PROJECT REPORT
OF
MINOR RESEARCH PROJECT

ON

"STUDY OF ANTIMICROBIAL ACTIVITY OF SOME IMPORTANT WEED PLANTS USED FOR HEALTH CARE BY GOND TRIBES OF CHHATTISGARH"

SUBMITTED BY
DR. SANDHYA MADAN MOHAN
PRINCIPAL INVESTIGATOR

&

DR. BHAWANA PANDEY
CO- INVESTIGATOR

DEPARTMENT OF HOME SCIENCE
BHILAI MAHILA MAHAVIDYALAYA
HOSPITAL SECTOR, BHILAI

SUMMARY

ABSTRACT

Weed plants are important medicinal herbs found throughout India. It has been used in almost all the traditional system of medicine, ayurveda, unani, and sidha from the ancient time. It serves as a folk medicine in traditional uses (Pandey *et al.*,2014, 2015) In present study, the extracts of leaf, stem, inflorescence and roots of leafy vegetable *Chenopodium album, Colocassia esculanta* and *Amaranthus spinosns* was screened. These extracts were processed for qualitative determination of some phytochemicals constituents. Qualitative phytochemicals revealed the presence of alkaloids, saponins, flavonoids and glycosides in each extract. Antibacterial screening against *S.aureus* and *Streptococcus* and fungal against *Aspergillus niger* and *A. flavis* was done and minimum inhibitory concentration was determined. It was found that the extracts shown excellent inhibitory activity against bacteria and fungus. In present study mixing of plant extracts of *Chenopodium album, Colocassia esculanta* and *Amaranthus spinosns* leaf extract for better antibacterial results.

Key Words: Medicinal herb, Minimum Inhibitory Concentration, Phytochemicals.

INTRODUCTION

Plants are the basis of all life on planet Earth. Via photosynthesis, they furnish oxygen and cleanse the air we breathe. Plants process 123 billion metric tons of carbon each year across the globe, thus stemming the buildup of greenhouse gases. More than 80 percent of the human population uses 50,000–80,000 species of medicinal plants; and of the top 150 pharmaceuticals prescribed in the United States, 75 percent are derived from plants. Some 4 billion hectares of forest cover the globe and provide pulpwood, charcoal, fiber, and timber in addition to critical habitat for birds, mammals, and other organisms.

In modern times, natural products from plants have been isolated for drug discovery and development. During the last 20 to 30 years, the analysis of secondary plant products has progressed a lot. Therefore, they are usually synthesized in plants for particular needs, while the primary metabolites have generally shared biological purposes across all species. Secondary metabolites may often be created by modified synthetic pathways from primary metabolite, or share substrates of primary metabolite origin. Plants have been evolving to adapt the environment with genetic encoding of useful and diverse synthesis for secondary

metabolites. In human life, these compounds are used as medicines, flavorings, or relaxing drugs, especially essential oils (Kabera *et al.*,2014, Madan Mohan *et al.*,2016).

Such plants are known as weeds. In short, A plant whose potentiality for farm are greater than its potentiality for goodness. (Tiwari *et al*. 2011, Pandey *et al*., 2014). Plants produce a vast and diverse assortment of organic compounds, the great majority of which do not appear to participate directly in growth and development. These substances, traditionally referred to as secondary metabolites, often are differentially distributed among limited taxonomic groups within the plant kingdom. Their functions, many of which remain unknown, are being elucidated with increasing frequency. The primary metabolites, in contrast, such as phyto sterolsacyl lipids, nucleotides, amino acids, and organic acids, are found in all plants and perform metabolic roles that are essential land usually evident.

Medicinal plants besides therapeutic agents are also a big source of information for a wide variety of chemical constituents which could be developed as drugs with precise selectivity. These are the reservoirs of potentially useful chemical compounds which could serve as newer leads and clues for modern drug design (Das *et al.*,1999).. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds (Dey *et al.*,1957). Correlation between the phytoconstituents and the bioactivity of plant is desirable to know for the synthesis of compounds with specific activities to treat various health ailments and chronic diseases as well (Pandey *et al.,* 2013). Various medicinal properties have been attributed to natural herbs. Medicinal plants constitute the main source of new pharmaceuticals and healthcare products (Krishnaraju *et al.*,2006). The use of medicinal plants in the industrialized societies has been traced to the extraction and development of several drugs from these plants as well as from traditionally used folk medicine (Ojalla *et al.,* 1999). Extraction and characterization of several active phytocompounds from these green factories have given birth to some high activity profile drugs (Vaidyaratanm *et al.,* 2001).

The use of traditional medicine is widespread in India (Zaika, 1988). A growing body of evidence indicates that secondary plant metabolites play critical roles in human health and may be nutritionally important. (Shelef, 1983). It is believed that crude extract from medicinal plants are more biologically active then isolated compounds due to their synergistic effects . Phytochemical screening of plants has revealed the presence of numerous chemicals

including alkaloids, tannins, flavonoids, steroids, glycosides and saponins etc. Secondary metabolites of plants serve as defense mechanisms against predation by many microorganism, insects and herbivores. Herbal medicines have become more popular in the treatment of many diseases due to popular belief that green medicine is safe, easily available and with fewer side effects.

An anti-microbial is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans. Antimicrobial drugs either kill microbes (microbiocidal) or prevent the growth of microbes (microbiostatic). Disinfectants are antimicrobial substances used on non-living objects. The history of antimicrobials begins with the observations of Pasteur and Joubert, who discovered that one type of bacteria. Technically, antibiotics are only those substances that are produced by one microorganism that kill, or prevent the growth, of another microorganism could prevent the growth of other bacteria (Pandey *et al.*, 2014). The term antibiotic is used to refer to almost any drug that attempts to rid your body of a bacterial infection. Antimicrobials include not just antibiotics, but synthetically formed compounds as well.

PHYTOCHEMICALS

Plants contain some organic compounds which produce definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids. In most cases these substances appear to be non-essential to the plant producing them. For example, penicillin produced by a few species of fungi (Family: *Penicillinaceae*) have great value to man as antibiotic, but appears to serve no useful purpose in the microorganisms producing it (Njoku *et al.*, 2009).

CLASSIFICATION OF PHYTOCHEMICALS

The exact classification of phytochemicals could have not been performed so far, because of the wide variety of them. In recent year Phytochemicals are classified as primary or secondary constituents, depending on their role in plant metabolism. Primary constituents include the common sugars, amino acids, proteins, purines and pyrimidines of nucleic acids, chlorophylls etc. Secondary constituents are the remaining plant chemicals such as alkaloids, terpenes, flavonoids, lignans, plant steroids, curcumines, saponins, phenolics, flavonoids and glycosides.

1. PHENOLICS

Phenolic phytochemicals are the largest category of phytochemicals and the most widely distributed in the plant kingdom. The three most important groups of dietary phenolics are flavonoids, phenolic acids, and polyphenols. Phenolic are hydroxyl group (-OH) containing class of chemical compounds where the (-OH) bonded directly to an aromatic hydrocarbon group. Phenol (C_6H_5OH) is considered the simplest class of this group of natural compounds. Phenolic compounds are a large and complex group of chemical constituents found in plants.

2. FLAVONOIDS

Flavonoids are polyphenolic compounds that are ubiquitous in nature. More than 4,000 flavonoids have been recognized, many of which occur in vegetables, fruits and beverages like tea, coffee and fruit drinks. The flavonoids appear to have played a major role in successful medical treatments of ancient times, and their use has persisted up to now. Flavonoids are ubiquitous among vascular plants and occur as aglycones, glucosides and methylated derivatives.

3. TANNINS

From a chemical point of view it is difficult to define tannins since the term encompasses some very diverse oligomers and polymers. It might be said that the tannins are a heterogeneous group of high molecular weight polyphenolic compounds with the capacity to form reversible and irreversible complexes with proteins (mainly), polysaccharides (cellulose, hemicelluloses, pectin, etc.), alkaloids, nucleic acids and minerals, etc.

4. ALKALOIDS

Alkaloids are natural product that contains heterocyclic nitrogen atoms, are basic in character. The name of alkaloids derives from the “alkaline” and it was used to describe any nitrogen-containing base. Alkaloids are naturally synthesis by a large numbers of organisms, including animals, plants, bacteria and fungi.

5. SAPONINS

Saponins are a group of secondary metabolites found widely distributed in the plant kingdom They form a stable foam in aqueous solutions such as soap, hence the name “saponin”. Chemically, saponins as a group include compounds that are glycosylated steroids, triterpenoids, and steroid alkaloids. (Saxena *et al.*,2013).

Keeping in view this fact the present study was conducted to find out the antimicrobial Activity of Weed Flora which are used by the Gond Tribes of Chhattisgarh including:
(F-Family; L/N-Local name)

1. *Amaranthus spinosns.* L (FAmaranthaceae; L/N Hatikhutura). Usage – Tender leaves and young shoot is a popular vegetable. Roots are good for gonorrhea.
2. *Boerhaavia diffusa* L (F. Nyctaginaceae; L/N Purna noa). Usage – Root extract against jaundice.
3. *Centella asiatica* L (F- Apiaceae; L/N Manimuni). Usage –Leaf juice taken to cure stomach disorder.
4. *Chenopodium album* L. (F –Chenopodiaceae; L/N Jilmil sak), Usage –The whole plant is a popular wild vegetable.
5. *Commenlina benghalensis.* L. (F –Commenlinceae L/N Kona simalu). Usage – The stem latex is used to treat eye disease.
6. *Colocasia esculenta* (L) Schott. (F – Araceae L/N – Kata kochun). Usage – The whole plant used for the treatment of cough, corms used for healing wounds. Whole plant is a popular wild vegetable.
7. *Cynodon dactylon* Pers. L (F – Poaceae V/N. Dubaribon). Usage –Used as sacred grass in Hindu worship programme.
8. *Cyperus rotundas* L. (F – Cyperaceae; L/N Kyabon). Usage – The rhizome extract used to cure dysentery.
9. *Mimosa pudica.* L. (F – Mimosaceae; L/ N – Nilajibon).Usage –Root extract used to cure jaundice.
10. *Oxalis corniculata*. L. (F – Oxalidaceae; V/N. Soru tengeshi). Usage – Plant used a wild vegetable and is used to cure dysentery.

An anti-microbial is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans. Antimicrobial drugs either kill microbes (microbiocidal) or prevent the growth of microbes (microbiostatic). Disinfectants are antimicrobial substances used on non-living objects.

The history of antimicrobials begins with the observations of Pasteur and Joubert, who discovered that one type of bacteria. Technically, antibiotics are only those substances that

are produced by one microorganism that kill, or prevent the growth, of another microorganism could prevent the growth of other bacteria.

Gond tribes of Chhattisgarh state used several plants for health care. The present study thrown light on the antimicrobial activity of selected weed plants. This study helps Gond Tribes to fix their medicine doses according to presence of secondary metabolites.

MATERIALS AND METHODS

Methodology for Phytochemical Analysis

1.1. Plant Sample:-

The leaf part of plant collected and botanically identified.

1.2. Processing:- The leaf part of plant was dried in shade and pulverized into fine powder by using mortal pistol.

1.3. Preparation of the extracts : -

- 10 gram powder of plant was weighed and transferred into 100 ml conical flask.
- 100 ml of petroleum ether was added in flask.
- The conical flask was closed by foil paper and placed at Room temperature for 72 hours.
- The crude extracts was then filtered by passing the extracts through Whatmann No. 1 filter paper. (Dash *et al.*,2011)

1.4 Phytochemical test:-

Chemicals- Wagner's reagent, Molish reagent, 5% Ferric chloride, 10% Alcoholic Ferric Chloride, 10% NAOH, Distill Water, HCL, H_2SO_4, Glacial Acetic Acid, 20% NaOH, Chloroform .

- **Test for alkaloid (wagner's test) –** Added 1ml of plant extract and 3-5 drops of Wagner's reagent.
- **Test for flavonoids (alkaline reagent test)-** Added 1 ml of extract and added 5-6 drops of 5% quos ferric chloride solution.
- **Test for terpenoids (salkowski's test)-** Added 1 ml of extract and added 0.5 ml of chloroform along with 3-5 drops of conc. H_2SO_4.(Abdul *et al.*,2013)

- **Test for saponons (foam test)-** Added 1 ml of extract and added 5 ml of distilled water and shaken vigorously .
- **Test for tannins (braymre's test)-** Added 1 ml of extract and treat it with 1 ml of 10% alcoholic ferric chloride solution .
- **Test for phenols (ferric chloride test)-** Added 1ml of extract and add 5-6 drops of 5% aquos ferric chloride solution.(Herin *et al.*,2013)
- **Test for cardiac glycosides (keller kelliani's test)-** Added 1 ml of extract and treated it with 1 ml of glacial acetic acid and 2-3 drops of 5% ferric chloride solution. To this mixture added 0.5 ml dilute HCL. (Ndam *et al.*,2014)
- **Test for carbohydrate(molisch's test)-** Added 1 ml of plant extract and add 3-5 drops of molisch's reagent , along with this add 1 ml of concentrated sulphuric acid down the test tube. Then allow the mixture to stand for 2-3 min.
- **Test for quinones –** Added 1 ml of extract and treated it with 0.5 ml of conc. HCL. (Njoku *et al.,* 2009)
- **Test for resins-** Added 1 ml of extract and added 5 ml of distilled water and the turbidity.
- **Test for coumarins-** Added 1ml of extract and added 1.5ml of 10% NaOH (Abdul *et al.*,2013)

1.5 Methodology for Antibacterial activity

1. Plant material- The leaf part of plant was collected. It was then botanically identified.

2. Microbial Cultures- Bacterial culture and Fungal culture: *Staphylococcus aureus* , *Streptococcus* Sp., *Aspergillus flavus* and *Aspergillus niger* were used for this project.

3. Preparation of the extract

- The leaf part of all plant sample was cleaned with deionized water and left for shade dry for 3 days.
- After shade try crushed the leaf part and deep in petroleum ether by cold extraction method in a 100 ml flask for 3 days.
- Then filtered the extract in a petri plate and left for evaporation of petroleum ether.
- After evaporation collected the extract from the petriplate that have sticky property.
- After that extract was diluted in the distilled water in different concentration 25%,50%.75% and 100%.

- Plant extract were used for the antibacterial activity. In different concentration of 25%, 50%, 75%, and 100% .
- For the 25% concentration taken 0.25 ml of plant leaf extract and 75ml of distilled water. Then 25% conc. Standard solution were prepared.
- For the 50% concentration taken 0.50ml of plant leaf extract and 50ml of distilled water. Then 50% conc. Standard solution were prepared.
- For the 75% concentration taken 0.75ml of plant leaf extract and 25ml of distilled water . Then 75% conc. Standard solution were prepared.
- For the 100% concentration taken 1ml of plant leaf extract.

4. Antibacterial activity

- Prepared nutrient agar media (peptone: 5gm ,beef extract : 3gm,agar: 18gm, distill water: 1000ml :pH:7.0), and autoclaved at 15 psi in 121^{o}C for 15 min. then taken the autoclaved media into laminar flow hood and poured into sterile petriplates and kept it for solidification.
- Then spread 100µl of bacterial cell suspension culture and made 4 wells 25%,50%,75% and 100% in the agar media plate.
- Loaded 80µl of the plant extract sample in each 4 wells .
- Kept the plate in incubator at 37^{o}C for 24-48 hrs.
- Then measured the zone of inhibition by MIC and plotted the graph.

5. Antifungal activity-

- Prepared sabroud's dextrose agar media (peptone: 10gm, dextrose :40gm, agar: 18gm, distill water: 1000ml, pH: 5.6), and autoclaved at 15 psi pressure in 121^{o}C for 15 min.
- then taken the autoclaved media into laminar flow hood and add antibiotic to the media then pour into sterile petriplates and kept it for solidification.
- Then spread 100µl of fungal cell suspension culture and make 4 wells of 25%,50%, 75% and 100% in the agar media plate.
- Loaded 80µl of the plant extract sample in each 4 wells .
- Kept the plate at room temperature (25-28^{o}C) for 48-72 hrs.
- Then measured the zone of inhibition by MIC and plotted the graph. (Dash *et al.*,2011)

DISCUSSION

Nature is a unique source of structures of high phytochemical diversity, many of them possessing interesting biological activities and medicinal properties. It is difficult to establish clear functionality and structure–activity relationships regarding the effects of phytochemicals in biological systems activity. This is largely due to the occurrence of a vast number of phytochemicals with similar chemical structures, and to the complexity of physiological reactions.

In the present study five weed plants were selected which consist of phytochemicals like alkaloid, flavonoids, saponins, terpenoids, tannin, cardiac glycoside, carbohydrate, quinines, resins, coumarins and phenol and they exhibited antimicrobial activity against. *S.aureus*, *Streptococcus*, *A.niger* and *A. flavus*. results were summarized. It is found that all five weed plants are very important for antimicrobial activity and can be used for treatment of different diseases. Gond tribes of Chhattisgarh used these plants for the cure of diseases and health care.

UNIVERSITY GRANTS COMMISSION - CENTRAL REGIONAL OFFICE,

Tawa Complex (Bittan Market), E-5, ARERA COLONY, BHOPAL-462 016
Ph. : 0755 – 2467418, 2467892, Fax. : 0755 – 2467893, web site : www.ugc.ac.in .

F.No.:MS-3/202002/XII/13-14/CRO

Date : 20 JUN 2014

Code : 202002

To
The Principal,
Bhilai Mahila Mahavidyalaya
Bhilai Nagar, Bhilai (C.G.)

Sub. : Financial Assistance for undertaking Minor Research Project by Dr. Mrs. Sandhya Madan Mohan, Assistt. Professor(Home Science) Bhilai Mahila Mahavidyalaya, Bhilai Nagar, Bhilai (C.G.), in ""Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh"".

Sir,

The Commission on the recommendations of the Selection Committee has approved the research project entitled in ""Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh"." of by Dr. Mrs. Sandhya Madan Mohan, Assistt. Professor(Home Science) Bhilai Mahila Mahavidyalaya, Bhilai Nagar, Bhilai (C.G.),and has agreed to provide a grant of Rs.500000/-.

Particular		Allocation		Grant being released
NON RECURRING				
1.	Books & Journals	Rs. 30000.00	Rs.	30000.00
2.	Equipments	Rs. 250000.00	Rs.	250000.00
RECURRING				
3.	Travels, Field work	Rs. 50000.00	Rs.	25000.00
4.	Contingency	Rs. 70000.00	Rs.	35000.00
5.	Chemical & Glassware	Rs. 70000.00	Rs.	35000.00
6.	Special Needs	Rs. 30000.00	Rs.	15000.00
	TOTAL	Rs. 500000.00	Rs.	390000.00

I am directed to convey the sanction of the Commission for Payment of Rs. 390000/- as first installment to The Principal, Bhilai Mahila Mahavidyalaya, Bhilai Nagar, Bhilai (C.G.), under following terms and condition.

1. The effective date of implementation of the Project will be the date of receipt of fund by the institution.
2. The tenure for the Minor Research Project will be 2 years [illegible]
3. On receipt of this letter the Principal Investigator must sign and return the Acceptance Certificate as enclosed duly countersigned by the Principal within 3 month of issue of this letter, failing which the approval should stand withdrawn.
4. In case, the grant is not settled within six months from the date of completion of the project, the same will lapse and no representation will be entertained on this behalf and Principal Investigator has to refund the whole grant.
5. Principal Investigator may undertake only one project at a time under UGC funding either by the UGC, H.O., New Delhi or by the C.R.O., Bhopal. The letter of undertaking enclosed may be sent to this office immediately after receiving this sanction. Failure to the submission of this and also in running two parallel projects funded by the UGC (Regional Office/Main Office at New Delhi), the Principal Investigator will be held solely responsible and have to refund the amount as and when it comes to the notice, of the authorities.
6. **The College shall maintain proper accounts of the expenditure out of the Grants which shall be utilised only on approved item of expenditure as per detailed in XII Plan Guidelines.**

BHILAI MAHILA MAHAVIDYALAYA

HOSPITAL SECTOR, BHILAI NAGAR (C.G.) 490 009
(Managed by Bhilai Education Trust)
(Affiliated to Hemchand Yadav Vishwavidyalaya, Durg)
Recognized Under Section 2(f) and 12(B) of the UGC Act 1956
NAAC Accredited with B Grade

Ph : 0788-2242699
0788-2242078
Website : www.bmmbhilai.com

No. BMM / 2017/916 Date : 09/02/2017

MINOR RESEARCH PROJECT

MS-3/202002/XII/13-14/CRO Bhopal

TO WHOM SO EVER IT MAY CONCERN

This is to certify that all the equipments and books which were purchased by Dr. Sandhaya Madan Mohan for her Minor Research Project MS-3/202002/XII/13-14/CRO Bhopal, dated 30/08/2014. Titled "study of antimicrobial activity of some important weed plants used for health care by gond tribes of chhattisgarh" have been submitted in the college.

Dated-

Rehna Hasan
Principal

Bhilai Mahila Mahavidyalaya

BHILAI MAHILA MAHAVIDYALAYA

HOSPITAL SECTOR, BHILAI NAGAR (C.G.) 490 009
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Ph : 0788-2242699
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No. BMM / 2017/916

Date : 09/02/2017

College Code- 202002

To,

The Educational Officer & Incharge
U.G.C., C.R.O.,
Tawa Complex (Bittan Market),
E-5 Areara Colony,
Bhopal.

File No. MS-3/202002/XII/13-14/CRO, dated 20/4/14.

Subject: Submission of Final Minor Research Project Account.

Respected Sir,

We are pleased to submit two copies of final report of the Minor Research Project sanctioned by C.R.O., Bhopal vide the above referred letter on " **Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh**."

The UGC proforma vide Annexure II, III, V and VI (duly filled), Utilization Certificate, Statement of expenditure incurred on Field work, Certificate of Equipment, Chemicals and Books and Expenditure detail and original bills are also being submitted.

Thanking you

Yours faithfully,

Zehra Hasan

Dr. Zehra Hasan
Principal
Bhilai Mahila Mahavidyalaya

Dr. Sandhya Madan Mohan
Principal Investigator

Ppandey

Dr. Bhawana Pandey
Co- Principal investigator

Enclosure: 1. Annexure II, III, V and VI (duly filled).
2. Utilization Certificate.
3. Statement of expenditure incurred on Field work.
4. Certificate of Equipment, Chemicals and Books.
5. Expenditure detail and original bills of expend

BHILAI MAHILA MAHAVIDYALAYA

HOSPITAL SECTOR, BHILAI NAGAR (C.G.) 490 009
Affiliated to Pt. Ravishankar Shukla University, Raipur (C.G.)
Recognized Under Section 2(f) and 12(B) of the UGC Act 1956
NAAC Accredited with B Grade

Ph : 0788-2242699
0788-2210078
Website : www.bmmbhilai.com

No. BMM / 2017/916

Date : 09/02/2017

To,

College Code-202002

The Education officer,
U.G.C.(C.R.O)
Tawa Complex , Bittan Market,
E-S,Arera Colony , Bhopal.

Subject :- Submission of Final Project REPORT .

Ref – F.NO. MRP F.NO. MS -3/202002/XII/13-14/CRO,

Respected Sir,

Please find enclosed following documents in reference to F.NO : **MS -3/202002/XII/13-14/CRO**, dated **20/6/14** and received on **05/11/14** allotted to Dr. Sandhya Madan Mohan as Principal Investigator and Dr. Bhawana Pandey ,as Co-Investigator , on the topic "**Study of Antimicrobial Activity of Some Important Weed Plants used for Health Care by Gond Tribes of Chhattisgarh**" .

1. Annexure VI –Final Report.
2. Report about work done.

This is for your information and necessary action please.

Thanking you,

Yours sincerely,

Dr. Sandhya Madan Mohan
Principal investigator

Dr. Bhawana Pandey
Co-Investigator

Dr. Zehra Hasan
Principal

SUMMARY OF EXPENDITURE STATEMENT

File No. MS-3/202002/XII/13-14/CRO,
Principal Investigator: Dr. Sandhya Madan Mohan
Co- Principal Investigator: Dr. Bhawana Pandey
Period of utilization from **01/07/14 to 30/06/2016**

SN	Item	Amount Approved (Rs.)	Expenditure Incurred (Rs.)
1	Books & Journals	30,000/-	
2	Equipments	2,50,000/-	68669/-
3	Contingency	35,000/-	35100/-
4	Field work/ Travel (Give detail in proforma)	25,000/-	
6	Chemicals & Glassware	35,000/-	33982/-
7	Special Needs		
	Total	3,90,000/-	

Rpandey

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.

Annual/Final Report of the work done on the Major/Minor Research Project. (Report to be submitted within 6 weeks after completion of each year)

1. Project report No. 1st /2nd /3rd /Final ____**FINAL**_____

2. UGC Reference No. F.No: **MS-3/202002/XII/13-14/CRO,** dated **20/6/14**
received on **15/11/2014**
Period of report: from **15/11/2014 to 14/11/2016**

Title of research project allotted to Dr. Sandhya Madan Mohan as Principal Investigator and Dr. Bhawana Pandey, Co Principal Investigator , on the topic "**Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh.**"

(a) Name of the Principal Investigator: **Dr. Sandhya Madan Mohan**

Deptt. and University/College where work has progressed
Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai

(b) Effective date of starting of the project - **15/11/2014**

3. Grant approved and expenditure incurred during the period of the report:
   a. Total amount approved- Rs. 5,00,000/-
   b. Total expenditure - Rs. 3,90,000/-
   c. Report of the work done: (Please attach a separate sheet)

   i. Brief objective of the project - **ENCLOSURE 1**

   ii. Work done so far and results achieved and publications, if any, resulting from the work Give details of the papers and names of the journals in which it has been published or accepted for publication - **ENCLOSURE 2**

   iii. Has the progress been according to original plan of work and towards achieving the objective? if not, state reasons: **Yes**

   iv. Please indicate the difficulties, if any, experienced in implementing the project- **Nil**

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.

Annual/Final Report of the work done on the Major/Minor Research Project. (Report to be submitted within 6 weeks after completion of each year)

1. Project report No. 1st /2nd /3rd /Final ____**FINAL**_____

2. UGC Reference No. F.No: **MS-3/202002/XII/13-14/CRO,** dated **20/6/14**
received on **15/11/2014**
Period of report: from **15/11/2014 to 14/11/2016**

Title of research project allotted to Dr. Sandhya Madan Mohan as Principal Investigator and Dr. Bhawana Pandey, Co Principal Investigator , on the topic "**Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh.**"

(a) Name of the Principal Investigator: **Dr. Sandhya Madan Mohan**

Deptt. and University/College where work has progressed
Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai

(b) Effective date of starting of the project - **15/11/2014**

3. Grant approved and expenditure incurred during the period of the report:
   a. Total amount approved- Rs. 5,00,000/-
   b. Total expenditure - Rs. 3,90,000/-
   c. Report of the work done: (Please attach a separate sheet)

   i. Brief objective of the project - **ENCLOSURE 1**

   ii. Work done so far and results achieved and publications, if any, resulting from the work Give details of the papers and names of the journals in which it has been published or accepted for publication - **ENCLOSURE 2**

   iii. Has the progress been according to original plan of work and towards achieving the objective? if not, state reasons: **Yes**

   iv. Please indicate the difficulties, if any, experienced in implementing the project- **Nil**

(b) If project has not been completed, please indicate the approximate time by which it is likely to be completed. A summary of the work done for the period (Annual basis) may please be sent to the Commission on a separate sheet.

Completed, Period 15/11/2014– 14/11/2016
Summary ENCLOSURE 3

v. If the project has been completed, please enclose a summary of the findings of the study. Two bound copies of the final report of work done may also be sent to the Commission –

Submitted

vi. Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any

One Student Registered for Ph. D.

SIGNATURE OF THE PRINCIPAL INVESTIGATOR

REGISTRAR/PRINCIPAL

SIGNATURE OF THE CO-INVESTIGATOR

College Code- 202002

To,

The Educational Officer & Incharge
U.G.C., C.R.O.,
Tawa Complex (Bittan Market),
E-5 Arera Colony,
Bhopal.

File No. : MS-3/202002/XII/13-14/CRO, dated 20/4/14.
Subject: Submission of Final Minor Research Project Report.

Respected Sir,

We are pleased to submit one copy of final report of the Minor Research Project sanctioned by C.R.O., Bhopal vide the above referred letter on "**Study of Antimicrobial Activity of Some Important weed Plants used for Health Care by Gond Tribes of Chhattisgarh**."

Thanking you,

Yours faithfully,

Dr. Sandhya Madan Mohan
Principal Investigator

Dr. Zehra Hasan
Principal
Bhilai Mahila Mahavidyalaya

Dr. Bhawana Pandey
Co- investigator

College Code- 202002

To,

The Educational Officer & Incharge
U.G.C., C.R.O.,
Tawa Complex (Bittan Market)
E-5 Arera Colony, Bhopal.

File No. MS- F.No: MS-3/202002/XII/13-14/CRO, dated 20/4/14.
Subject: Submission of Final Minor Research Project Report.

Respected Sir/Madam,

With regards, I am thankful to U.G.G., C.R.O., Bhopal for approving my project (MINOR RESEARCH PROJECT) F.No:MS- MS-3/202002/XII/13-14/CRO, dated 20/4/14 received on 05/11/14 (letter attached) & releasing first installment of the grant sanctioned (letter attached).

Sir, further it is to top mention that the concerned letter was received in the college and project work started from 15 November 2014.

This is to request you, please sanction second installment of the project as early as possible.

Please find final two copies of summary, one project report, CD and details of Expenditure statement. Bills and Audit Reports will be submitted within one month. This is for your information and necessary action please.

Thanking you

Yours sincerely

Dr. Sandhya Madan Mohan
Principal Investigator

Pandey

Dr. Bhawana Pandey
Co- investigator

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PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF THE PLANT EXTRACTS OF *COLOCASHIA ESCULENTA* L. AGAINST MICROBES

Sandhya Madan Mohan[1] and Bhawana Pandey*[2]

[1]Department of Home Science, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh.
[2]Department of Microbiology and Biotechnology, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh.

***Correspondence for Author: Bhawana Pandey**

Department of Microbiology and Biotechnology, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh.

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ABSTRACT

Colocashia esculenta L. is a shrub annual or perennial herb belongs to Family: Araceae. A large, showy, marginal aquatic plant with heart-shaped, dark green leaves, taro can reach 5 feet tall and is often grown as a summer annual. It has been identified as Taro in Ayurveda and has been found to have antiasthmatic, aphrodisiac, analgesic and antidepressant. In the present study the active phyto components of *Colocashia esculenta* L. were revealed using phytochemical analysis. The antimicrobial activity of *Colocashia esculenta* was studied using well diffusion method. The activity was against *Staphylococcus aureus, E.coli, Pseudomonas* and *Salmonella typhi* at different concentrations of 50, 100 and 200µg/disc and the results have been illustrated.

KEYWORDS: *Colocashia esculenta* L., Antimicrobial Activity, Antiasthmatic, Aphrodisiac, Analgesic.

INTRODUCTION

Herbal medicine involves the use of plants for medicinal purposes. The term "Herb" includes leaves, stems, flowers, fruits, seeds, roots, rhizomes and bark. The quest for plants with medicinal properties continues to receive attention as scientists are in need of plants, particularly of ethno botanical significance for a complete range of biological activities, which ranges from antibiotic to anti cancerous. Several plants used traditionally have potential antimicrobial properties (Shelef 1983; Zaika 1988) and this has raised the optimism about the phyto-antimicrobial agents (Das *et al.*,1999).

FIG 1: *Colocashia esculanta* Plant.

FIG 2: *Colocashia esculanta* Plant root.

The major chemical substances of interest were the alkaloids and sapogenins, however other diverse groups of naturally occurring phytocomponents such as flavonoids, tannins, unsaturated sterols, terpenoids and essential oils etc. (Lozoya *et al.*, 1990).*Colocashia esculenta* L. is a shrub annual or perennial herb belongs to Family: Araceae. A large, showy, marginal aquatic plant with heart-shaped, dark green leaves, taro can reach 5 feet tall and is often grown as a summer annual.

This plant has a history of use for the treatment of various ailments and the most commonly used plant part for this purpose is the root, but flowers, bark and fruit can also be utilized. Several research works have been carried out to study about the Phytochemical components

of *Colocashia esculenta* (Ahmad and Beg, 2001; Arthur, 1954; Deininger, 1984) and also about the antimicrobial activity of the plant (Palacios. *et al.*, 1991; Ojalaa, *et al.*, 1999). The present study intends to study about the antibacterial activity of the Plant Extracts of *Colocashia esculenta* against selected Microbes.

MATERIALS AND METHODS

Sample Preparation

Colocashia esculenta leaves were collected and shade dried. The dried leaves were powdered and soaked in 100ml of methanol. It was left for 24 hours so that alkaloids, terpenoids and other constituents if present get dissolved. The methanolic extract was filtered using Whatmann 41 filter paper. It was again filtered through Sodium sulphate in order to remove the traces of moisture.

Preliminary Phytochemical Screening

Phytochemical screening of the plant extract was carried out as per the methods and tests given by Dey and Raman (1957).

ANTIMICROBIAL ASSAY

Media Preparation

Bacterial Media (Muller Hinton Media)

36g of Muller Hinton Media (Hi-Media) was mixed with distilled water and then sterilized in autoclave at 15lb pressure for 15 minutes. The sterilized media were poured into petri dishes. The plates with wells were used for the antibacterial studies.

Fungal Media (Potato dextrose sugar)

200g of potato, 20g of dextrose, 20g of agar were mixed and autoclaved. The solidified plates were bored with 6mm diameter cork borer. The plates with wells were used for antifungal studies.

Antibacterial activity of the plant extract

The methanolic extract of 50µg, 100µg and 200µg were tested against two bacterial pathogens namely *Staphylococcus aureus, E. coli, Pseudomonas* and *Salmonella typhi* for their antimicrobial activity. It was demonstrated by well diffusion method.

Antifungal activity of the plant extract

The methanolic extract and aqueous extract of 100, 200 and 500µg were tested against different fungal pathogen *Aspergillus fumigatus* for their antifungal activity. It was demonstrated by well diffusion assay (Bauer *et al* ., 1996).

RESULTS AND DISCUSSION

The preliminary phytochemical screening of *Colocashia esculenta* extract showed the presence of bioactive components like Terpenoids, Flavonoids, Glycosides, Alkaloids, Quinines, Phenols, Tannins, Saponins and Coumarin (Table 1). The results of the antimicrobial assay of the methanolic extract of *Colocashia esculenta* indicated that the plant exhibited antimicrobial activity against the tested microorganisms at three different concentrations of 50, 100 and 200µg/disc. The potential sensitivity of the extract was obtained against all the three micro organisms tested and the zone of inhibition was recorded and presented below in the tabulation drawn (Table 2).

Table 1: Phytochemical Screening of Metanolic Extract of *Colocashia esculenta.*

S.No	Tests	Leaves of *Colocashia esculenta*
1	Terpenoids	-
2	Flavonoids	-
3	Saponins	+
4	Resins	+
5	Glycosides	+
6	Sugars	+
7	Alkaloids	+
8	Quinines	+
9	Phenols	-
10	Tannins	+
11	Saponins	+
12	Coumarin	+

Table 2: Antimicrobial activity of Metanolic Extract of *Colocashia esculenta*.

Test Samples	Zone of Inhibition (c.m)			
	0.2mg/ ml	0.4mg/ ml	0.6mg/ ml	0.8mg/ ml
Staphylococcus aureus	8.43	8.76	9.41	9.66
E.coli	7.34	7.54	7.88	7.98
Pseudomonas	8.33	8.90	8.45	7.43
Salmonella typhi	8.84	8.67	8.23	8.03
Aspergillus fumigates	6.02	8.56	12.22	10.98

DISCUSSION AND CONCLUSION

In the present era, plant and herb resources are abundant, but these resources are dwindling fast due to the onward march of civilization (Vogel, 1991). Although a significant number of studies have been used to obtain purified plant chemical, very few screening programmes have been initiated on crude plant materials of different medicinal plants (Pandey *et al*., 2014) (Madan Mohan *et al.,* 2014, 2015). It has also been widely observed and accepted that the medicinal value of plants lies in the bioactive phytocomponents present in the plants (Veeramuthu *et al.,* 2008). In the present investigation, the active phyto components of *Colocashia esculanta* was studied and further the antimicrobial activity of the plant extract was also tested against three potentially pathogenic microorganisms at different concentrations of the extract to understand the most effective activity. The maximum zone of inhibition was obtained for *Staphylococcus aureus,* and followed by *Pseudomonas* and *Salmonella typhi* and minimum zone of inhibition was obtained by *E. Coli. Aspergillus*

fumigatus showed resistance against *Colocashia esculenta* extract.

From the above studies, it is concluded that *Colocashia esculenta* may represent new sources of anti-microbials with biologically active components that can establish a scientific base for the use of plants in modern medicine.

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Phytochemical Analysis and Uses of Mimosa pudica Linn. in Chhattisgarh

Sandhya Madan Mohan[1], Bhawana Pandey[2],Sunita G. Rao[3]
[1,3(]*Department of Home Science,Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh)*
[2(]*Department of Microbiology & Biotechnology,Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh.)*

Abstract: *Ethanolic extracts of Mimosa pudica leaves were screened for phytochemical constituents. Phytochemical analysis of the extract revealed that the antimicrobial activity of the plant materials is due to the presence of active constituents like alkaloids or tannins.Mimosa pudica is used in disease related to blood and bile, bilious fever, piles, jaundice, leprosy, ulcer and smallpox. In the present study ethanolic extracts of Mimosa pudica leaves and roots sample were obtained using soxhlet apparatus. Phytochemical studies for the presence of revealed that tannin and proteins are present in both the samples.*

Key words*: Antimicrobial activity,Mimosa pudica , phytochemical.*

I. Introduction

Mimosa pudica Family Mimosae known as sensitive plant in English and lajvanti or chuimui in Hindi language. The plant is distributed through out in India in moist locality. A diffuse prickly under shrub, is about 45-90 cm in height. Leaves bipinnately compound, pinnate 2-4 delicately arranged with 10-20 pairs of leaflets, rachis clothed with ascending bristles. Flowers pink, in globose heads, penduncles prickly, usually in auxiliary pairs all along the branches. Fruits bristly pods, flat, straw colored consisting of 3-5 one seeded segments. The roots and leaves are commonly used in treatment as bitter, astringent, acrid, cooling vulnerary, alexipharmic, diuretic antispasmodic, emetic, constipating and febrifuge (Vaidyaratanm, 2001).The present study intends to study about the phyto constituents of the plant extracts of Mimosa pudica against pathogenic microbes in Chhattisgarh.

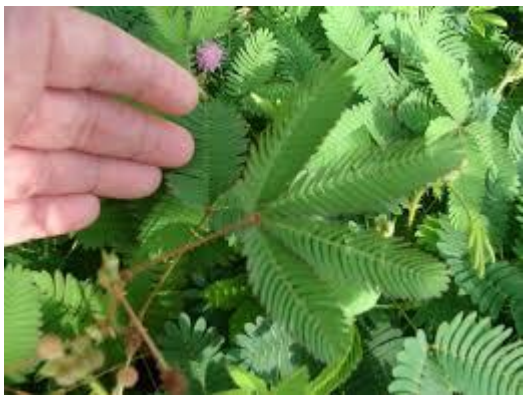

Fig 1: Mimosa pudica Plant

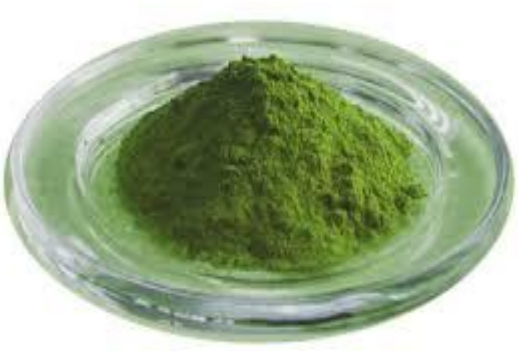

Fig 2: Powdered Mimosa pudica leaves

Many plants species used traditionally have potential antimicrobial and antiviral properties (Shelef et al. 1983) and this has raised the optimistic thinking of scientists about the future of phyto-antimicrobial agents. (Das et al., 1999). Mimosa plant has a history of use for the treatment of various ailments and the most commonly used plant part for this purpose is the root, but flowers bark and fruit can also be utilized. Several research works have been carried out to study about the phytochemical components of Mimosa pudica (Ahmad et al. 2001; Arthur, 1954.) and also about the antimicrobial activity of the plant (Palacios et al., 1991). The major chemical substances of interest in these surveys were the alkaloids and steroidal saponins, however also been reported (Lozoya & Lozaya, 1989). The methanolic extract of leaves of M. pudica showed the presence of bioactive components like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins

and coumarin (Gandhiraja et al., 2009). In Manipur, a state in India, it is reported that the consumption of the decoction of leaves boiled in water causes diuresis, and is used in urinary tract infection. This plant has hepatoprotective, hypolipidemic, antifertility, antihapatotoxic, anti convulsant, anti depressant and wound healing properties. The seeds of the plant was also said to have diuretic property (Krishnaraju et al., 2006). Roots of mimosa contain tannin, ash, calcium oxalate crystals and alkaloid mimosine (Oudhia et al., 2006).

This plant has a history of use for the treatment of various ailments and the most commonly used plant part for this purpose is the root, but flowers, bark and fruit can also be utilized. Several research works have been carried out to study about the Phytochemical components of Mimosa pudica (Ahmad and Beg, 2001; Arthur, 1954; Deininger, 1984) and also about the antimicrobial activity of the plant (Palacios et al., 1991; Ojalaa et al., 1999). The present study intends to study about the phytochemicals in plant extracts of Mimosa pudica.

II. Collection Of Plant Materials

Fresh leaves and root of Mimosa pudica were collected from Durg- Bhilai Region.

2.1 Sample Preparation

The sample leaf and root were washed with sterile water, shade dried, powdered and kept in an air tight container for further use.

About 20g of the powdered leaves were soaked in 100ml of methanol. It was left for 24 hours so that alkaloids, terpenoids and other constituents if present get dissolved. The methanolic extract was filtered using Whatmann 41 filter paper. It was again filtered through Sodium sulphate in order to remove the traces of moisture.

III. Plant Extraction Method Extraction:

20 gms of each sample were taken and extracted separately with 250 ml ethanol using soxhlet apparatus. The extract were collected and dried. The condensed extract was then dissolved in ethanol to the concentration of 100mg/ml. After that allow for 5 cycles and switch of the apparatus and then take the sample solution and extracted solution in a beaker and cover it with a paper and make holes on the paper for the evaporation of the solvent .Allow it for drying and then collect the residue from the beaker.

IV. Phytochemical Screening (Dey And Raman, 1957)

Phytochemical screening of the plant extract was carried out as per the methods and tests given by Dey and Raman (1957) to decipher the presence or absence of various phytocompounds. The stock concentration of plant extract 10 mg/ml was used.

4.1 Test for Tannins

4.1.1 Preparation of 0.1% ferric chloride:

To 99.9 ml of distilled water 0.1ml of ferric chloride reagent was added.

4.1.2 Ferric chloride Test

1 ml of the sample taken and a few drops of 0.1% ferric chloride was added and observed for brownish green or blue, black colouration.

4.2 Test for Saponins

To 1 ml of extract 5 ml of distilled water was added and shaken vigorously. Observed for soaking appearance indicates the presence of saponins.

4.3 Test for Flavonoids

To 1 ml of extract 5 ml of dilute ammonia solution was added, followed by addition of concentrated sulphuric acid along the sides of the tube. Appearance of yellow colouration.

4.4 Test for Alkaloids

1 ml of sample was taken to that few drops of Dragandoff reagent was added and observed for orange red colour.

4.5 Test for Protein

1 ml of sample was taken to that few drops of Bradford reagent was added. The blue colour was observed.

4.6 Test for Steroids

1 ml of the filtrate was taken to that 10% concentration H_2SO_4 was added and observed for green colour.

4.7 Test for Anthroquinones

1 ml of sample was taken to that aqueous ammonia (shaking) was added and observed for change in colour of aqueous layer (Pink, Red or Violet).

V. Result And Discussion

5.1 Phytochemical analysis

The crude extract of both samples were studied and the result were tabulated (Table-1) Phytochemical, which process many Ecological and physiological roles as widely distributed as plant constituents. Phytochemical exhibit wide range of biological effects as constituents at their antioxidant properties. The phytochemical analysis of the crude extract indicated the presence of tannins, proteins and steroids.

These compounds are known to be biological active and therefore aid the antimicrobial activity. Tannins have been found to form irreversible complexes with highly rich protein resulting in the inhibition of cell protein synthesis.

Tannins are known to react with protein to provide difficult tanning effect which is important for the treatment of influenced or ulcerated tissues. Herbs that that have tannins have the main component astringen are used for treating intestinal disorder such as diarrhea and dysentery. The presence of tannin in Mimosa pudica is the traditional treatment for ailments.

Steroidal compounds present in Mimosa pudica extracts are important due to their relationship with various anabolic hormones including sex hormones. Mimosa pudica extracts which exhibited antibacterial activity and antiviral activity. It is concluded that both extract could be potential source of active antimicrobial agent.

Table 1. Phytochemical Screening of Metanolic Extract of Mimosa pudica.

S.No	Tests	Leaves of Mimosa pudica
1	Terpenoids	+
2	Flavonoids	+
3	Steroids	-
4	Anthroquinone	-
5	Glycosides	+
6	Sugars	-
7	Alkaloids	+
8	Quinines	+
9	Phenols	+
10	Tannins	+
11	Saponins	+
12	Coumarin	+

VI. Conclusion

From above studies, it is concluded that the susceptibility of various microbial agents to different concentrations of Mimosa pudica indicates that plant is the potential source for antimicrobial compound. So further work on the profile in order to determine the nature of bioactive principles present in the plant and their mode of action.

In the present era, plant resources are abundant, but these resources are dwindling fast due to the onward march of civilization (Vogel, 1991). Although a significant number of studies have been used to obtain purified plant chemical, very few screening programmes have been initiated on crude plant materials. It has also been widely observed and accepted that the medicinal value of plants lies in the

bioactive phytocomponents present in the plants (Veeramuthu et al., 2008).

From the above studies, it is concluded that the traditional plants may represent new sources of anti-microbials with stable, biologically active components that can establish a scientific base for the use of plants in modern medicine. These local ethnomedical preparations and prescriptions of plant sources should be scientifically evaluated and then disseminated properly and the knowledge about the botanical preparation of traditional sources of medicinal plants can be extended for future investigation into the field of pharmacology, phytochemistry, ethnobotany and other biological actions for drug discovery.

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