

PROLOGUE PHYTOCHEMICAL ANALYSIS OF TRADITIONAL MEDICINAL PLANTS USED BY TRIBES IN GARIYABAND DISTRICT

(CHHATTISGARH) - INDIA

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ABSTRACT

The preliminary phytochemical analysis of some traditional medicinal plants from Gariyaband District (CG) has been accomplished. 15 - 20 informants of different ages interviewed with the help of structured questionnaire in 20 different villages of same district. Villages have been signified through nearby forest area and tribal population. Composed data revealed usage and importance of some medicinal plant species traditional used to cure various diseases. Selected plant species are well known for their medicinal properties in the selected district. The plants were Azadirachta indica, Andrographis paniculata, Aloe Vera Linn, Amaranthus viridis L., Amaranthus tricolor, Galium aparine, Lucas cephalotes Spreng, Mentha piperita Ocimum sanctum, and Phyllanthus emblica, Trigonella foenum-graecum. Qualitative phytochemical analysis of selected plant species confirms the presence of various phytochemicals like alkaloids, flavonoids, steroids and terpenoid. The presence of phytochemicals can be unified with medicinal potential of these plants. Research study reveals the scientific evidences associated with use of traditional medicinal plants for the treatment of various diseases among human beings.

Key Words : *Medicinal Plants, Phytochemical Analysis, Alkaloids, Flavonoids, Steroids And Terpenoid.*

I. INTRODUCTION

India is rich in fauna ranked 10th in map of the world. More than 22% land area of the country is covered by the forest area and tree cover. Forest provides wide varieties of products but most importantly medicinal plant (Jagdish, et al., 2009). A big part of world's population relies on plant based medicines which are being used

since the ancient ages as traditional health care system. Herbal products are obtained from leaves, branches, root, seed, fruit and flower or in some cases whole plant is known for medicinal property. Depending upon the plant species, from which plant products are obtained to cure disease. Advancement in the field of Pharmaceutics through research achievements clearly states that, bioactive phyto-chemical constituents of the medicinal plant provide them medicinal value. All plants have some known or unknown medicinal property having potential of producing definite physiological effects on human body. Those phyto-chemicals are commonly known as Primary or Secondary Metabolites synthesized in plant species. These natural compounds are the base of modern drugs (Allopathic/Ayurvedic) used by the people for curing different diseases now a days (Edegoa, *et al.*, 2005; Akinmo-laudn, *et al.*, 2001; Rout, *et al.*, 2009). Phyto-constituents are the natural bioactive compounds found in plants. These phyto-constituents affect nutrient, fibers etc. inside human bodies to form an integrated part of immune system responsible to work against various diseases and stress conditions. Already discussed that, phyto-chemical found in the plant species are divided into two groups, namely primary and secondary constituents; according to their function in plant metabolism. A primary constituent comprises common sugars, amino acid, proteins and chlorophyll while secondary constituents include alkaloids, terpenoids, steroids, flavonoids etc. The present study reveals that the qualitative phyto-chemistry of medicinal plants used by the peoples of Gariyaband district (Chhattisgarh) India, to cure various ailments. In 21st century tribal people are still dependent upon traditional methods to cure various diseases due to lack of proper medical facilities of modern age. The knowledge of plant species known for their medicinal properties by the village people are passed on from one generation to the next. Hence, traditional knowledge is continuously running from last thousands of years among them. Scientific proof is required to encourage productivity of such medicinal plants must be obtained through research studies.

II. MATERIAL AND METHODS

Collection and Sampling

Plant sample were collected in sterile polybags, easily available in market place but sterilized in Laboratory. Sampling is done through various locations in district Gariyaband. 15 - 20 informants of different ages interviewed with the help of structured questionnaire in 20 different villages of same district. Villages have been signified through nearby forest area and tribal population. Consultation with the informants also revealed that some medicinal plants are commonly used to cure diseases like cold, fever, throat infection, body pain, headache, skin care, burn, diarrhea, vomiting, stomach infection including fatigue and some people also informed about plant capitulate known for vigorous potential etc. In Composed data revealed usage and importance of some medicinal plant species traditional used to cure various diseases in Gariyaband district (Chhattisgarh). Some of the plant species were difficult to collect due to seasonal unavailability and forest reach. Availability of some plant species are seasonal dependent. Collection of the specimens was limited due to seasonal dependency and Taxonomical identification of plant is done by the expert. The collected specimens were maintained in form of herbarium. (Table 1)

A preliminary analysis done with dried plant material. Plant phytochemicals were extracted via. methanol as solvent at room temperature and incubated for 24 hours. Procedure of extraction has been repeated three times sequentially, followed by filtration, resulting in concentrated extract formed with the help of scientific incubatory shaker at 40°C. All chemical tests are sequentially repeated thrice in a row without disturbing environmental conditions.

Table 1: Medicinal uses of plants under investigation

Botanical Name	Common Name	Family	Occurrence/habit	Part used for phytochemical analysis of the Plant	Medicinal properties of plant
<i>Azadirachta indica</i>	Neem	Meliaceae	Wild	Leaf	Dental care, insect repellent, lice, scabies, antibacterial,
<i>Andrographis paniculata</i>	Chirayta	Acanthaceae	Cultivated	Leaf	Cold, diarrhea, flu. Analgesic and stomachic.
<i>Aloe Vera Linn</i>	Ghritkumari	Liliaceae	Cultivated	Leaf	Beauty, burn, constipations, cut, skin care, wrinkles, acne, anti-inflammatory, anti-viral, cathartic, depurative and emollient.
<i>Galium aparine</i>	goosegrass	Rubiaceae	Weed	Leaf	Eczema, hypertension, kidney infection, anti-cancer, diuretic, vulnerary.
<i>Mentha piperita</i>	Piperment	Lamiaceae	Cultivated	Leaves	Aromatherapy, bronchitis, fatigue, flu, ulcer, halitosis, lice herbal tea, sinus, antioxidant, skin tonic, analgesic, astringent.
<i>Ocimum sanctum</i>	Tulsi	Lamiaceae	Cultivated/Wild	Leaf	Cold, congestion, flu, herbal
<i>Phyllanthus emblica</i>	Bhui amla	Phyllanthus emblica	Weeds	Leaf	Obesity, herbal tea, chronic constipation, longevity
<i>Trigonella foenum-graecum</i>	Fenugreek (Methi)	Papiolionace ae	Cultivated	Leaf	Helpful in reducing pain during childbirth and enhancer of milk flow in females, diabetes, anemia, asthma, bronchitis,

					inflammation, ulcer etc.
<i>Lucus cephalotes</i> <i>Spreng.</i>	Gumee Bhaji	Lamiaceae	Weeds	Leaf	Cough and cold, chronic skin eruptions, swellings,
<i>Amaranthus viridis</i> L.	Chaulai Bhaji	Amaranthaceae	Cultivated	Leaf	Antimicrobial, antioxidant, laxative, anti-inflammatory, skin infection etc.
<i>Amaranthus tricolor</i>	Lal Bhaji	Amaranthaceae	Cultivated	Leaf	Helpful in kidney function, digestion, dysentery, diabetes, cholesterol etc.

Qualitative Analysis of Phyto-constituents:

Preliminary phytochemical study of methanol extracts/powdered sample of each plant was carried out as described by Harborne (1973), Edeoga et al., (2005) and Krishnaiah et al., (2009).

Alkaloids:

- a. **Qualitative test of Alkaloids by Mayer's reagent:** Formation of cream color precipitate after reaction with Alkaloids and Mayer's reagent [Potassium mercuric iodide solution] substantiate presence of Alkaloids in given sample.
- b. **Qualitative test of Alkaloids by Dragendorff's reagent:** Formation of Reddish brown precipitate is obtained after reaction with Potassium bismuth iodide solution, commonly known as Dragendorff's reagent. Test with Dragendorff's reagent validate presence of Alkaloids.
- c. **Qualitative test of Alkaloids by Wagner's reagent:** This is the simple qualitative test to obtain brown precipitate by the reaction of Alkaloid if present in given sample with the solution of iodine in potassium iodide [Wagner's reagent].

Flavonoids:

- a. **Qualitative Test for the detection of Flavonoids by Shinod's Test:** The test solution is reacted with 3-4 pieces of Magnesium ribbon strip and conc. HCl dropwise, which appears into pink, crimson red and sometimes green to blue color. This reaction is popularly known as Shinod's Test.
- b. **Qualitative Test of Flavonoids by Zn-HCl reduction test:** In this test Zinc and Conc. HCl is reacted with the sample. Appearance of red color confirms presence of flavonoids in the given sample.
- c. **Qualitative Test of Flavonoids by Alkaline Reagent:** Addition of few drops of NaOH (Sodium Hydroxide) to the test sample and formation of intense yellow colour and afterwards color disappears after adding dil. acid, illustrates presence of flavonoids. This reaction is known as Alkaline Reagent Test.

Sterols and Triterpenoids

- a. **Qualitative Test of steroids and Triterpenoids by Libermann-Buchard Test:** Treatment of test solution with acetic anhydride and sulphuric acid gives brown ring at the junction of two layers along with

green upper layer reveals presence of steroids. Appearance of red color confirms occurrence of Triterpenoids. This test is known as Libermann-Burchard Test.

Test of Carbohydrates:

- Molish's Test:** Reaction of test solution with alcoholic α -naphthol and 0.2 ml of conc. H_2SO_4 adding through the wall of test tube gives purple/violet color ring at the intersection of two layer.
- Benedict's Test:** (Alkaline solution comprising cupric citrate complex): Addition of few drops of Benedict's reagent to the test solution in boiling water bath gives red brown color ppt. due to presence of reducing sugar.
- Fehling's Test:** Reagent is prepared by adding two different solutions in ratio 1:1. Fehling's A (Slightly acidic Aqueous Copper sulphate solution, $CuSO_4 \cdot 5H_2O$) and Fehling's B (Aqueous solution of Potassium tartarate and Sodium hydroxide ($NaOH$)). Reaction of Fehling's reagent with test solution in boiling water appears red color precipitate due to formation of cuprous oxide which confirms presence of reducing sugar.

Table 2: Preliminary phyto-chemistry of medicinal plants

Plant Extracts	Part	Alkaloid	Flavonoid	Steroid	Terpenoid	Sugars
<i>Azadirachta indica</i>	Leaf	-	+	-	+	+
<i>Andrographis paniculata</i>	Leaf	+	+	+	+	+
<i>Aloe Vera Linn</i>	Leaf	+	+	+	+	+
<i>Amaranthus viridis L.</i>	Leaf	+	+	+	+	+
<i>Amaranthus tricolor</i>	Leaf	+	+	+	+	+
<i>Gallium aparine</i>	Leaf	-	-	+	+	+
<i>Lucus cephalotes Spreng.</i>	Leaf	+	+	+	+	+
<i>Mentha piperita</i>	Leaf	+	+	+	-	+
<i>Ocimum sanctum</i>	Leaf	-	+	-	+	+
<i>Phyllanthus emblica</i>	Leaf	+	+	-	+	+
<i>Trigonella foenum-graecum</i>	Leaf	+	+	-	+	+

(+) Indicate presence of phytochemicals and (-) Indicate absence of phytochemicals.

III. RESULTS AND DISCUSSION

Ten endemic species of medicinal plants were investigated in present study (Table 1). Selected medicinal plant species are popular and well known among the people of selected tribal area in Gariyaband district (Chhattisgarh) – India. The result is summarized in Table 2. revealing information that *Andrographis paniculata*, *Aloe vera L.*, *Mentha piperita*, *Phyllanthus emblica*, *Lucus cephalotes speng.*, *Amaranthus viridis L.*, *Amaranthus tricolor* and *Trigonella foenum-graecum* are comprises alkaloids. *Ocimum sanctum*, *Azadirachta indica*, *Aloe vera L.*, *Metha piperita*, *Phyllanthus emblica*, *Lucus cephalotes speng.* *Amaranthus viridis L.*, *Amaranthus tricolor* and *Trigonella foenum-graecum* contains flavonoids. *Andographis paniculata*,

Aloe vera L., *Gallium aparine*, *Mentha piperita*, *Lucus cephalotes spreng.*, *Amaranthus viridis L.* and *Amaranthus tricolor* are rich in steroids. Except *Mentha piperita* among all selected species of plants includes Terpenoids. Prior studies on *Andographis paniculata* revealed presence of flavonoids and diterpenoids in leaves (Rao et al., 2004; Smith et al., 2006; Chen, et al., 2008; Chen et al., 2006). Sugar is very common among all selected species of the plant. *Aloe vera*, *Lucus cephalotes spreng.* *Amaranthus viridis L* and *Amaranthus tricolor* containing all targeted phytochemical i.e. alkaloid, flavonoid, steroid, terpenoid and sugar (Pulipati et al., 2015). Large amount of sugar is detected on *Aloe vera*, earlier it was already reported. (Waller et al., 1978; Femenia et al., 1999; Ahmed. and Hussain, 2013)

IV. CONCLUSION

There are many plant species globally known for their medicinal property. Traditionally they are used as medicine since long time. But it is necessary to find out responsible metabolite scientifically from the mixture of phyto-chemicals which provides medicinal property to the plant. Isolation, concentration and storage are also an important part of drug synthesis. Development of pharmaceutical sciences is majorly dependent upon discoveries of plant species along with their medicinal values. Traditionally many endemic plant species are available in all part of the world including land and aquatic environment. These plants are highly adapted to specific environmental conditions. Hence, it requires longitudinal research methodology for vast exploration and identification of valuable plant species approved scientifically. Many more plant species were informed by the village people during the investigation period but due to technical reason and seasonal variation among the plant species it was difficult to collect specimens. Hence, lot's of effort and more research in this area is required. Information gathered during this research period will help us to continue expansion of this investigation. Analysis of other part of plant i.e. root, shoot, flower, seeds are missing in this part of study, which may have equal potential of medicinal values.

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