to-196°C)

a. **Seed Preservation**: The seeds have been grouped broadly into two categories, based on their response to dehydration.[3] A majority of them are desiccation tolerant, called 'Orthodox' and hence can be stored for longer durations. The second group of plant species are called 'Recalcitrant', whose seeds suffer injury on their drying and therefore cannot be stored at subzero temperatures.
b. **Pollen Preservation**: Pollen storage was mainly developed as a tool for controlled pollination of synchronous flowering in plants, especially in fruit tree species. In addition, pollen storage has also been considered as an emerging technology for genetic conservation.

Botanical gardens

A botanical garden is an institution holding documented collection of living plants for the ' purpose of scientific research, conservation, display and education. They serve as repositories of germplasm collections, specially rare and endangered ones of indigenous and exotic origin.

Botanical gardens can play a key role in ex-situ conservation of plants, especially those facing imminent threat of extinction. Several gardens in the world are specialized in cultivation and study of medicinal plants, while some contain a special medicinal plant garden or harbor special collection of medicinal plants.

Challengesahead

While it is quite commendable that the MPCA initiative resulted in many profound changes in the conservation perspectives among the resource managers and affected a shift in the conservation priorities, it is also true that, the rigor and the intensity with which the program was implemented could not be sustained beyond the project network, for various reasons. Whatever are the dilemmas, given the novelty, innovativeness and the cost effective element in the MPCA model and the emerging expectations by the sector, the current need is to focus on the following on a priority basis, in order to deepen the understanding of medicinal plants and to address the emerging needs:

1. Expand the MPCA network so as to capture the other red listed species not brought under the conservation network.
2. Using the established MPCA sites as Open air Centre for Conservation education and Learning and establish links with the nearby Educational and research Institutes.
3. Take up Status surveys, Population studies of selected Red listed species to enrich the current data sets.
4. Take up small time market studies to examine the Harvesting and Collection-Produce flow-Market links of those species which are in High volume trade.
5. Conceive and develop small time field studies to generate additional field data on the Phonology, Reproductive biology, Seed biology of red listed species and to generate substantial examples and case studies for deepening the understanding of medicinal plants.
6. Take up studies to develop propagation methods for select red listed species and conceive species recovery initiatives.

Take up small time field studies to understand the cultural links of medicinal plants.

CONCLUSION

Medicinal plants occupy a vital sector of health care system in India and represent a major national resource. The dedicated medicinal plants are used by various tribal's and local people to

cure different ailments ranging from simple injuries, wounds, cuts, fever, diarrhoea, ulcers, swelling, bone fractures, potency, antidote, skin care, night blindness, toothache, asthma, cough & cold. Hence, there is an immense need for conservation of diversity of medicinal plant wealth for the present and fore coming generations, by adapting the suitable strategy with most appropriate method of conservation.

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Investigation of Filler Curry Leaves Extract on Poly (vinyl alcohol) Composite Films for Food Packaging Applications

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ABSTRACT:

[The present study aims to evaluate the influence of filler curry leaves extract on Poly (vinyl alcohol) composite films. The composite films of PVA/Curry leaves extract were prepared by solvent evaporating technique and analyzed for different properties. The influences of phase morphology on mechanical properties were determined by using Universal testing machine (UTM) and Scanning electron microscopy (SEM). Meanwhile interaction among the blend films was confirmed with Fourier Transform infrared spectroscopy. The results of SEM micrographs revealed that composite films were completely miscible with each other and the same influence was observed in mechanical properties which showed improved tensile properties, elongation at break and young's modulus. The improved properties could be due to the strong interaction among the composite films which was confirmed by the FTIR spectroscopy. The incorporation of curry leaves extract in PVA being advantages and such films can be commercially explored for food packaging applications in future.]

Key words: PVA, curry leaves extract, mechanical properties, and morphology.

Applications of Microalgae - A Review

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ABSTRACT:

[Microalgae are a group of microorganisms used in aquaculture. They are perfect agents for large-scale production of valuable compounds because they grow fast with minimal nutrient requirement. Generally, several species are regarded as safe for human consumption. Microalgae have recently attracted considerable interest worldwide, due to their extensive application potential in the renewable energy, biopharmaceutical, and nutraceutical industries. They play an important role as renewable, sustainable, and economical sources of biofuels, bioactive medicinal products, and food ingredients. Several microalgae species have been investigated for their potential as value-added products with remarkable pharmacological and biological qualities. As biofuels, they are a perfect substitute to liquid fossil fuels with respect to cost, renewability, and environmental concerns. Microalgae have a significant ability to convert atmospheric CO_2 to useful products such as carbohydrates, lipids, and other bioactive metabolites. Although microalgae are feasible sources for bioenergy and biopharmaceuticals in general, some limitations and challenges remain, which must be overcome to upgrade the technology. The present review gives the potential of microalgae for the production of various bioactive compounds with respect to sustainablilty.]

Keywords: Microalgae, Biofuels, biomass, Bioactive compounds, Sustainability, Biotechnological applications

INTRODUCTION:

Microalgae are the large group of photosynthetic unicellular species, which exist individually or in chains, or groups. There are at least 40,000 known species of algae in India. These organisms are remarkably adaptable and occupy virtually every environment on the planet. They can be found in waters of widely varying temperature, pH, and salinity (from freshwater to hyper saline). They are perfect agents for large-scale production of valuable compounds because they grow fast with minimal nutrient requirement. Generally, several species are regarded as safe for human consumption. Microalgae have recently attracted considerable interest worldwide, due to their extensive application potential in the renewable energy, biopharmaceutical, and nutraceutical industries. They play an important role as renewable, sustainable, and economical sources of biofuels, bioactive medicinal products, and food ingredients. Several microalgae species have been investigated for their potential as value-added

products with remarkable pharmacological and biological qualities. As biofuels, they are a perfect substitute to liquid fossil fuels with respect to cost, renewability, and environmental concerns. Microalgae have a significant ability to convert atmospheric CO_2 to useful products such as carbohydrates, lipids, and other bioactive metabolites. Although microalgae are feasible sources for bioenergy and biopharmaceuticals in general, some limitations and challenges remain, which must be overcome to upgrade the technology. The present review gives the potential of microalgae for the production of various bioactive compounds with respect to sustainability.

Applications of Microalgae:

I-Microalgae as Biofuel

The fossil fuel holds back the dearth towards the 21st century due to increase in energy demand and increase in greenhouse gas emission makes it important to develop alternative energy carriers that are renewable, clean and environmentally friendly. In modern era, fossil fuel depletion and global warming has led to the world's eyes on production of bioenergy from algal biomass. Therefore the key plans to reduce poverty are increased access and energy security. Currently, the only alternative to replace the fossil fuel consumption and dependency is the production of biofuels from algal biomass.Some of the important species of microalgae is *Cyanidium caldanum. Scenedesmus spp., Chlorococcum spp.Synechococcus elongates, Euglena gracilis Chlorella sp., Eudorina spp., Dunaliella tertiolecta, Nannochloris spp.Chlamydomonas spp.etc.*

As Biofuel microalgae are used to obtain the following:

a) **Bio-oil:** Bio-oils are quite similar to petroleum oils due to which they can be used as a substitute. Some of the examples are *Dunaliella* spp. *Spirulina*, *Scenedesmus*, *Desmodesmus, Laminaria saccharina and some of the fresh water forms of micro algae are Oedogonium* and *Cladophora*.

b) **b) Bio-diesel:** In Recent year's study of biodiesel has been widely recognized. *Chlorella vulgaris* and *Chlorella protothecoides* are two main species; containing high oil content has been studied by many workers for production of biodiesel.

c) **Biohydrogen:** Hydrogen holds a promising role as a future fuel and renewable energy source whereas the current classical methods of producing hydrogen are energy intensive, costly

and are not environmentally friendly. The diversity of biofuel sources has become an urgent energy issue. In current years, a much attention has been paid towards the bio-hydrogen production. Some of the microalgae used in the production of biohydrogen are Dunaliella salina, *Chlorella* spp., *Scenedesmus* spp., Micromonas spp.Porphyraspp.Volvox spp. Chlamydomonas spp. Anabena spp.etc.

d) **Biomethane Production:** In these days, worldwide production of biogas from biomass is gaining importance. The biomass productivity of algae is generally higher than land plants, but its growth is influenced by limiting of different nutrients. Methane in the form of compressed natural gas is used as a vehicle fuel, and is claimed to be more environmentally friendly than fossil fuels such as gasoline/petrol and diesel. Microalgae such as *Cladophora glomerata, Chara fragilis and Spirogyra neglecta* are mainly used.

Bioethanol: Bioethanol production from algae has gained unusual importance due to its high biomass productivity, diversity, variable chemical composition, high photosynthetic rates of these organisms. Algae are the optimal source for production of bioethanol due to large amount of carbohydrates/polysaccharides and thin cellulose walls. *Some of the species of Dunaliella, Chlorella, Chlamydomonas, Arthrospira, Sargassum, Spirulina*, Gracilaria*, Prymnesium parvum, Euglena gracilis* and *Scenedesmus are used in the production of Bioethanol.*

Biobutanol Production: In Asia, Europe and South America, algae cultivation is mainly accomplished for bioethanol and biogas production, whereas in USA, algae are gaining attention for biobutanol production. Since 100 years, butanol has been used as a fuel in transportation and has been recommended as a potential candidate for biofuel, not only to improvise, but to take place of ethanol as petroleum additive due to its low vapor pressure and high energy density. Many *Clostridium* sp., *Ulva lactuca* and *Saccharina* are capable of yielding butanol.

II- **Algae-Based Non-Energy Options:**

The application of micro algae is practically infinite for number of products, due to its large diversity and changes in chemical composition influenced by different cultivation systems.

There are several Useful natural substances that can be derived from microalgae such as – Pigments, Carotenoids, Poly unsaturated fatty acids, vitamins, antioxidants etc.

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III- **Micro algae and Pharmaceuticals:**

Microalgae are rich sources of peculiar biologically active compounds including primary and secondary metabolites. Algae provide a wide range of pharmacy products, proteins, vaccines, nutrients that otherwise are not available or are very costly to produce from animal and plant sources. Algae have also been examined as vitamin and vitamin precursor sources such as ascorbic acid, riboflavin and tocopherol. Large diversity of micro-algae makes it a potential candidate for discovery of various new metabolites and high value compounds. Some example are - *Chlorella vulgaris, Chlamydomonas pyrenoidosa* have shown antibacterial activity, *Ochromonas spp.*, *Prymnesium parvu* are capable of producing toxic substances having immense potential in pharmaceutical, *Spirulina platensis* showed antiviral activity, *Poteriochromonasmal hamensis anti cancerous activity, Stigonema* anti-inflammatory activities etc.

IV- **Micro algae and Cosmetics**

Microalgal species like *Arthrospira* and *Chlorella* are well established players in the skin care market. Microalgal extracts are part of various cosmetics such as anti-aging cream, rejuvenating care products, sun protectants and hair care products. Generally species like *Chondruscrispus*, *Ascophyllum nodosum*, *Alariaesculenta*, *Nannochloropsisoculata*, *Chlorel la vulgaris, Spirulina platensis* and *Dunaliella salina* are used in cosmetics.

V- **Micro algae and Pigments**

A large number of pigments associated with light occurrence are found in microalgae. Expect chlorophyll as primary photosynthetic compound, the important ones are phycobiliproteins and carotenoids. Carotenoids extracted from microalgae have various applications in market: β-carotene from *Dunaliella* as vitamin supplement in health foods, Lutein, zeaxanthin and canthaxanthin for pharmaceutical uses The phycobiliproteins like phycocyanin and phycoerythrin which are unique in algae are already in use as food and cosmetics applications. A different carotenoid from microalgae is astaxanthin, has industrial applications. This pigment is a keto-carotenoid, mainly derived from alga *Haematococcus pluvialis*

VI- Micro algae and High-Value Molecules

A few microalgae are harnessed for production of high value compounds such as pigments or proteins. The important sources of various bioactive lipid compounds are marine microalgae with percentage of polyunsaturated fatty acids, effective against numerous diseases. The

prevention of several diseases including cardiovascular disorders, cancer, asthma, arthritis, kidney and skin disorders, depression and schizophrenia has also been shown by polyunsaturated fatty acids. Among various algae species, *Dunaliella* sp., *Chlorella* sp, *Spirulina* sp. are major producers of high value compounds such as proteins, lipids and pigments

VII - **Micro Algae-Derived Compounds for Human Usage**

Many macro and micro algae (seaweeds) are consumed in various parts of Asia as food directly and edible in small amount by native people of countries like Africa, South America and Mexico due to their vitamins and nutritional value. They can also be added into different foods A blue green alga named *Spirulina platensis* is acquiring worldwide attention as food additive due to its high nutritional value as a food to human. It has been demonstrated as a rich source of proteins, polyunsaturated fatty acids, pigments, vitamins and phenolics. Currently, the micro algal market is ruled by *Chlorella* and *Spirulina,* due to their high protein value, nutritional value and ease of growing.

VIII - Micro algae and Fertilizer

Both macro- and microalgae contain numerous compounds to promote germination, leaf or stem growth, flowering and can also be used as a biological protectants agent against plant diseases and are used in various coastal areas. After the recovery of oil and carbohydrates from macroalgae and microalgae, still many nutrients are left in spent biomass. One potential application for this leftover biomass is to use as a biofertilizer and will increase economic potential of algae for reuse in cultivation after extraction of nutrients. The left-over biomass will be used as fertilizer. Most of the cyanobacteria are able to fix atmospheric nitrogen and can be used as effective biofertilizers. They play a major role in conserving and building soil fertility for increasing rice growth and yield as natural biofertilizer.

IX - Micro algae and Fibres for Paper

Various sulphur containing polysaccharides provide structural stability to most of the algae. As a potential feedstock, cellulose-containing algae can be owned for production of paper and but there are few examples of algae as a non-wood fibre source.

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XI- Micro algae and as processed food ingredients

The products like agar, alginates and carrageenans are among most valuable products that can be derived from algae due to their gelling and thickening properties. In past years, a considerable growth has been observed in area of algae research and development in fields like protoplast fusion, macro algal cell cultures and transgenic algae.Presently, various algae feeds are used for culture of various fish like larvae, juvenile fish and finfish. The most commonly used algae for aquaculture feed are *Chlorella*, *Tetraselmis*, *Pavlova*, *Phaeodactylum, Nannochloropsis*, *Skeletonema* and *Thalassiosira.*

CONCLUSION:

Microalgae are tiny factories and renewable, sustainable and economical sources of biofuels, bioactive medicinal products and food ingredients. Microalgae useful in mitigation of elevated CO_2 level and treatment of waste water The microalgae are promising agents owing to increased demand for bioactive compounds like carotenoids, phenolic, flavonoids, proteins, and carbohydrates. Isolation and identification of novel metabolites from microalgae will help to the development of new therapeutic agents, nutraceutical, and food industries. The natural active products are finding an extent range of applications in the cosmetics, pharmaceuticals, food, and feed industries. Carotenoids, phenolic, and flavonoid are strong antioxidants, capable of reacting with scavenging oxygen species because of their hydroxyl groups. Several compounds extracted from algae are used in cosmetic industry as thickening agents, water-binding agents, and antioxidants in facial and skin care products. Natural carotenoids are preferred than synthesized carotenoids and have good applications in the food and feed industries, as well as in cosmetics and pharmaceuticals. It is well known that microalgae contain valuable products including proteins, β-carotene, lutein, carbohydrate, phenolic, and flavonoids compounds that are useful for various industrial applications. Carotenoids from microalgae are an essential class of antioxidants which play an important role in quenching reactive oxygen species generated during photosynthesis.

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Role of Eco-Friendly Agricultural Practices in Agriculture Development

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ABSTRACT

[Green revolution technologies have more than doubled the yield potential of rice and wheat, especially in Asia. These high input production systems requiring massive qualities of fertilizers, pesticides, irrigation and machines, however, disregard the ecological integrity of land, forests and water resources, endanger the flora and fauna and cannot be sustained over generations. To a great extent, future food security and economic independence of developing countries would depend on improving the productivity of biophysical resources, through the application of sustainable production methods, by improving tolerance of crops to adverse environmental conditions and by reducing crop and post-harvest losses caused by pest and diseases. Indigenous agricultural practices can play a key role in the design of sustainable and eco-friendly agricultural systems, increasing the likelihood that the rural population will accept, develop and maintain innovations and interventions. In this context, those eco-friendly methods are being considered as environmentally safe, selective, biodegradable, economical and renewable alternative for use in organic farming system. Organic farming implies, that the use of organic nutrients and adoption of natural methods of plant protection in place of fertilizers and pesticides. To the maximum extent feasible organic farming system rely upon crop rotations, crop residues, animal manures, legumes, green manures, mineral baring rocks and aspects of biological pest control to maintain soil productivity and tilth to supply plant nutrients and to control insects, weed and other pests.]

INTRODUCTION:

Agriculture is the most important enterprise in the world. Agriculture is the process of producing food, feed, fiber and other desired products by the cultivation of plants and the raising of domesticated animals. In a true sense, it is a productive unit where human get the free gifts of nature namely, land, light, air, temperature, rain water, humidity etc. are integrated into a single primary unit indispensable for human beings. The effect of prolonged and over usage of chemicals in crops production has resulted in human health hazards and pollution of environment and ground water. At present, the issue is whether to continue with the chemical inputs-based intensive technologies or to go back to the traditional environment friendly farming practices like organic farming for sustainable production, income and socio-economic development of the farming community. In this context that biological pesticides are being

considered as environmentally safe, selective, biodegradable, economical and renewable alternative for use in organic farming system.

Green Pesticides or ecological pesticides which are believe to be environmentally friendly and thus cause less harm to the eco system and animal health. In agrology, pesticides are evaluated for minimal average environmental effects. Biocides include germicidal, antibiotic, antibacterial, antiviral, antifungal, antitrotozaols and antiparasites. Pesticides typically came in the form of sprays and dusts. Many ecological pesticides are biological pesticides. Environmental friendly agricultural technologies for food safety appropriate technologies, which do not assault the nature, would have key roles to play in ensuring food security, in improving human health and in rehabilitating and conserving the environment to safeguard the well being of the posterity. Instead of striving for more "green revolutions" with emphasis on miracle seeds, hard-hitting, synthetic and engineered pesticides and increased use of fertilizers, the future must look to natural ways and processes for augmenting agricultural productivity. In fact, all development efforts and activities should be within well defined ecological rules rather than within narrow economic gains. Sustainable agricultural systems must be ecologically sound for long-term food sufficiency, equitable in providing social justice, and ethical in respecting path future generations and other species.

GOAL OF ECO-AGRICULTURE: (METHODS/PROCEDURE)

The aim of eco-agriculture is to manage the resources of rural communities to improve their welfare, preserve biodiversity and ecosystem services, and develop more productive and sustainable farming systems. Eco-agriculture, now emerging as a holistic approach to ecologically and socially responsible land use, represents a vision of rural communities managing their landscape and resources to jointly achieve three goals:

1. Enhance rural livelihoods
2. Conserve or enhance biodiversity and eco-system services
3. Develop more sustainable and productive agricultural system

The core of this ecological-based farming is ensuring that business or agricultural activity is consistent with the natural functions of ecosystems, where for instance, the cycle of soil nutrients and biodiversity structure are maintained so as to create a system of agriculture that is resistant to pests and has self-maintained natural soil nutrients. Thus, farmers will no longer depend on costly chemicals and artificial pest control.

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In addition, by reviving local or indigenous seed varieties, farmers' dependence on hybrid seeds commercially produced by multinational companies can be reduced or even eliminated. This will give farmers the freedom to plant seeds in accordance with local natural conditions at a reasonable cost. Consequently, agricultural production costs can be minimized and agricultural commodities sold at a premium price as organic products, which in turn would improve farmers' incomes. Also, agricultural commodities that are free from chemicals and genetically modified organisms are safes and healthier for human consumption. In short, eco-agriculture tries to combine conservation with development. Farmers and rural communities are key actors in conserving biodiversity and ecosystems.

Indian farmers have increased production 40 percent by using organic fertilizers in paddy farming systems similar to conventional rice farming. Making eco-agriculture work requires a favorable institutional environment, suitable financing and good dissemination of information.

To boost Agriculture development, we need to create biodiversity reserves that:

- benefit local farming communities,
- Develop habitat networks in non-farmed areas,
- Reduce land conversion to agriculture by increasing farm productivity,
- Minimize agricultural pollution,
- Modify management of soil,
- Water and vegetation resources,
- Modify farm systems to mimic natural ecosystems.

These steps can be started through initiatives at the grassroots level, with the coordinated and collaborated efforts of various stakeholders, but should include government support in promoting eco-agriculture practices and creating a sustainable agricultural system in India.

Climate change is also having a growing impact on agriculture and requires new practices and approaches to guarantee the sustainability of farming, which still is the main source of livelihood for most Indonesians. Agriculture is an activity directly related to the use of natural resources. We now often see and hear of crop failures due to climatic influences. This is compounded by farming practices that pay little heed to the rules of ecosystem balance and environmental conservation, which will in turn have an impact on agriculture itself.

ECO-FRIENDLY AGRICULTURAL PRACTICES: are as follows

Agronomy: Cropping pattern, sowing time

Water management: Exp. (SRI Technology, DSR,) collection of rain water in pond

Soil conservation and reclamation.

Entomological practices: Exp. (IPM Technology) Control termite, American bollworm, sucking pests, other insects, spray related practices)

Storage: Pulses stored in mud containers; Neem leaves (Azadirachta indica)

Zoology: Rat control by cat and pet dogs.

SUSTAINABLE AGRICULTURE:

Sustainable agriculture is a complex issue associated with producing food while maintaining our biophysical resources including soil, water and biota with no adverse impacts on the wider environment. It should:

- Maintain or improve the production of clean food
- Maintain or improve the quality of landscapes, which includes soils, water, biota and aesthetics
- Have minimal impact on the wide environment
- Be acceptable to society

CONCERNS OF ECO-FRIENDLY SUSTAINABLE AGRICULTURE:

The concept of sustainability has many dimensions. It can be used to mean economic sustainability, social sustainability, institutional sustainability as well as environmental sustainability. The environmental sustainability agenda in agriculture, which is the topic of this paper, covers the protection of the resource base, the reduction of negative externalities and the promotion of positive externalities. Principal issues include water quality and quantity, air quality, soil erosion, biodiversity, and landscape protection as well as food safety and animal welfare. The agenda includes:

1. Water quality and quantity concerns: Issues here include leaching of nutrients and pesticides, water extraction and drainage and flooding. Contamination of both ground and surface waters caused by high levels of production and use of manure and chemical fertilizers is a serious problem, particularly in areas of intensive livestock or specialized crop production.

2. Air quality concerns: The issues here are emissions of ammonia and greenhouse gases. At EU level, agriculture is responsible for about 8% of total greenhouse gas emissions but due to the pastoral nature of Irish farming, the proportion here rises to 30%.

3. Biodiversity concerns: Issues include genetic, species and ecosystem diversity. The intensification of agriculture has led to widespread reduction of species and habitats.

4. Landscape concerns: The marginalization of agricultural land can lead to its abandonment if farming ceases to be viable. Alternatively, intensification of agriculture can lead to the loss of important landscape features such as hedges and ponds, the enlargement of fields and the replacement of traditional farm buildings with industrial structures. Rights of access may be restricted in interests of more efficient farming.

5. Soil erosion concerns: Overgrazing particularly in mountain areas has led to the erosion of vegetation cover with the consequent loss of soil, the silting of rivers, etc.

6. Food safety and animal welfare concern: The issue here is the effect of agricultural practices on human health and animal well-being rather than the physical environment. There is concern about the consequences for the quality and safety of the food supply of the increasing use of pesticides and drugs, as well as the consequences of introducing genetically-modified organisms.

Eco-friendly approaches for farming system

The following eco-friendly approaches are as:

A. Organic farming: Organic farming is a production system, which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming system rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilt, to supply plant nutrients, and to control insects, weeds, and other pests.

B. Biological farming: Biological farming allows the use of selected chemical fertilize3rs (avoiding disruptive materials such as anhydrous ammonia and potassium chloride) and adopts low-inputs approaches to use of herbicides and insecticides. (Diagnostic instruments to monitor plant and soil conditions are frequently used in biological farming. These include refract meters to monitor sugar content (Brix) in plant tissue sap; electrical conductivity meters to monitor ERGS (or energy released per gram of soil); ORPS meters (or oxygen reduction potential of soil); and radionics.**)**

C. Nature farming: In addition to these methods-based approaches to sustainable farming, regenerative agriculture and perma-culture are widely recognized. However, these letter systems, like sustainable agriculture, are more conceptually oriented than methods-based.

D. Regenerative Agriculture: In regenerative agriculture bunds on nature's own inherent capacity to cope with pests, enhance soil fertility, and increase productivity. It implies a continuing ability to recreate the resources that the system requires. In practice, regenerative agriculture uses low-input and organic farming systems as a frame work to achieve these goals.

The methods of ecological agriculture are based on modern ecological science combined with time-tested indigenous knowledge, giving emphasis on the mode of cultivation through Integrated Crop Management (ICM), which providing Integrated Farming System (IFS), Integrated Pest Management (IPM) for crop production. ICM program arranging FFS and provide various types of training courses on eco-friendly agriculture for their club members in order to increase their eco-friendly agricultural knowledge and to make a favorable attitude and adoption of these activities. Sometimes, ICM program provides financial facility to its group members for practicing ecological agriculture and help them for marketing their ecologically produced organic products.

CONCLUSION:

In a healthy farm system, agriculture works in harmony with the natural environment. This begins with healthy soil that stores water and nutrients and provides a stable base to support plant roots. In a sustainable system, soil is kept in balance. Crops are rotated through the fields to replace nutrients in the soil. Where there is livestock, animals graze the land, then waste from those animals is used to fertilize the soil. The idea is that as farmers take from the land they also give back. Industrial farms disregard that need for balance. Land is used continuously and not given proper rest. Crops are not rotated in a way that replenishes the soil. Manure and chemical fertilizers are used to "feed" the soil, but through over-application these additives become a problem.

Organic, mechanical, physical and cultural practices of agriculture are mainly used in ecological agriculture. Chemical fertilizers and chemical pesticides not only contaminate surface water, they also affect fish population and human health as well. To regain the lost ecological status, it

is high time to start the ecological agriculture without further delay. Some NGOs, GOs became very much concerned about the devastating effect of indiscriminate use of chemical fertilizers and pesticides since long, and earnestly felt the need for developing an alternative agricultural strategy that is sustainable, productive and environment-friendly. Since 1985 DAE has been working towards development of this alternative strategy and termed it as "Eco-friendly agriculture".

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Medicinal plants of Panchlingeshwar sacred grove/temple complexes Nandikurali, Raibag, Belagavi, Karnataka

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ABSTRACT:

[Sacred groves are the places, where numbers of medicinal plants are conserved and preserved for providing traditional health care for local people. This traditional information is being documented before it is lose forever. Hence, an ethanobotanical survey was carried out in July 2017 and May 2018 to document traditional medicinal information from Panchlingeshwar sacred grove. A total 54 species belonging to 48 genera under 28 families were used to treat 21 human disorders. Most of the medicinal plant species are distributed under the family Anacardiaceae, followed by Apiaceae, Lauraceae and Moraceae.The information about plant species local names, parts used, mode of preparation, dosage also been documented.]

Keywords: Sacred groves, Nandikurali, Medicianl plants, Belagavi

MICROWAVE IRRADIATION SYNTHESIS OF SILVER NANOPARTICLES USING LEAF AND FRUIT EXTRACT

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ABSTRACT:

[The immense use of Nanoparticles due to its small size and change in size affects the properties enormously. These can be synthesized by different physical, chemical and biological methods. But biological approach is more convenient, ecofriendly, low cost, less time consuming. A microwave irradiation synthesis of silver nanoparticles were carried out biological approach using extracts of Neem leaves (Azadirachta Indica) and bitter gourd (Momordica Charantia) fruit .We synthesized silver nanoparticles by mixing two different extracts along with silver nitrate solution and comparative study has been done. Structural characterization of synthesized sliver nanoparticles was performed by uv-vis and FTIR spectroscopy. The synthesized silver nanoparticles exhibit energy absorption band at 300nm-420nmfor different samples. The FTIR spectra of synthesized silver nanoparticles showed strong bands at 3400, 1500, 1350,500 cm^{-1} to identify the compounds for the reduction of silver ions to silver atoms, the functional groups present in plant fruit extract were investigated by FTIR.]

Keywords: Azadirachta Indica, FTIR, Momordica Charantia, Microwave irradiation, Neem leaves, Silver Nanoparticles, Spectra.

INTRODUCTION:

Nanotechnology is promising as a rapidly growing field with its applications in Science and technology. Silver Nanoparticles (AgNPs) are studied widely among researchers. With this keen interest of AgNPs among researchers the need for synthesis of Silver nanoparticles has increased. But the need for biosynthesis of nano particles arose as the physical and chemical processes are less convenient. Often, Chemical synthesis method leads to presence of some of toxic chemicals that adverse effect in the medical applications. This is not an issue when it comes to biosynthesis route. So, in the search of cheaper pathways for nano particles synthesis, scientists use microbial enzymes, plant and fruit extracts. With their antioxidant and reducing properties they are responsible for the reduction of silver ion to silver metal nano particles. Green synthesis provides advancement over chemical and physical method as it is cost effective, eco friendly and in this method there is no need to use high energy, temperature and toxic chemicals.[1] The main objective of this paper is to study the formation and characterization of silver nano particles by green synthesis for the further applications of it in optical sensors, effective diagnostic techniques and also for antibacterial activities. The first time in this paper we have reported that

the microwave irradiation green synthesis of silver nano particles by reduction of silver ions using mixed extracts of Neem leaves and Bitter Gourd fruit. The reaction process is very simple, cost effective, and rapid. The extracts mixtures of Neem leaves and Bitter gourd acted as reducing agents, stabilizing agents and also capping agents for AgNPs. Formation of silver nano particles was confirmed by SPR spectra using UV-VIS spectrometer and absorption peak is found at 300nm-425nm for various samples. The properties were characterized by UV-VIS and reducing and functional groups were characterized by FTIR.

EXPERIMENTAL:

Typically, a plant extract-mediated bio reduction involves mixing of aqueous extract with an aqueous solution of the appropriate metal salt. The synthesis of nano particle occurs within 15 to 20 seconds in a microwave oven.

Materials:

Neem leaves, Bitter Gourd, Silver Nitrate ($AgNO_3$), Distilled water.

Preparation of Plant and fruit Extract:

Neem leaves extract was used to prepare silver nanoparticles on the basis of cost effectiveness, ease of availability and its medical property. Fresh leaves were collected and surface cleaned with running tap water to remove contaminated organic contents, followed by distilled water. About 20 gm of finely cut leaves were kept in a beaker containing 100 ml distilled water and boiled for 20 seconds in a microwave oven. The extract was cooled down and filtered for the further use.

Similar procedure is fallowed for Bitter gourd fruit extract. Fresh fruits were collected from the market. About 20 gm of finely cut pieces were placed in a beaker containing 100ml of water and boiled for 30 seconds and then filtered for the further use.

Green synthesis of Silver nano particles:

Solution of Silver nitrate was prepared of about 500ml of 0.1mM solution. Freshly prepared 10 ml of neem leaves extract is added to the 100 ml of $AgNO_3$ solution. This set up is placed in a microwave oven and irradiated with microwaves for 70 seconds; reduction of Ag^+ to Ag^0 was confirmed by color change of solution from colorless to brown. FIG1

Solution of Silver nitrate was prepared of about 500ml of 0.1mM solution. Freshly prepared 10 ml of bitter gourd fruit extract is added to the 100 ml of $AgNO_3$ solution. This set up is placed in

a microwave oven and irradiated with microwaves for 60 seconds; reduction of Ag^{+} to Ag^{0} was confirmed by color change of solution from colorless to brown. Fig1

Combination of extracts and synthesis of AgNPs: We take the different combination of plant and fruit extract for further synthesis of silver nanoparticles and to study its properties.

Different ratios of extracts (Bitter gourd 6ml + neem leaves 4ml+ 100ml and (Bitter gourd 4ml+ neem leaves 6ml + 100ml AgNO3 solution)

Synthesis:

These different combinations were kept in a microwave oven for 70 seconds and color change was observed from colorless to brown. Fig1

CHARACTERIZATION OF SILVER NANOPARTICLES

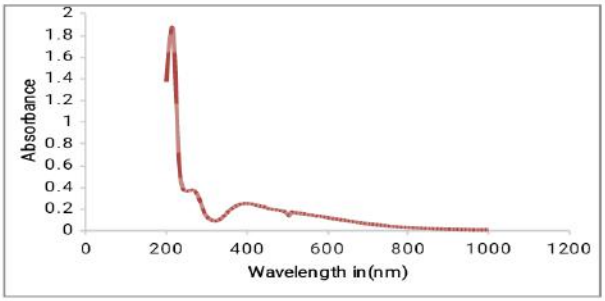
UV-Vis spectra analysis has been done after 24 hours of preparation, 1ml of sample was pipette out into a test tube and analyzed at a room temperature. The FTIR spectra recorded to analyze functional group, stabilizing and capping agent.

Visual observation of UV-VIS spectra:

In all experiments addition of plant extracts of Neem leaves and fruit extracts of bitter gourd into the beakers containing aq. Solutions of $AgNO_3$ led to change im color of the solution from colorless to brown within reaction duration due to excitation of surface Plasmon resonance in AgNPs. On the addition of different combination of extracts to aq solution of AgNO3 keeping its concentration constant. The color of solution is changed from brown to dark brown. .Finally colloidal brown solution indicating the formation of AgNPs from UV-vis graphs its clearly shown the absorbance peak are found at 300nm to425nm which tells us the formation of nanoparticles by comparing with previous reports.

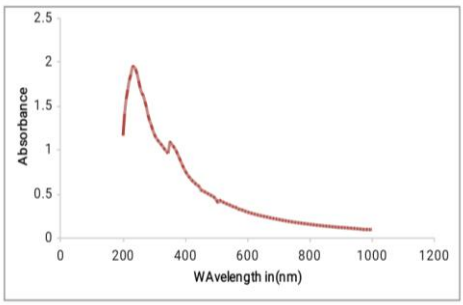
UV visible spectra for sample 1:

[Bitter gourd Fruit extract 10ml + 100ml $AgNO_3$solution]



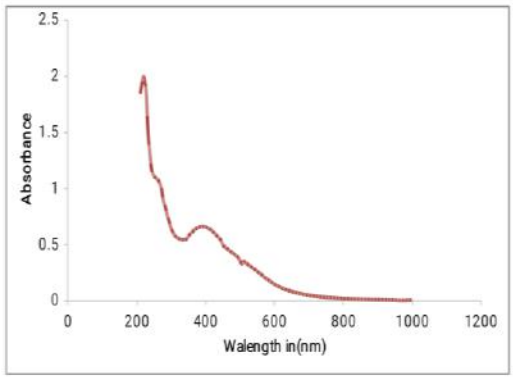
UV visible spectra for sample 2:

[Neem leaves extract 10ml +100ml$AgNO_3$solution]



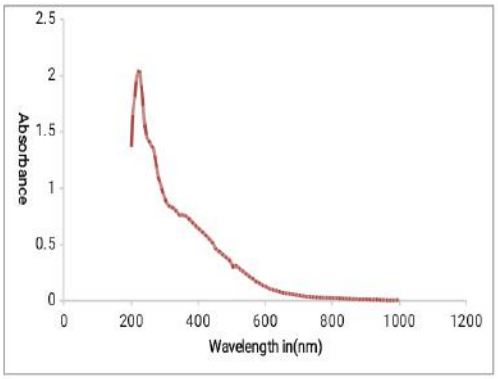
UV visible spectra for sample 3:

[Bitter gourd Fruit extract 6ml + neem leaves extract 4ml + 100ml $AgNO_3$ solution]



10nm. UV visible spectra for sample 4:

[Bitter gourd Fruit Extract 4ml + Neem leaves Extract 6ml + 100ml$AgNO_3$ solution]



FTIR ANALYSIS

FTIR analysis measurements were carried out to identify the bio molecules for capping and stabilizing agents of metal nano particles synthesized. The FTIR spectrum shows (Fig3)a band between 3400-3500cm^{-1} corresponds to O-H stretching H- bonded alcohols and phenols. The peak around 1500-1600cm^{-1} corresponds to C-H bonds. The peak around 1350-1450 cm^{-1} showed the bond stretch for N-h. Therefore the synthesized nano particles were surrounded by proteins and metabolites such as terpenoids etc. From the analysis of FTIR studies are confirmed that carbonyl groups from amino acid residues and proteins has a strong ability to bind the metal (i.e. capping of AgNPs) to prevent agglomeration and stabilize them. This suggests that biological molecules could perform dual role of formation and stabilization of AgNPs.

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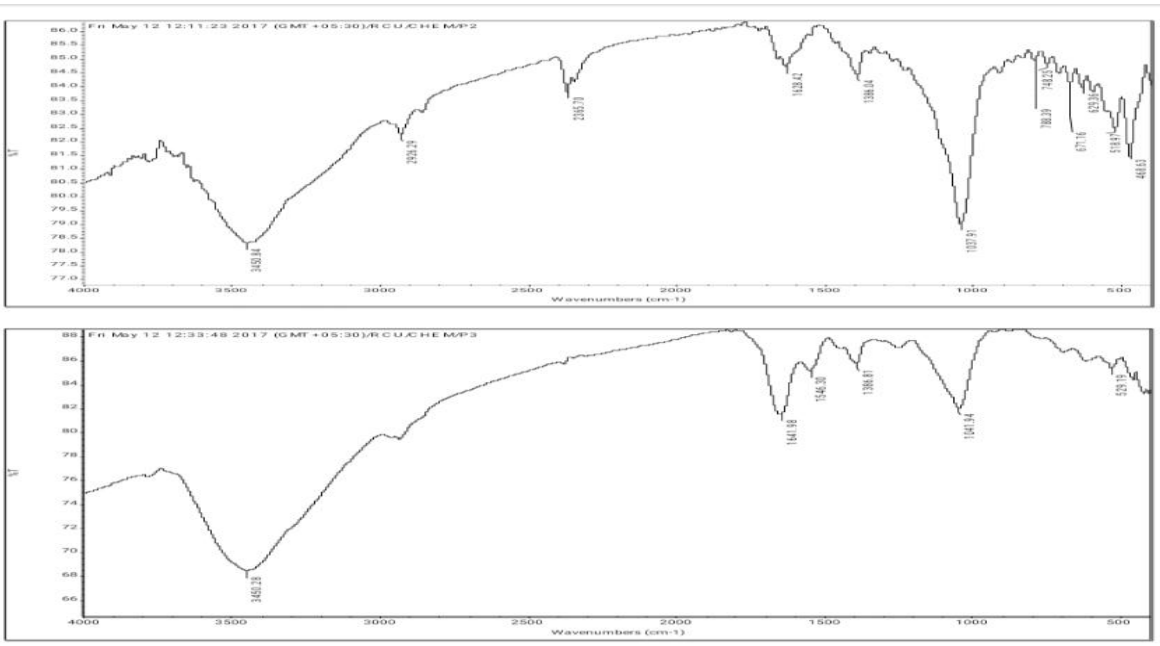

Fig3. FTIR analysis

CONCLUSION:

Silver nano particles have been synthesized by reducing silver ions with an aq. Extracts of neem and bitter gourd fruit. The silver nano particles have been characterized by UV-VIS and FTIR spectra. From FTIR it is confirmed that bio molecules could possibly performed dual functions of formation and capping agent of AgNPs. The XRD and SEM analysis of these samples may be studied in the future for the extension of its applications in optical sensors, neem leaves and bitter gourds are known to be medicinal plants and silver is also anti bacterial agent so we may extend this work to study antibacterial property. .Due small size of AgNPs we may use it in medical diagnostic techniques. Due to surface Plasmon activation of silver nano particles we may use it as sensors. [4]

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NEW TRENDS IN PLANT TAXONOMY

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ABSTRACT:

[Systematics is a branch of Biology that deals with cataloguing plants, animals and other organisms into categories that can be named, remembered, compared and studied. Study of only one organism of a group provides sufficient information about the remaining members of that group. Taxonomy, systematics or classification of organisms is based on the study of their comparative morphology (form, external and internal structure), cytology, embry-ology, fossil relatives, biochemical analysis and ecological relationships. The knowledge is required by all biologists working in different fields, e.g., agriculture, forestry, industry, ecology, medicines, genetics, physiology, etc. It also helps in developing evolutionary rela-tionships, with or without the help of taxonomic studies of fossils In contrast classical systematics is based on the study of mainly morphological traits of one or a few specimens with supporting evidences from other fields. New systematics is also called population systematics and biosystematics. It strives to bring out evolutionary relationships amongst organisms. New systematics is based on the study of all types of variations in the species. Along with morphological characters, other investigations are also carried out to know the variety of traits. Delimitation of species is carried out on the basis of all types of biological traits. It is also called biological delimitation. Traits indicating primitiveness and advancement are found out. Inter-relationships are brought out. Species are considered dynamic. This resulted in development of phylogenetic clas-sification or cladistics (Gk. klaclos- branch, L. dados- branch). In cladistics organisms are arranged in historical order in which they evolved as branches of the parent stock. This phase is known as new systematics or biosystematics. The terms systematics, taxonomy and classification are often held as syn-onyms but technically they carry different meanings.]

INTRODUCTION:

Modern taxonomists consider that the gross morphological characters are not always sufficient to provide means of differentiation in determining the genetically and evolutionary relationship between taxa. To achieve these taxonomical evidences from anatomy, embryology, palynology, cytology, palaeobotany, ecology, biochemistry etc. are discussed.

Dr. V. Puri has said "One of the most significant modern trends in plant taxonomy is towards a synthesis between the older methods, outlook and more recent developments in our knowledge of plants".

Modern Trends in Relation to Taxonomy:

1. Morphology in Relation to Taxonomy
2. Anatomy in Relation to Taxonomy

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3. Embryology in Relation to Taxonomy
4. Palynology in Relation to Taxonomy
5. Cytology in Relation to Taxonomy
6. Ecology in Relation to Taxonomy

1. Morphology in Relation to Taxonomy:

Gross morphology has no doubt provided the foundation and framework for taxonomy, but it has become increasingly clear that contributions to systematics may come from almost any branch of biology. The modern taxonomist has, therefore, to have a broader outlook than his predecessor a few years ago.

Morphological characters are plants habit, root structural types, stem habit, stem structural types, bud structural types, leaf structural types, inflorescence types, flower types, perianth structural types, androecial types, stamen types, gynoecial types, carpel types, ovule types, fruit types and seed types.

Modification of flowers in stamen number, anther position, ovary position, style length, stigma shape, number of carpels, number and fusion of perianth parts etc., contribute to the reproductive success of the species. The growth habit (herbaceous or woody) of plants may be of primary usefulness in classification. Brassicaceae and herbaceous; Asteraceae have both woody and herbaceous members.

2. Anatomy in Relation to Taxonomy:

It is believed that internal structure of plants can provide more information than external morphology. However, anatomical features cannot by themselves constitute the basis of classification but can be used with advantage to supplement those morphological attributes on which classification has been built. The anatomical studies of organs of flowering plants can serve as an integral part of taxonomy.

3. Embryology in Relation to Taxonomy:

A recognition of the value of Embryology in taxonomy was delayed because of the time and trouble involved in collecting embryological data.According to Maheshwari (1964) and Bhojwani and Bhatnagar (1978), the characters of taxonomic value in delimiting plant groups include the:

(a) Anther; (g) Form organization of the embryosac

(b) Quadripartition of the microspore mother cell; (h) Fertilisation;

(c) Development and organisation of the pollen-grain; (i) Endosperm;

(d) Development and structure of the ovule; (j) Embryo and

(e) Origin and extent of the sporogenous tissue in the ovule (k) Seed-coat.

(f) Megasporogenesis and development of the embryosac;

4. Palynology in Relation to Taxonomy:

According to Bailey and Nast (1943), "there are families of dicotyledons in which the pollen is of very considerable taxonomic significance not only in the differentiation of subfamilies and tribes but also of genera and species". A few examples will illustrate the statement.

NPC system: The pollen classification is based on number-position character analysis, called NPC system. As a rule, the number of apertures is only one in the cryptogams and gymnosperms whenever the grains are aperturate but the position is distal in the latter and proximal in the former and the apertures are non-trichotomous (e.g. monolete) or trichotomous (e.g. trilete) in character.

5. Cytology in Relation to Taxonomy:

The application of cytological data in elucidation of taxonomic problems, it is seen that various attributes of chromosomes like number, morphology, size, behaviour in crosses and aberrations in reproduction are all important.

Chromosome number: The haploid number of chromosomes in angiosperms ranges from n = 12 in *Halopappus gracilis* (Asteraceae) to around n = 132 in *Poa littoroa* (Poaceae). Most of the angiosperms have chromosome numbers ranging between n = 7 and n = 12. About 35 to 40% per cent of the flowering plants are polyploids.

Chromosome morphology: A study of chromosome morphology is informative to the taxonomist in assessing affinities and modes of origin of separate species. The important work of Babcock in Crepis show how chromosome morphology coupled with chromosome number is of considerable importance in the genetic and taxonomic phases of study.

Chromosome size: It has already been discovered that evolutionary development involves in addition to alterations in chromosome number, their size, changes in structure etc., so that analysis of these cytological characters may also shed important light on species relationships. Recent observations on the Menispermaceae have shown that this aspect of cytology is sometimes valuable in taxonomic discussions.

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Large chromosomes, low chromosome number and symmetrical karyotype represent a primitive status, while small chromosomes, high number and extreme asymmetry indicate advancement.

Chromosome behaviour in crosses: The behaviour of chromosomes in crosses is a reliable factor in assessing relationships. Pathak (1940) made a careful karyotypic analysis of various species of *Aegilops*, *Secale* and *Triticum*, suggesting that the hexaploid *T. spelta* and *T. vulgare* were probably derived through hybridisation between a tetraploid wheat and Roy (1959) carried out detailed genome analysis of *Aegilops longissima* and *A. sharonensis*.

On the basis of chromosome pairing and fertility of F1 hybrids and the derived amphidiploidy, he thought that the two species are closely related. From a study of the karyotypes of species of *Aegilops*, Cheenaveeraiah (1962) postulated that the section Sitopsis should be shifted from *Aegilops* to *Triticum* or given the rank of a new genus.

6. Ecology in Relation to Taxonomy:

The ecological criteria are of comparatively little direct importance in taxonomy, though ecological criteria at the interspecific level cannot be neglected. In flowering plants, tolerance and plasticity are widespread. The tolerance of a plant population is determined by its ability to survive and reproduce upon exposure to a range of environmental factors. The tolerance is greater when the range is wider. On the other hand, plasticity is ascertained by the degree to which the appearance of plants varies in moving from one set of factors to the other.

The above trends are using in the plant taxonomy to identify, Classify and to find out the Phylogenetic relations among with plants. Recently a technology has been improved in the field of systematics to collect all the necessary data to interpret the levels, similarities, characters of species.

Modern Tools of Systematic Botany:-

1. Geographic Information System 2. Molecular Techniques.

A. Geographic Information System (GIS):

The latest technique used as a tool in Biosystematics is Remote sensing and the use of computer. Remote sensing is carried out by satellites to get an idea of the particular phytogeographical area. It was first used in 19th century by using camera. But now the technology is well developed and

pictures are provided by the satellites.Geographical information system gives the information about an area. Computer and software is required for interpreting results.

A Geographic Information System (GIS) captures, stores, analyzes, manages, and presents data, which is linked to a location. It includes mapping software and its application with remote sensing, land surveying, aerial photography mathematics, photogrammetry, geography, and tools that can be implemented with GIS Software.

The process needs:

(a) Energy source, (b) Transmission path

(c) Target, and (d) Satellite sensor.

B. Molecular Techniques:

Molecular techniques as taxonomic tool are of very recent development. Rapid advancement in molecular biology of plants influenced taxonomists in this respect. The direct application of the molecular parameters as taxonomic feature is relatively less developed.DNA profiles are most widely used in classification. Intra-specific variation can be detected easily. Other parameters used are molecular sequences. It offers the most unambiguous and reliable basis for phylogenetic as well as systematic consideration.

DNA Profile Making: Eukaryotic genome has a variety of sequence types including various claims of repetitive and non-repetitive types. The methods which reveal specific DNA sequence distribution patterns are generally known as DNA profile methods. The important DNA profile methods are DFP (DNA finger printing) and MAAP (Multiple Arbitrary Amplican Profiling).

DNA Finger Printing: DNA finger printing is a useful technique for genotype determination. It is possible to trace gene-flow amongst individual in the population to establish genetic relationship. Individual genotype can be identified at molecular level on the basis of an extremely high level of polymorphism in the sequence of its DNA. DNA finger printing adequately describes intra-population genotype distribution.

Another important investigation in the field of Biotechnology to the systematics is **Chloroplast DNA Profile**: Palmer (1985, 1987, 88) studied the chloroplast DNA as taxonomic or phylogenetic parameter. According to them the comparison of restriction site data in chloroplast DNA's has generally been applied to examine relationship among closely related species or

genera. For example, in Family Asteraceae chloroplast DNA variation was examined in 57 genera belonging to 15 tribes.

DNA markers are devoid of environmental and developmental influences, unlimited in number to detect polymorphism, devoid of pleotropic and epiplastic tremendous discriminatory power, which is consistent under identical experi-mental conditions. Recently such molecular markers are identified including hybridization based markers as RFLPs, Repeat elements, Microsatellites, Minisatellites, PCR based markers as Ap-PCR, MP-PCR, ISSR, STS, STMS, SCAR, DAF, AFLP etc.

CONCLUSION:

In earlier days plants were classified according to the Natural and Artificial systems of classifications which are based on the single characters or morphological characters. As Science field is developing we are incorporating all the modern trends which distinguishes the plants and provide perfect classification according to Morphology, Anatomy, Embryology, Palynology, Cytology ,Ecology and also the Paleobotany. We are also using the Biotechnology for better improvement of the plant Systematics.

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Phytochemical screening and effect of leaf extract of *Atalantia racemosa* Wt. against larvae of *Spodoptera litura* (Fabricius)

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ABSTRACT:

[Acetone, Methanol and Aqueous extracts of Atalantia racemosa were evaluated for their antifeedant activities against third instar larvae of Spodoptera litura. Bioefficacy of Atalantia racemosa leaf extracts were studied by leaf disc no choice bioassay method at 1%, 3% and 5% concentration of crude extracts against third instar larvae of Spodoptera litura under laboratory conditions. Maximum antifeedant activity was recorded in 5% acetone extract (49.56±2.45%) followed by 5% methanol extracts (40.18%±1.24) and 5% Aqueous extract (19.18%±0.15). The treated larvae show reduction in size as compared to their untreated larvae of same instar. The preliminary phytochemical screening of different solvent extract of leaves of the same plant was showed presence of alkaloids, phenols which may effective for larvae.]

Keywords: *Atalantia racemosa, Spodoptera litura,* antifeedant activity.

INTRODUCTION:

In the last five decades, many countries including India have concentrated on non-polluting and economic entomological technologies to increase the productivity of vegetable crops and economically important trees. Insect pests play a major role in damaging the crops and hence there is a need to use effective control agents. Crop loss due to insect pests varies between 10 to 30% for major crops (Ferry et al., 2004). Insect pests are mainly controlled with synthetic insecticides over the last 50 years. Because of their longer usage, there are problems of pesticide resistance and negative effects on non-target organisms, including humans and the environment (Franzen, 1993). Due to these impacts of chemical insecticides prompted search for alternate techniques for insect pest management (Isman ,1995).

The shrub *Atalantia racemosa* is belongs to family Rutaceae and partially prence in India and Srilanka (Sukimaraan, 2010). *Spodoptera litura* (F.) commonly known as the tobacco caterpillar is generalist herbivore infesting more than 290 species of plants belonging to 80 to 99 families. (Wu,2004).This paper describes a laboratory study to assess the antifeedant activity of *Atalantia*

racemosa leaf extracts in different solvents against third instar larvae of the notorious polyphagous pest - *Spodoptera litura* and simultaneously phytochemical screening of the *Atalantia racemosa* was tested.

MATERIALS AND METHODS:

Collection of Plant material:

Plant leaves were collected around Amboli, Maharashtra. The plant materials (leaves) were washed several times with tap water followed by distilled water and air dried under room temperature (27±2^{0}C) and relative humidity (RH, 75±5) at Science Research Facility Centre, Devchand College, Arjunnagar.

Extraction Method:

After complete drying the plant materials (leaves) were powdered using electric blender and sieved through kitchen strainer. The extracts were prepared by soaking 3 g of dried powder in 30 mL of acetone, methanol and aqueous were added sequentially and subjected to orbital shaker for 72 hrs with 120rpm. The extracts were filtered through Whatman's No. 1 filter paper. The solvent from the crude extracts were evaporated to air dryness at room temperature. The crude extracts were collected in clean Borosil vials and stored in the refrigerator at 4^{0}C for subsequent bioassay against *S. litura*.

Phytochemical Screening: The Acetone, Methanol and aqueous extracts were used to perform the phytochemical screening using standard methods (J.B. Harbone, 1973) for the detection of the following:

Screening for Alkaloids (Mayer's Test): 1ml of the extract was measured into a watch glass and little amount of dilute hydrochloric acid and Mayer's reagents were added to the solution; the formation of a white precipitate indicated the presence of alkaloids.

Screening for Flavonoid (Shindo's Test): 1.3ml of the extract was mixed with 0.5g of magnesium turnings; the mixture was boiled for 5minutes; the appearance of orange to red colour indicated the presence of flavonoid.

Screening for Terpenoids: Crude extract was dissolved in 2ml of chloroform and evaporated to dryness. To this, 2ml of concentrated H2SO4 was added; a reddish brown coloration at the interface indicated the presence of terpenoids.

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Screening for Phenol: A few drops of ferric chloride solution were added to 2ml of the extract in a watch glass; the appearance of bluish green colour indicated the presence of phenol.

Screening for Saponin (Frothing Test): 2.5ml of the extract was mixed with a few drops of distilled water and the mixture was shaken vigorously, a cupious lather formation was noticed which indicated the presence of saponin, and the absence of the cupious lather meant the absence of saponin.

Screening for Tannin (Wohler's Test):A few drops of basic lead acetate solution was added to 1.6ml of the extract; the appearance of a white precipitate indicated the presence of tannin in some of the plant extracts.

Establishment of *Spodoptera litura*:

Egg masses were collected from the tobacco field nearby Nipani area. Reared in laboratory .The eggs were surface sterilized with 0.02% sodium hypochloride solution and allowed to hatch. The larvae were reared on normal diet (Castor leaf) in controlled environmental chamber (27^0C, 75%RH.) Third instar larvae were selected for experiments.

Antifeedant activity:

Antifeedant activities of plant extracts were studied using leaf disc no choice bioassay method. Fresh castor leaf of disc 4 cm diameter were dipped in one per cent concentration of each plant extracts. After solvent evaporation at room temperature, leaf disc was kept in individual Petriplate. In each petriplate a pre starved third instar larvae of *Spodoptera litura* was introduced. The larva was allowed to feed on treated discs for twenty four hours. The experiment was carried out in triplicate. At the end of the experiment, unconsumed area of leaf disc was measured with ImageJ software and per cent antifeedant activity calculated based on the formula of Singh and Pant [Singh, 1980]. Larval mortality was also recorded. The average value calculated and depicted in the observation table.

Formula used:

$$\text{Per cent antifeedant activity} = \frac{A - B}{A+B} \times 100$$

A- Leaf disc consumed by the larvae in control

B- Leaf disc consumed by the larvae in treated

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RESULT AND DISCUSSION:

Phytochemical Screening:

The results of the phytochemical screening, as shown in table: 1 below revealed for alkaloids negative in acetone and positive in methanol and aqueous extracts. Test for flavonoids, terpinoids shows positive in acetone and methanol and negative in aqueous extract. Test for saponins shows positive in acetone and methanol and negative in aqueous extract. Test for phenolic compounds shows positive in acetone and methanol extract and negative in aqueous extract and tannins shows positive in methanol extract and negative in acetone and aqueous extracts. The main categories of phytochemicals present in Atalantia spp. Include alkaloids, coumarins and flavonoid; which impart profuse pharmaceutical potential to the plants.[Saloni Sharma, 2015]

Antifeedant activity:

In the present investigation, the acetone extract (5%) of A. racemosa at the tested concentrations recorded maximum antifeedant activity against S.litura when compared to the other extracts after 24 hrs. This is in agreement with the findings of (Baskar K,2008)who observed that the hexane extract of A. monophylla had higher antifeedant activity on S. litura .Larval mortality was high probably due to the presence of alkaloids in this plant. Similar results were also recorded in *Atalantia monophyla* (Basu.D,1972) and another plant of rutaceae family *zantoxylum rhetsa* was effective against larva of *Helicoverpa armigera* (P.D.Shiragave,2018).

CONCLUSION:

In the present study, the voracious feeding habit of third instar larvae of *Spodoptera ltura* was highly reduced by treatment with the extracts of *Atalantia racemosa*. Maximum reduction in antifeedant activity was recorded in acetone extract followed by methanol and aqueous extracts. Presence of Alkaloids and flavanoids may effective for major pest like *Spodoptera litura.*

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Table 1: Phytochemical screening of acetone, methanol and aqueous Extracts.

Sl. No.	Phytochemical	Acetone Extract	Methanol Extract	Aqueous Extract
1	Alkaloids	-	+	+
2	Flavanoids	+	+	-
3	Terpinoids	+	+	-
4	Saponins	-	+	-
5	Phenols	+	+	-
6	Tanins	-	+	-

Key: + = Trace amount. - = Not Detected

Table 2: The effect of percentage of antifeedant activity of *Atalantia racemosa* on *Spodoptera litura* at 5% Concentration after 24 hrs.

Treatment	Antifeedant activity (%)
	24 hrs
Acetone	49.56±2.45%)
Methanol	40.18%±1.24
Aqueous	19.18%±0.15

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Preparation and Characterization of Betel Leaf Extract Doped Chitosan/Vaniilin Blend Films

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ABSTRACT

In the present study it is planned to prepare the Betel leaf extract doped chitosan/vanillin blend films and characterized with different instrumental techniques. The mechanical, morphological and antimicrobial properties of the blend films were analysed by using Universal testing machine (UTM), Scanning electron microscopy (SEM) and Disc diffusion method. The results of the UTM and SEM revealed that there is significant improvement in the mechanical properties and blend films were miscible with each other exhibiting homogeneous phase morphology. This could be possibly due to the good molecular miscibility between three components. The results of antimicrobial study showed that incorporation of betel leaf extract to the chitosan/vanillin blend films enhanced the antimicrobial activity. The prepared blend films can be a good candidate to replace the non-biodegradable packaging plastics.

Key words: Chitosan, blend films, degradation, swelling behaviour and chemical resistivity.

Preparation and characterization of *Lactuca Scariola* Leaves Extract Doped Poly (Vinyl Alcohol) Composite Films

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ABSTRACT

In this study, *Lactuca scariola* leaves (Ls) extract doped Poly (vinyl alcohol) composite films were fabricated by using solution casting technique. The prepared composite films were characterized by using Atomic force microscopy (AFM), Thermogravimetric analysis (TGA), Universal testing machine (UTM) and Fourier transform infrared spectroscopy (FTIR). The AFM study revealed that composite films (PLs-1 (0.5 mL) initially showed smooth and uniform surface morphology with decreased roughness compared to pure PVA film. The results of TGA confirmed that addition of Ls plant extract to the PVA has influenced on thermal stability of the composite films indicating the increase in the degradation temperature when compared to virgin PVA film. The mechanical study confirmed that highest tensile strength and young's modulus observed for the PLs-2. This could be due to the strong interaction and compatibility among the PVA and Ls in composites at lower content. Meanwhile, the stress-strain curves of PLs composite films indicated that films were less elastic and flexible in nature compared to pure PVA film. As the Ls plant extract increased in the PVA films starts moving towards brittle and rigid.

Key Words: *Lactuca Scariola*, PVA, AFM, and TGA.

Role of Plant Resources In Degradation of Plastics

Saadiqa. M. Lingasur

ABSTRACT

Plastic consumption in India has been on the rise for the last few decades. It has become a common element in our day to day life in this globalized world. With increasing global consumption and their natural resistance to degradation, Plastic materials are seen as environmental threat because they are difficult to degrade. Most of today's plastics are synthetic polymers are produced from Non-renewable petrochemical sources such as oil, coal and natural gas. Hence they are not biodegradable.

Most micro-organisms degrade natural polymers and synthetic polymers by the process called as biodegradation.

One of the biggest challenges with plastic waste is that it is extremely hard to dispose. Disposal by landfills and burning releases green house gases like carbon dioxide, methane etc., and poisonous chemicals like polyvinyl chloride, polyurethene etc. Now, a new environmentally friendly plastic is being manufactured known as Bioplastics.

Bioplastics are made from biological material instead of from fossil fuels and they are supposed to have different properties from synthetic plastics, they are easily biodegradable in nature. But now we may have some more help to clean up the mess in the form of plant resources. Many researchers and engineers have been seeking to develop biodegradable plastics that are made from renewable resources, such as plants. Scientists in United States, have already been able to produce plastics from plant materials such as corn, wheat and soya beans in the form of cellulose.

In India, there is immediate application for biodegradable plastics in several areas –Agricultural mulch, industrial packaging, wrapping, milk sachets, food service, pharmaceuticals, medical devices, etc. The concept of biodegradable plastics is very new in India. But, to protect the environment from abuse it is necessary to switch on to the Eco-friendly plastics from synthetic plastics.

THE EFFECT OF VARIOUS PLANT EXTRACT ON THE SURVIVAL OF WHITE GRUB

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ABSTRACT

Crop losses by soil—pest insects have been identified as one of the main causes of low food production. Among different insect pests, white grubs (larvae of Coleoptera, Scarabaeidae) are among the destructive insect pests in Karnataka. The grubs attack a wide range of crops such as groundnut, sorghum, maize, Sugarcane, soybean, black gram, mung bean, pigeon pea, cucurbits, Brassica, tomato, sweet potato, clusterbean, cowpea and potato. The chemical control of groundnut white grubs, Holotrichia serrata F. and H. reynaudi Blanchard (Coleoptera: Scarabaeidae), was possible using chlorpyrifos and imidacloprid But chemical control have some limitations that they leave harmful residue in treated soil which kills useful soil flora and fauna. Keeping this in mind, the present investigation was carried out to study the control of White grub using various plant extracts such as Neem, Tobacco extract and Jatropa.

For the study purpose, First the soybean field was divided into five parts and then after a month from germination the soybean crop grown in the field infected with white grubs were subjected to different leaf extract such as Neem, Tobacco, Jatropa and Cow urine separately in 100% concentration (100gms of fresh leaves crushed in 100 ml water), and also one part with water which is considered as control then all the area were treated twice a week with alternate watering of equal amount of tap water. After two months of growth randomly some of the plants were uprooted, and observed for white grubs.

Response of the various plant extract on survival of white grub from the study it is indicated that the Neem leaf extract exerts a remarkable effect on white grubs compare to other leaf extract. It is therefore suggested that Neem leaf extract can have a commercial application for destruction of white grub.

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Curcumin promotes mitochondria-mediated apoptosis in human laryngeal cancer cell line (HEP-2) by miRNA-203 mediated down regulation of surviving

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ABSTRACT

Curcumin (CUR) is phenolic compound and its pharmacological profiling confirmed that potential anti-cancer property as they exhibit pleiotropic action on cancer. It selectively causes tumor cells to induce the apoptosis through mitochondria-related intrinsic and death receptorassociated extrinsic pathways. Recent studies found that CUR plays a vital role in cancer progression by changing specific miRNA expressions in a variety of cancers. CUR inhibits cell proliferation and promotes apoptosis of laryngeal cancer through Bcl-2 and phosphoinositide 3-kinase (PI3K)/protein kinase B (Akt), and by up regulating microRNA-15a (miR-15a). MiR-203 is an antitumor miRNA that is down regulated in pancreatic cancer cells and laryngeal carcinoma cells specifically targeting survivin expression. Its expression is inversely related to the expression of the survivin gene by inhibiting the caspase-3 and caspase-7activity results in inhibition of cell apoptosis. The aim of the present study was to investigate whether curcumin inhibits cell proliferation and promotes apoptosis of laryngeal cancer through miRNA-203 mediated down regulation of survivin. We performed cytotoxicity by the 3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. Rhodamine-123 dye was used assess Mitochondrial transmembrane potential. Further we confirmed the apoptosis by DAPI staining and DNA Fragmentation. Then we performed the quantitative RT-PCR miRNA-203 and apoptosis-modulating genes expression CUR was showing high significant ($P<0.01$) decrease in cell viability compared to control at different time intervals.CUR showed concentration-dependent manner collapse in mitochondria membrane potential. Similarly, for CUR treated cells shown nuclear fragmentation, chromatin condensation and blebbing of the nucleus. CUR significantly increased concentration-dependent manner Bax and caspase-3 genes. MiR-203 expression was significantly increased by CUR compared with the untreated control cells In conclusion; the present study demonstrates that CUR promotes mitochondria-mediated apoptotic in human laryngeal cancer cell line (HEP 2) by up regulation of miR-203 and targeting survivin. We suggest that curcumin may offer an important therapeutic advantage in the clinical management of refractory laryngeal cancer over other standard treatments.

Key Words- Curcumin, Anticancer, MiR-203,Apoptosis, RT PCR

Plants as Antimicrobial Agents

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INTRODUCTION

The word antimicrobial was derived from the Greek words anti (against), mikros (little) and bios (life) and refers to all agents that act against microbial organisms. An Antimicrobial is any substance of natural, semi-synthetic or synthetic origin that kills or inhibits the growth of micro-organisms but causes little or no damage to the host.

The term *"antimicrobials"* include all agents that act against all types of microorganisms such as bacteria (antibacterial), viruses (antiviral), fungi (antifungal) and protozoa (antiprotozoal)

Some antimicrobial plants are-Garlic, Coconut Oil, Lemon, Ginger, Clove, Nutmeg, and Cardamom.

GARLIC:

Garlic is a powerful anti-bacterial that can fight yeast infections, fungus and candida overgrowth. Garlic contains a natural protective compound called allicin and other volatile oils, which are released on chewing and crushing it. Garlic has potential to combat heart disease.

COCONUT OIL:

The anti-bacterial properties of coconut oil come from the presence of medium chain fatty acids or triglycerides (MCTs) found in it. The two most potent medium chain triglycerides found in coconut oil are lauric acid and caprylic acid. Research has shown that it can inactivate several types of bacteria, fungi, yeast and viruses. It is a great remedy to fight skin infections.

LEMON:

The anti-bacterial and anti-fungal properties of lemon enable it to fight bacteria that cause acne.

It is full of Vitamin C, which also acts as an antioxidant that fights disease-causing free radicals in the body. Symptoms of a deficiency of Vitamin C includes fatigue, mood changes, weight loss, joint and muscle aches, bruising, dental conditions and dry hair and skin.

GINGER:

Ginger is an effective home remedy for throat infections.

Sucking a piece of raw ginger and taking in all its juices is known to cure cough and kill the bacteria that has caused the infection.

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Ginger also contains a group of chemical compounds called sesquiterpene that are known to kill rhinoviruses, agents that cause cold.

CLOVE OIL:

Clove oil has biological activities, such as antibacterial, antifungal, insecticidal and antioxidant properties, and is used traditionally as a savoring agent and antimicrobial material in food.

Clove oil is used as an antiseptic in oral infections.

NUT MEG:

Nutmeg is the dried seed of the Myristica fragrans Houtt. It has anti-cancer, anti-inflammatory and anti-diarrheal properties. Nutmeg also acts as a memory enhancer and aphrodisiac.

CARDAMOM:

Greater cardamom (Amomum subulatum Roxb. Zingiberaceae) commonly known as "Bari ilaichi" is a well known plant used in Ayurvedic and Unani medicine. Used for the treatment of various diseases and disorders like gastric ulcer.The essential oil isolated was effective against majority of microorganisms used viz. Bacillus pumilus, Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, Saccharomyces cerevisiae.

CONCLUSION:

Plant extracts have great potential as antimicrobial compounds against microorganisms. Thus, they can be used in the treatment of infectious diseases caused by resistant microbes.

The synergistic effect from the association of antibiotic with plant extracts against resistant bacteria leads to new choices for the treatment of infectious diseases.

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Applications of Nanomaterials in Agricultural Science

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ABSTRACT

Nanomaterials are being widely and successfully applied in various technological fields such as electronics, sensors, energy devices, biomedicine, tissue and gene engineering, etc., as nanomaterials provide huge surface area, excellent electron conductivity, ease of surface modification, superior mechanical strength, and biocompatibility. Very recently, the applications of these nanomaterials have been extended to agricultural science and agricultural practice, because nanoparticles easily form their emulsions, encapsulations, enhanced solubility and their biocompatibility. In view of this, we briefly summarized the use of various nanoparticles in the agricultural filed. The mechanisms of action of these nanoparticles on specific agricultural applications have been described. Specifically, the utility of nanoparticles in *precision-farming, nano-based products (nano-fertilizers, nano-fungicides, and nano-pesticides), crop-improvement and preservation of plant/vegetables products,* have been explored.

Keywords: Nanomaterials, Agricultural applications, Crop-improvement, Biocompatibility.

Biotechnology in Plant Medicines

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ABSTRACT

Medicinal plants are the most important source of life saving drugs for the majority of the world's population. The biotechnological tools are important to select, multiply and conserve the critical genotypes of medicinal plants. In-vitro regeneration holds tremendous potential for the production of high-quality plant-based medicine.Cryopreservation is long-term conservation method in liquid nitrogen and provides anopportunity for conservation of endangered medicinal plants. In-vitro production of secondary metabolites in plant cell suspension cultures has been reported from various medicinal plants. Bioreactors are the key step towards commercial production of secondary metabolites by plant biotechnology. Genetic transformation may be a powerful tool for enhancing the productivity of novel secondary metabolites; especially by *Agrobacterium* rhizogenic induced hairy roots. This article discusses the applications of biotechnology for regeneration and genetic transformation for enhancement of secondary metabolite production in-vitro from medicinal plants.

Key words: Bioreactors; genetic transformation; regeneration; secondary metabolites.

Secondary metabolites

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INTRODUCTION

Plants produce a large and diverse array of organic compounds that appear to have no direct functions in growth and development i.e. they have no generally recognized roles in the process of photosynthesis, respiration, solute transport, translocation, nutrient assimilation and differentiation. They have a very restricted distribution than primary metabolites in the whole plant kingdom.

Higher concentrations of secondary metabolites might result in a more resistant plant; the production of secondary metabolites is thought to be costly and reduces plant growth and reproduction. The cost of defense has also been invoked to explain why plants have evolved induced defense, where concentrations generally increase only in stress situations.

There are three major groups of secondary metabolites viz terpene, phenolics and N and S containing compounds.

Terpenes composed of 5-C isopentanoid units, are toxins and feeding deterrents to many herbivores. Phenolics synthesized primarily, have several important defensive role in the plants. Members of the third major group i.e. N and S containing compounds are synthesized principally from common amino acids.

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Herbalism

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INTRODUCTION

Herbalism (also **herbal medicine**) is the study of botany and use of plants intended for medicinal purposes. Plants have been the basis for medical treatments through much of human history, and such traditional medicine is still widely practiced today. Archaeological evidence indicates that the use of medicinal plants dates back to the Paleolithic age, approximately 60,000 years ago. Modern medicine makes use of many plant-derived compounds as the basis for evidence-based pharmaceutical drugs. For example,drug Digitoxin is used as a cardiotonic is extracted from *Digitalis purpurea.* The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently uses herbal medicine for some aspect of primary health care Pharmaceuticals are prohibitively expensive for most of the world's population. In comparison, herbal medicines can be grown from seed or gathered from nature for little or no cost. The traditional medicines in different countries are named differently like Traditional Chinese medicine, Traditional Korean medicine, Ayurveda, Siddha medicine, Unani., Ancient Iranian Medicine, Ifá , Muti, etc.;. Ayurveda is the most ancient system of medicine. It focuses not only on curing the unhealthy but also on maintaining the health and longevity in the healthy. This can be achieved by using the plants growing around us and maintaining a good, healthy diet.

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Management of Insect Pest by RNAi

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ABSTRACT

The fast growing human population requires the development of new agriculture technology to meet consumers demand, while minimizing environmentle impacts.Insects pests are one of the main causesfor losses in agriculture production.and current control technology based on pesticides application or the use of transgenic crops expressing '*Bascillus thuringienesis*' toxin proteins are facing efficaly challenges,Navel approaches to controls pests are urgently neccessary, RNAinterference(RNAi) is gene silencing mechanism triggered by providing double stranded RNA (dsRNA), that when ingested in to insects can lead to death or affect the vialibilty of the target pest. Transgenic plants expressing dsRNA version of insects specific target genes are the new generation of resistant plant. And also the core RNAi pathway in insects and the dsRNA uptake, and spread of systematic silencing signals in some key insects species, and I also explain some of the most recent development studies to control agricultural insects' pest by RNAi transgenic plants.

Keywords: Biotechnology, RNAinterference (RNAi), Doublestranded RNA (dsRNA), Gene silencing, insect control.

Phytomedicine

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ABSTRACT

The aim of this topic is to summarize accumalated information related to chemical composition, pharmacological activity, traditional and offical use of phytomedical plant in medicine .In the last decades Phytomedicine have stabilized their significance. The herb used in herbal medicine is known as phytotherapy which assist in healing illness and diseases. It contains various phytoconstituents belonging to alkaloids, glycosides, flavonoids and fixed oil. Due to the study of Phytomedicine many plants properties were revealed. The method used to evaluate plant based medicine are similar to those used by orthodox medicine yet a herb contain many active chemicals unlike conventional drugs which focus on specific chemicals hence botanical or herbal medicines may combine several action to support body health. We have come across the following current applications of Phytomedicines, how Phytomedicine work the examples related to Phytomedicines, the chemical extracted and the phytochemical present in them & the medicinal property present in them. In some of the plants like the Indian snake root is the plant used in treating high blood pressure and mental illness and in case periwinkle the all the parts are used in treating diabetes sore throat.

Plant Tissue Culture

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ABSTRACT

Plant tissue culture has a great significance in plant biotechnology especially in the crop improvement programmes. The term tissue culture may be defined as process of in-vitro culture of explants (pieces of living differentiated tissues) in nutrient medium under aseptic conditions. However, in general, the tissue culture includes the term tissue culture as well as cell culture, organ culture and suspension culture also.

Plant tissue culture is fundamental to most aspects of biotechnology of plants, biotechnology is one of most beneficial of all sciences. The products of plant biotechnology are being transferred rapidly from laboratories to fields.

Also, the plant tissue culture has become of great interest to molecular biologists, plant breeders and even to industrialists, as it helps in improving the plants of economic importance. In addition to all this, tissue culture contributes immensely for understanding patterns and responsible factors of growth, metabolism, morphogenesis and differentiation of plants.

Key words: Tissue culture, Cell Culture, Suspension Culture

Recent Trends in Plant Science, Crop Science

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ABSTRACT

Advancement in the field of science and technologyalong with the global urbanisation are the major factors driving the course and evolution of agricultural research. Rise in per capita income in developing nations, occupational changes and global linkages have changed the food preferences .these trends along with the increase in population pose a challenge to agriculture for producing more and better food. Increase in productivity of agriculture by employing techniques of conventional agriculture is posing a limitation. The threat to environment, due to dependence on chemical fertilizers and pesticides for increasing productivity and pest management is a major constraint affecting the global food production. Vertical farming and organic farming are the research areas to fight these constraints. Vertical farming employs vertical stacking of the farms therefore small land can be utilised for more production. Advantages of vertical farming are, increase in production and availability in crops, production of organic crops, conservation and recycling of natural resources, environment friendly, sustainable urban groups. In addition, this technique is well suited for rapidly growing urban population as the demands of food supply can be met from within the cities and thus reducing the transportation cost and environment deterioration caused by fuels in the process. Organic farming on the other hand is based on the principles of minimization of the chemical inputs in the agriculture and hence is environment friendly. Advantages of organic farming are sustainability, ecological services, biodiversity. Challenges faced in organic farming are highly labour intensive effective organic inputs are not available in appropriate quantity and time hence constraints in adoption of such practices should be addressed. Thus this technique can be utilized for increasing the production and productivity to meet the growing food demands.

Lichens

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ABSTRACT

The lichens are a small group of curious plants with about 18,000 species. We call them curious because they are composite or dual organisms. During the 1860s it was found that the thallus of all lichens is composed of two quite different organisms, a fungus and an alga, forming a self supporting combination. The fungal component is called the mycoboint and the algal component is known as the phycoboint. The classification of lichens – Many scientists classifies the lichens on the basis of the nature of the fungal element and, the kind of the frutification. On this basis, the lichens are divided into the two groups. In Ascolichens the fungal component is an Ascomycete. Basidiolichens in this group are placed the lichens in which the fungal partner is Basidiomycete. The habit and lichen thallus – The lichens grow in a wide variety of habitats. They are commonly found growing on the walls and roofs of houses, leaves, tree bark, and rocky surface. Generally they are xerophytic in nature. The plant body of lichens is a thallus. It may be grey or greyish green. The types of lichens are Crustose, Foliose, and Fruticose.

The ecological importance of lichens is of considerable ecological importance. The lichens' thallus secretes certain organic acids which gradually dissolve and disintegrate the rock to which they cling. Certain species of lichens are valuable sources of food. A few species have been used as food by man. The traditional use of lichens in the preparation of dyes deserves a special consideration. The fungal component of certain species of lichens produce colored pigments that have been used for centuries as dyes in colouring fabrics and paints. Medicinal use of lichens: a few species of lichens have been used in the medieval times as a cure for jaundice, fever, diarrhea, epilepsy and various skin diseases. Lichens serve as indicators of air pollution. Peltigera canina – dog lichens is used as a medicine for hydrophobia. Lobaria pulmonaria – lung wort is used for lung disease. Xanthoria parietina – is useful for jaundice. Paramelia sexatilis – is useful for treating epilepsy.

Role of Biotechnology in Agriculture

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ABSTRACT

As India is a developing country. We know that agriculture is the backbone of our country. But studies show 40% farmers would switch over another job. Due to fewer yields, crop loss due to natural calamities etc. India stands 103rd in global hunger index.

Biotechnology is application of technology using living organisms to obtain useful products. The transferred gene is known as trans gene and the plants or crops that develop after a successful gene transfer is known as transgenic crops or genetically modified crops.

There are several benefits of gm crops in the present scenario as the gm crops are having several characters like they are herbicide tolerant, insect resistance, virus resistance, drought resistance, salt tolerance, also they increase productivity, enhance shelf life, in improving nutritional value, also in photo remediation, in preparation of edible vaccines for HIV, cholera, rabies, hepatitis-B.

The biotechnology industries of India are bio-can, serum institute of India, Dr.Reddy's laboratory limited, Bharat serums and vaccines limited.

There was a controversy that whether gm crops are good or bad. But 2017 world heath summit and 2016 report from national academics of science's and medicine and also FDA and WHO says that there is scientific consensus that GM crops and foods are safe.

Anthelmintics

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INTRODUCTION

Anthelmintics are drugs that are used to treat infections with parasitic worms. This includes both flat worms, e.g., flukes and tapeworms and round worms, i.e., nematodes. They are of huge importance for human tropical medicine and for veterinary medicine. The World Health Organization estimates that a staggering two billion people harbor parasitic worm infections. Worms also infect livestock and crops, affecting food production with a resultant economic impact. Also of importance is the infection of domestic pets. Indeed, the companion animal market is a major economic consideration for animal health companies undertaking drug discovery programmes. Despite the prevalence of parasitic worms, anthelmintic drug discovery is the poor relation of the pharmaceutical industry. The simple reason is that the nations which suffer most from these tropical diseases have little money to invest in drug discovery or therapy. It comes as no surprise therefore that the drugs available for human treatment were first developed as veterinary medicines. There is thus a pitifully small repertoire of chemotherapeutic agents available for treatment. In some respects, this situation has been exacerbated by the remarkable success of ivermectin over the last twenty years (Geary, 2005), which has decreased motivation for anthelmintic drug discovery programmes (Geary, Sangster and Thompson, 1999). This prompts concern, as anthelmintic resistance has been widely reported in livestock and it may also only be a matter of time before this phenomenon occurs in parasites of humans.

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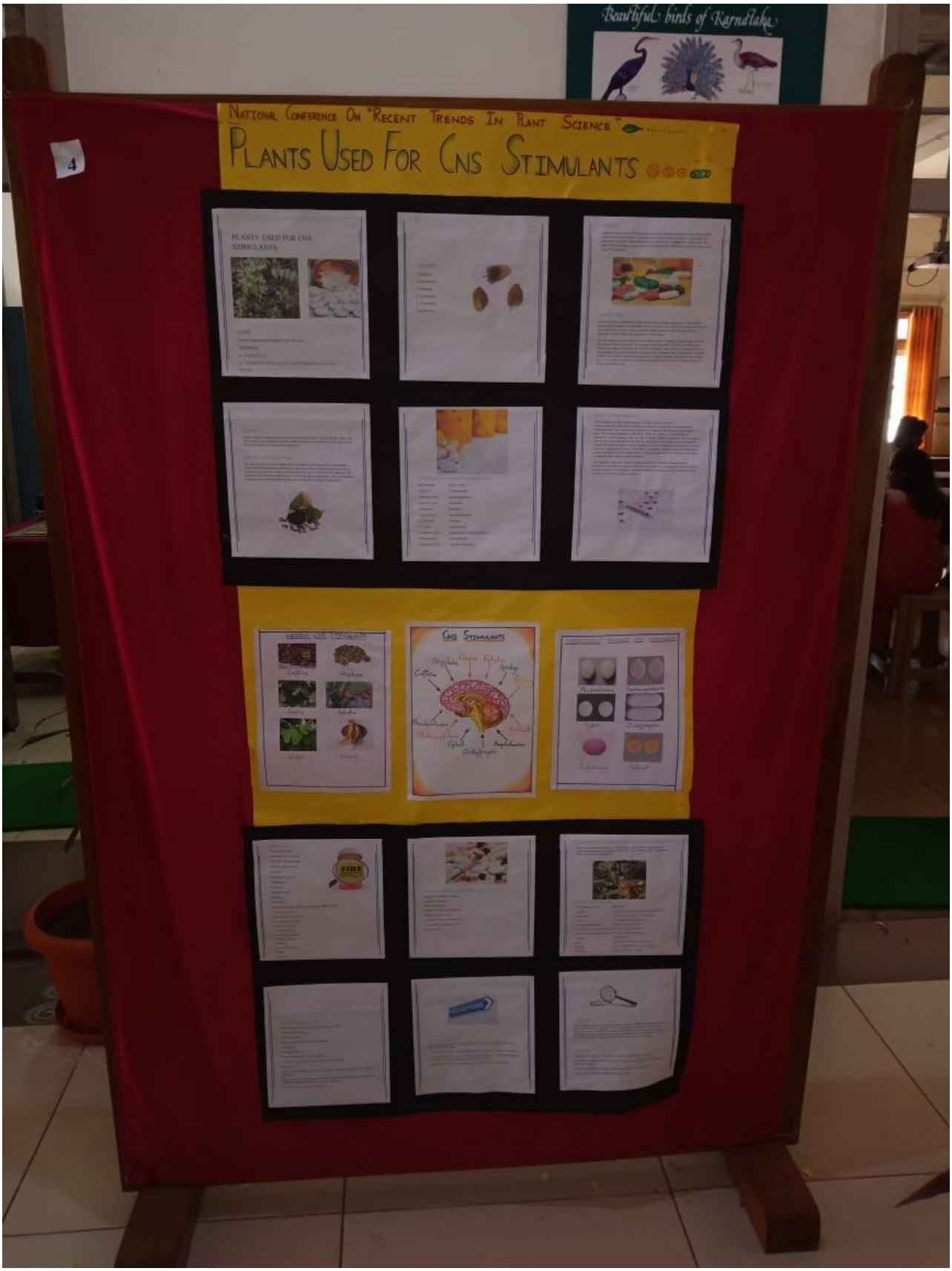
Beautiful birds of Karnataka
National Conference On "Recent Trends In Plant Science"
Plants Used For Cns Stimulants
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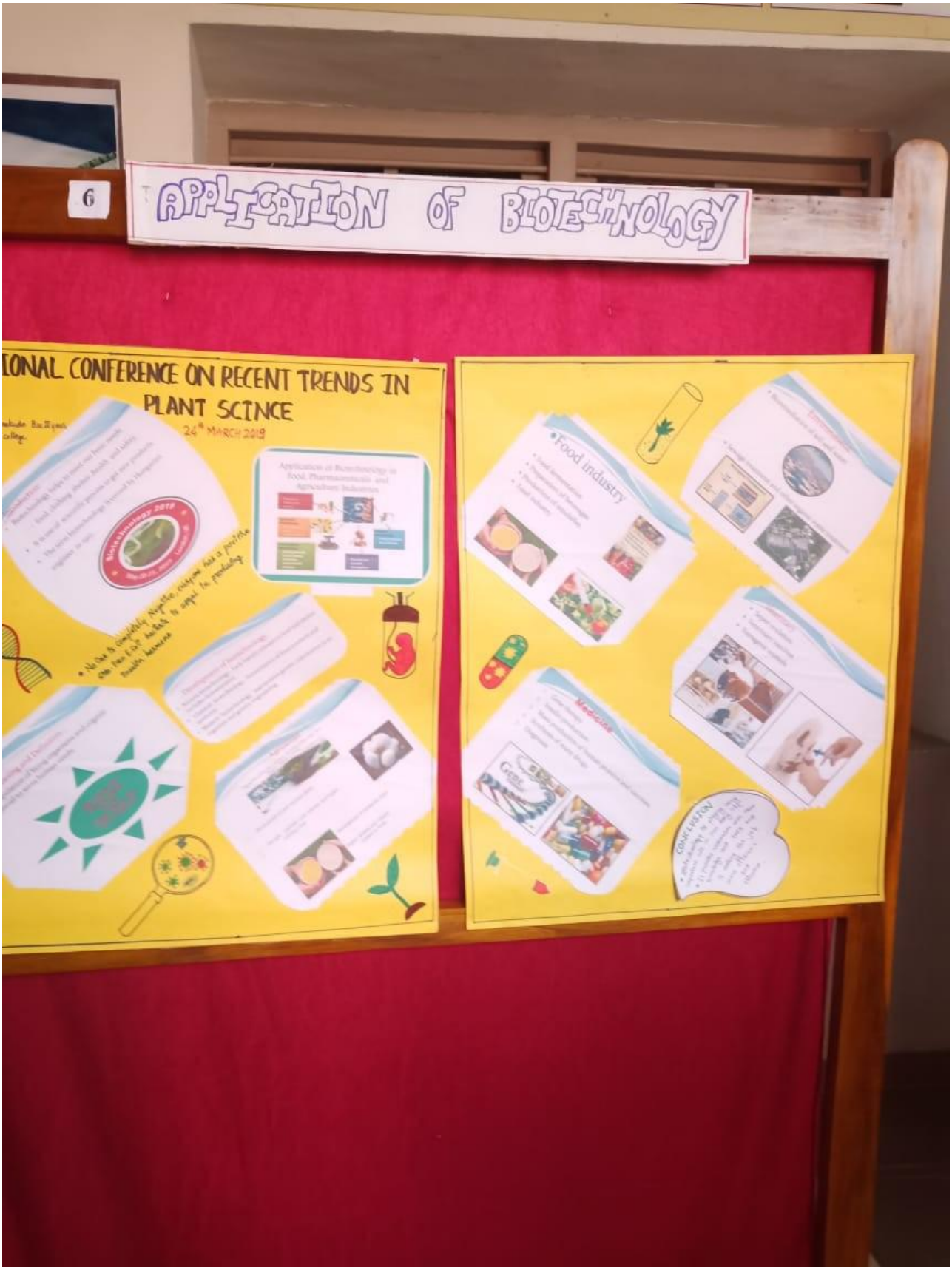
PLANTS USED FOR CNS STIMULANTS
CNS STIMULANTS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APPLICATION OF BIOTECHNOLOGY
ONAL CONFERENCE ON RECENT TRENDS IN
PLANT SCINCE
24th MARCH 2019
Food industry

DEVCHAND COLLEGE, ARJUNNAGAR.
NIPANI.

Department of Agrichemicals and Pest Management

GREEN HOUSE PEST MANAGEMENT

GREEN HOUSE : A structure enclosed and used for the cultivation or protection of tender plants.

PEST : A pest is an organism which causes plant , animal , human ,and their properties.

ABSTRACT

BENIFITES

This bright , flowering pant is effective as removing trichloroethylene , which you n some with your dry cleaning . It's also good for filtering out the benzene that comes

Gerberas (sometimes called gerbera daisies) like well drained soil , so be sure pots h ges holes. Mist leaves a couple time a week and make sure plants get at least six hou sunlight every day.

RED MITES

CAUSES

CONTROL:
Plant water spray
Wettable Sulphur : 1.5 gm
Magiter (Fenazaquin) : 1 ml
Omite (Propargite) : 1ml

CATTERPILLAR

CAUSES

CONTROL
Larvin (Thiodicarb) : 0.4gm
Thimet (Phorate) (SI) : 2gm/plant

ROOT KNOT NEMATODE

CAUSES

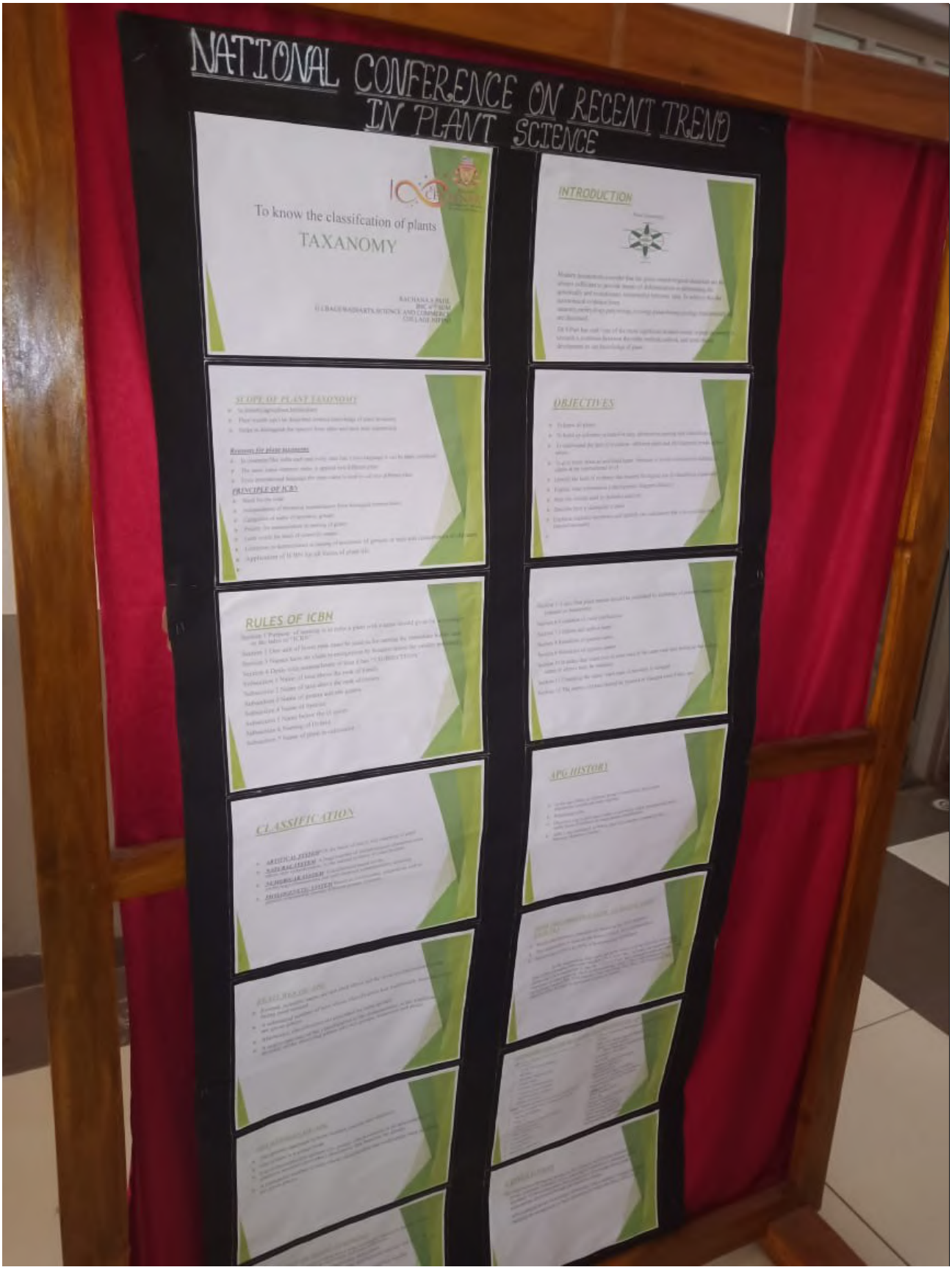
CONTROL

THRIPS

CAUSES
Causes specks or strips on ray floret, Brown spot on leaf petioles / midvein

CONTROL
Roger (Dimethoate): 2
Nuvacvon (Monocrotopho 2ml

REFERENCES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To know the classifcation of plants
TAXANOMY
INTRODUCTION
SCOPE OF PLANT TAXONOMY
OBJECTIVES
RULES OF ICBN
CLASSIFICATION
APG HISTORY

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