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STUDY ON MORPHOLOGICAL VARIATIONS AND IDENTIFICATION OF BIOACTIVE COMPOUNDS IN JAGMA (AGLAIA ELAEAGNOIDEA A. JUSS). BENTHEM.) –RED LISTED PLANT SPECIES IN WESTERN GHATS

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ABSTRACT Ethnobotonical information is leading to the discovery of novel phytopharmaceutical and other phytoproducts. Natural products, either as pure compounds or as standardised plant extract, provide an unlimited opportunities for new drugs because of the unmatched availabilities of chemical diversity. The plant Jagma is a red listed species which is found on middle part of Western Ghats. The plant *Aglaia elaeagnoidea (*A.Juss.) Benth. belongs to family Meliaceae, which grows in dry ever green forest as shrub and sometimes found as under storey trees in wet evergreen forests. The plant populations were also showed slight variations morphologically in plant height, leaves size and shape. Phytochemical analysis conducted on the plant (Jagma) extracts revealed the presence of bio active compounds such as phenols, tannins, flavonoids, resins, saponins and triterpinoids, which are known to exhibit antimicrobial as well as physiological activities. This preliminary study can be utilized for further to check the antimicrobial properties of the Jagma and its bio active components identified.

KEYWORDS : Jagma, Ethnobotany, Bio active compounds, Phytochemicals, antimicrobial properties

INTRODUCTION

The great variety of life on earth as provided for man's needs over thousands of years. This diversity of living creatures forms a support system which has been used by each civilization for it's growth and development. The diversity of life on earth is so great that if we use it sustainably we can go on developing new products from biodiversity for many generations. Medicinal plants are an integral component of ethnoveterinary medicine. The use of traditional medicine and medicinal plants in most developing countries, as a normative basis for the maintenance of good health, has been widely observed (Choudri and Maheshwari, 2009). . An increasing reliance on the use of medicinal plants in the industrialized societies has been traced to the extraction and development of several drugs and chemotherapeutics from these plants as well as from traditionally used rural herbal remedies. Moreover, in these societies, herbal remedies have become more popular in the treatment of minor ailments, and also on account of the increasing costs of personal health maintenance. Indeed, the market and public demand has been so great that there is a great risk that many medicinal plants today, face either extinction or loss of genetic diversity due to over exploitation.

Ethnobotonical information is leading to the discovery of novel phytopharmaceutical and other phytoproduct. Therefore, industries based on medicinal and aromatic plants have been established all over the world with a view to manufacture the so called green products to satisfy the growing demands. Many infectious have been known to be treated with herbal remedies throughout the history of mankind. Similarly Juliana and Paulo(2000) studied the phytochemical and antimicrobial activity of plant *Caryophyllus aromaticus* extracts and reported the presence of phytochemicals like Benzoic acid, Cinnamoic acid and showed the presence of antimicrobial property of the extracts. Natural products, either as pure compounds or as standardised plant extract, provide unlimited opportunities for new drug leads because of the unmatched availabilities of chemical diversity. Kaur and Aurora (2009) studied the antibacterial and phytochemical analysis in *Anethum graveonens, Foeniculum vulgare and Trachysprmum ammi* and showed the presence of phytochemicals like alkaloids, flavonoids and saponins. They also found that highest antibacterial efficacy shown by these plants which provides a scientific basis for the traditional home made remedies. There is a continous and urgent need to discover new antimicrobial compounds with diverse chemical structures and novel mechanisms of action new and reemerging infectious diseases. Therefore, researches are increasingly turning their attention to folk medicine, looking for new leads to develop better drug against microbial infections (Shihabudeen et al. 2010). The increasing failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has led to the screening of several medicinal plants for their potential antimicrobial activity.

India is a varietal emporium of medicinal plants and is one of the richest countries in the world in regard to genetic resources of medicinal plant. . Methanol extracts of 6 plants species traditionally used in India folklore medicine for the treatment of bacterial and fungal infections were investigated for invitrio antimicrobial activity against pathogens *Staphylococcus sp, Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa, Candida albicans* and *Aspergillus niger* by disc diffusion method. *Eugenia jambolana* and *Cassia auriculatya,* showed the highest to toxicity against all the bacteria (Parekh and Chanda Sumitra, 2006.. The plant exrtact showed antibacterial activity but not antifungal activity. The plant Jagma is a red listed species which is found in middle part of Western Ghats. By considering above factors in review part, an attempt has been made to study the morphological parameters of the populations and to analyze the phytochemicals (bio active components) in leaf extract of the jagma.

MATERIAL AND METHODS

The present study was carried out in Post Graduate Department of Botany, Alva's College Moodbidri and Alva's Ayurvedic Medical college Moodbidri from june 2017-2018. A field survey was carried out in Western ghats regions in Udupi and Dakshina Kannada District to identify medicinally important plant. Among these , Jagma (*Agalia eleganoidea* (A.Juss) Benth.) was selected to study its distribution, morphological and flower traits of the plant species (Bhat, K. G. 2012, 2003) and identification of bio active compounds. The fresh leaf samples were collected from the Kodibettu and Hiriadka (Udupi district). in polythene bags.

Preparations of plant samples: The fresh leaf sample was washed under running tap water and dried. About 200g fresh leaf samples were used for the extraction of bio active compounds (phyto chemicals). The plant material was air dried by using drier then these materials were kept under sunlight by closing it within cloth for 7 days. These sun dried plant materials were kept in hot air oven for 24 hours at 70^{0}c. These dried plant materials were weighed. The weight

of the dried materials recorded. The inert materials removed from the sample and only leaf and petioles used for grinding. The materials were grind by using mixer and coarse powder was weighed. Different solvents like ethanol, methanol, chloroform, acetone, petroleum Ether, benzene and distilled water were used and prepared extracts with standard methods (Dahiya and Purkayastha, 2012). Soxhlet method was also used to extract the leaf extracts.

Concentration and drying method: The solvent extract obtained above is concentrated under reduced pressure below 40 using rotatory evaporator. The concentrated extract is finally lyophilized to give a completely dry product.

Qualitative tests: Various qualitative tests for alkaloids (Dragendorff's test) , carbohydrates (Molisch's test, Benedicts test, Fehling's test), Flavonoids triterpinoids, (Liedeermann-Burchard's test) , proteins (Biuret's test), resins. Saponins, steroids(Liebeermann- burchard's test, Salkowski reaction), tannins and starch. .

RESULTS AND DISCUSSION

The plant *Aglaia elaeagnoidea (*A. Juss.) Benth. belongs to family Meliaceae, which grows in dry ever green forest and sometimes found as under storey trees in wet evergreen forests, up to 1000 m in some parts of Western ghats. It is normally found as shrub in Western Ghats and randomly found in the study area. Plant is shrub with compound leaves, basal 2 pairs of leaves are in equal size and posterior leaf is quite larger than basal leaves.). A small tree or shrub. Leaves impapipinnate, up to 23 cm long; leaflets 3-7, up to 16× 6 cm, elliptic to oblanceolate or obovate, entire, rounded or acuminate at apex. Flowers are minute 2 mm in diameter, bisexual, in supra axillary dense spreading panicles; pedicels 0.5- 1.5 mm long. Calyx 5- lobed , scaly. Petals 5, erect, oblong. Stamens 5; anthers sessile, included or slightly exerted in the subglobose staminal tube. Berry subglobose or pyriform, ferruginous, yellow or orange at maturity. Seeds 1-2 usually completely covered with thin white gelatinous aril. Common among bushes on the lateritic slopes and disturbed woods, fruite is berry and dible. Leaves are pinnate or trifoliate i.e Middle leaf is larger than remaining leaves. Leaf margin entire with acute tip.Stipules absent and leaves are arranged in opposite manner. Leaf base is pulvinous. The average height of plants is 83.6 cm (40cm-156cm), the average length of leaflet is 9.6 cm, The average breadth of leaflet=3.4 cm, Flowering season is during January and fruit setting is on April to May. The plant populations were also showed slight variations morphologically in plant height, leaves size and shape. These variations could be due to environmental and edaphic factors.

The study also indicated that it has several synonyms such as *Aglaia roxburghianahern, Aglaia barberi, Aglaia maiae, Aglaia canarensis, Aglaia bourdillonii,Aglaia minutiflorabedd, Aglaia odoratalour, Nemedra elaeagnoidea, Mimea roxbhurgiana, Aglaia abbreviate. It has various vernacular name such as* Priyangu (Bengali & Hindi), Punyava, Sempuli, Semuli (malayalum), Chokkala, Kannikombu (Tamil), Yerraduga, Kondanduga (Telug), Gadagayya, Kempu nola, Thottilu Gida (Kannada), Pucche Parndu, Jagma (Tulu) and Coastal boodyarr, Droopyleaf (English). These knowledge was recorded from local, folk practitioners and experts.

Phytochemicals / Bio active compounds

Phytochemical analysis conducted on the plant extracts revealed the presence of bio active compounds (constituents) which are known to exhibit medicinal as well as physiological activities. Analysis of plant extracts of various solvents revealed the presence of phenols, tannins, flavonoids, resins, saponins and triterpinoids (Table 2). The results of presence and absence of various bio components in the plant extracts as discussed below.

Alkaloids : In dragendroff's test no orange or orange red precipitate was produced. Hence alkaloid compounds were absent in leaf samples. .

Carbohydrates: Presence of carbohydrates was confirmed by Molisch's tests, Benedict's test and Fehling's test.

Flavonoids : During the test there was no pink, reddish brown or brown color was produced. So, flavonoids were absent in leaf sample.

Triterpenoids: During the test, violet colour ring was developed which indicated the presence of triterpenoids in the leaf sample.

Proteins: During test no brick red precipitate on heating, hence proteins were absent in leaf sample.

Resins: During the test there was no turbidity seen in the test tube hence resins absent in leaf sample.

Saponins : During the test formation of honey comb like froth was clearly seen which indicates the presence of saponins in the leaf sample.

Steroids: In Liebermann-Burchard's test a greenish color solution was developed. Hence steroids were present in leaf .

Similarly, Salkowski reaction: showed red color solution was in the alcoholic layer. Hence, steroids were present.

Tannins: During test green colour solution was developed which indicates the presence of gallotanins.

Statch : The leaf samples do not developed blue colour during the test which indicated that starch was absent.

Above all qualitative tests indicated that the Jagma plant leaf extracts have bio active compounds. Similar study also indicated in *Ceiba pentandra* stem bark and used in traditional medicines which contains potential source of Antimicrobial agents as well as possible Anti inflametary agents. The plant Jagma leaf extracts also used in folk medicines in around villages of the study area. Phytochemical analysis of the plant extracts of various plant species showed important bioactive compounds such as Flavonoids, Tannins, Steroids, Alkaloids and Glycosides (Anosike. *et al.* 2012). Similarly four plant extracts showed a brought spectrum of antimicrobial activity. Phytochemical investigation revealed the presence of tannins, saponins, alkaloids, glycosides, flavonoids and essential oils in the studied plants (Kubmarawa *et al.*, 2007). Hence the Jagma leaf extracts could be used for antimicrobial and antifungal activity. *Psidium guajava*is an important food crop and medicinal plant which contains chemical constituents with pharmacological and clinical uses. The plants contains a phytochemicals like Phenol, Flavonoids, Carotenoids, Terpenoid and Triterpen which have antimicrobial properties in the treatment of Diarrhoea and Dysentery (Martha Rose. *et al*., 2008). Jagma plant species is already red listed which has gor enormous bio active compounds. Therefore, jagma plant populations must be conserved and given priority for multiplications. However the Jagma plant parts were used in folk medicines by villagers and local practitioners. The present preliminary study can be strengthened and identified bio active compounds could be utilized for studying the anti microbial activity. However, leaf extracts of Jagma has been utilized in traditional medicines by local peoples.

Table 1: Vernacular Names for Jagma in various langauges

Sl. No.	Language	Vernacular name
1	Bengali	Priyangu.
2	Hindhi	Priyangu
3	Malayalam	Punyava, Sempuli, Semuli
4	Tamilnadu	Chokkala, Kannikombu
5	Telugu	Yerraduga, Kondanduga
6	Kannada	Gadagayya, Kempu nola, Thottilu Gida
7	Tulu	Pucche Parndu, Jagma
8	Common names	Coastal boodyarr, Droopyleaf

Table 2. Details of Phytochemical tests (presence / absent)

Sl. No.	Bio Active compounds	Tests Name	Extract type	Inference	Present (+) or Absent (-)
1	Alkaloids	Dragendorff's test	Alcoholic / aqueous extract	No orange colour /ppt	Absent (-)
2	Carbohydrates	Molisch's Tests	Aqueous	Red violet ring	Present (+)
	Carbohydrates	Benedict's tests	aqueous	Coloured ppt	Present (+)
	Carbohydrate	Fehling's tests	Aqueous	Red ppt.	Present (+)
3	Flavonoids	-	alcoholic	No pink colour	Absent (-)
4	Triterpenoids	Liebeermann burchard's	Petroleum ether extract	Voilet ring colour	Present (+)
5	Proteins	Biuret test	Aqueous / alcoholic	No brick red color	Absent (-)
6	Resins	-	Aqueous extract	No turbidity	Absent (=)
7	Saponins	-	Aqueous extract	Honey comb froth	Present (+)
8	Steroids	Liebeermann burchard's	Petroleum ether extract	Greenish colour	Present (+)
	Steroids	Salkowski reaction	Chloroform extract	Red colour	Present (+)
9	Tannins	-	Aqueous extract	Green colour	Present (+)
10	Starch	Iodine test	Aqueous extract	No blue colour	Absent (-)

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