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Preliminary Phytochemical Investigation on A Few Cucurbitaceae Plants

Bhavani MB[1]*, Leelavathi S[1], and Ismail Shareef M[2]

[1] DOS Botany, Manasagangotri, University of Mysore, Mysore-570 006, Karnataka, India.
[2] Dept. of Biotechnology, Acharya Institute of Technology, Acharya Post (O), Bangalore-560 107, Karnataka, India

ABSTRACT

The present study was undertaken to evaluate the preliminary phytochemical constituents of four wild Cucurbitaceae plants such as *Corallocarpus epigaeus, Mukia maderaspatana, Diplocyclos palmatus* and *Lagenaria siceraria*. All the above selected plants wildly grow throughout India. The plants for the present investigation were collected from Mysore (Karnataka) and Chittor (Andra Pradesh) districts. Qualitative phytochemical screening was undertaken to check for the presence of alkaloids, flavonoids, saponins, tannins, anthroquinones, phenols, cardiac glycosides, di and triterpenoids in various extracts such as petroleum ether, chloroform and methanol. Among all the three extracts, maximum phytochemicals were found dissolved in methanol followed by chloroform and then petroleum ether. The presence of phenols, tannins, flavonoids, alkaloids and terpenoids confirms that these plants possess valuable medicinal properties that can be further isolated and characterized to establish their potential against ailments.

Keywords: *Corallocarpus epigaeus, Mukia maderaspatana, Diplocyclos palmatus, Lagenaria siceraria*, cucurbitaceae.

Corresponding author

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INTRODUCTION

Plants have been used as food, fodder, fuel and medicine since the beginning of the human civilization. It is the main source of medicine in developing countries. The world health organization report says that about 80% of the population in the developing countries still rely upon traditional medicines, especially plant drugs for their recovery from ill-health [1]. Plants are also being used to treat humans, animals and plant diseases from time immemorial, also herbal medicines have been known to man for centuries [2,3]. Therapeutic efficacies of many indigenous plants for many disorders have been described by practitioners of traditional medicine [4,5,6]. In order to quench the thirst for a new drug for an ailment from herbal origin a few wild Cucurbitaceae plants such as *Corallocarpus epigaeus, Mukia maderaspatana, Diplocyclos palmatus* and *Lagenaria siceraria* were chosen.

Corallocarpus epigaeus is commonly known as Akasgaddah in Hindi and Akashagaruda in Tamil [7], and is distributed in tropical and temperate regions of India, Ceylon, Deccan and South Maratha country. The rhizome is especially useful in Syphilitic cases, old venereal complaints, chronic dysentery and snake bite [8].

Mukia maderaspatana is commonly known as Madras pea pumpkin in English and Agumaki in Hindi. The plant is reported to possess hepatoprotective activity [9], antirheumatic [10], diuretic, stomachic (a digestive tonic), gentle aperients, antipyretic and antiflatulent, antiasthamatic, anti-inflammatory, anti-diabetic and antibronchitis and is used for toothaches besides its use in vertigo and biliousness [11].

Diplocyclos palmatus is commonly known as Lollipop climber and marble vine, Shivalingi and Bankakra in Hindi and Linga konde balli in Kannada. In the traditional system of medicine the different parts of the plant (leaves, stem, flower, seeds and even whole plant) are used in the treatment of various ailments such as jaundice, inflammation and fever [12]. In Ayurveda the fruits are used in the area of reproductive medicine (female infertility, aphrodisiac, tonic, leucorrhoea) [13]. *Lagenaria siceraria* is commonly known as bottle gourd and white pumpkin, Pungikayee in Kannada and Lauki in Hindi. Since time immemorial the fruit is used as immunosuppressant, cardio-protective, diuretic, as cardio tonic and nutritive agent [14].

These plants are distributed in tropical and temperate regions of India. An ethnobotanical survey and literature review reveals that these plants are used in home-made medicines. The present research work is aimed to describe the phytochemical analysis of the above mentioned plants.

MATERILAS AND METHODS

Plant materials

For the present study, the four following plants viz., *Corallocarpus epigaeus, Mukia maderaspatana, Diplocyclos palmatus* and *Lagenaria siceraria* belonging to the family

Cucurbataceae have been selected. These plants have been collected from Mysore (Karnataka) and Chittor (Andra Pradesh) districts in the month of April and September where they were growing profusely. The plants have been identified and authenticated by experts from National Ayurveda Dietetics Research Institute, Bangalore.

Processing of plant material

The collected plant materials were washed with running tap water and shade dried (± 28°C). The dried samples were powered using a stainless steel mixer grinder. After pulverization the powder was sieved with a commercial sieve of mesh size approximately 0.3 mm to make the particle size uniform and labeled and stored in airtight bottles for further use.

Extraction of plant material

The plant materials were extracted with petroleum ether, chloroform and methanol using soxhlet extraction apparatus continuously for 16 hours [15]. For extraction, the dried plant material was used. Initially 50 g of plant material was packed in filter paper and loaded into the thimble of soxhlet apparatus. 300 ml of solvent was poured into the flask (distilling pot) and the whole apparatus was set. The soxhlet extraction was performed for 12- 16 hours until the collected solvent in siphon tube appears to be clear. Later the extracted solvent was evaporated under reduced pressure using a rotary vacuum evaporator to get solid/ semi solid extract. The extract was weighed, physical characters were noted. The percentage yield was calculated and the extracts were suitably labelled and stored in clean and dry specimen bottles.

Preliminary phytochemical analysis [16]

All the four plant extracts were screened for the presence of various secondary metabolites such as alkaloids, flavonoids, phenols, tannins, saponins, terpenoids, glycosides and steroids were screened according to the standard phytochemical methods described by Harborne.

RESULTS AND DISCUSSIONS

The chloroform and methanolic extract of tuber of *Corallocarpus epigaeus* (Table 1) showed the presence of alkaloids, flavonoids, phenols, tannins, teiterpenoids and cardiac glycosides. Triterpenoids were present in the petroleum ether extract and steroids were present only in the methanolic extract. Saponins, anthraquinones and diterpenes were totally absent in all the three extracts.

The petroleum ether, chloroform and methanolic extract of whole plant of *Mukia maderaspatana* (Table 1) showed the presence of alkaloids, flavonoids, tannins, diterpenes, triterpenoids, glycosides and steroids. Phenols and saponins were present in chloroform and methanol extracts. Anthraquinones were totally absent in all the three extracts.

The chloroform and methanolic extracts of aerial parts of *Diplocyclos palmatus* (Table 1) contained alkaloids, flavonoids, tannins, saponins, diterpenes, triterpenoids, glycosides and steroids. Phenols were present in methanolic extract only. Petroleum ether extract contained tannins, triterpenoids, glycosides and steroids. Anthraquinones were totally absent in all the three extracts.

The methanolic extract of the fruit of *Lagenaria siceraria* (Table 1) showed the presence of alkaloids, flavonoids, phenols, tannins, saponins, triterpenoids, steroids and glycosides. Wherein the petroleum ether and chloroform extracts showed the presence of triterpenoids, glycosides and steroids. Anthraquinones were totally absent in all the three extracts.

Thus, the phytochemical screening of the petroleum ether, chloroform and methanolic extracts of *Corallocarpus epigaeus, Mukia maderaspatana, Diplocyclos palmatus,* and *Lagenaria siceraria* showed the presence of alkaloids, flavonoids, terpenoids, steroids, phenolics, saponins, glycosides and tannins (Table 1). The presence of alkaloids is interesting as significant quantities are used as anti-malarials, analgesics and stimulants [17]. Terpenoids have antitumor, anticancer, antiviral, antimicrobial and anti-inflammatory activities [18].

The leaves of *Mukia maderaspatana* contain many constituents which are considered mainly to be responsible for various antimicrobial properties. Eugenol is the main constituent and it is responsible for its repellent property. The presence of eugenol attributes to its antioxidative property and is also thought to be responsible for inhibition of lipid peroxidation [19]. This property helps in maintaining good health and in preventing the occurrence of heart diseases as well as most of the other biochemical diseases because oxidative stress is the hallmark of such diseases [20]. Eugenol is the major component found in the whole plant of *Mukia maderaspatana* which is being used for the pharmacological work. Saponins are generally regarded as antinutrients but are also believed to be useful in human diets for controlling cholesterols. Its presence in this plant therefore could suggest that the plant is of medicinal value. Tannins are distributed all over the plant kingdom and are astringent, bitter plant polyphenols that either bind and precipitate or shrink proteins, Tannins have traditionally been considered antinutritional but may be employed medicinally as antidiarrheal, hemostatic and antihemorrhoidal compounds. Its presence in the plant suggests it to be of medicinal value because tannins have shown to possess potential antiviral [21], antibacterial [22] and antiparasitic effects [23].

The flavonoids are known to inhibit tumor growth and also serve to protect against gastrointestinal infections and are of pharmacognostic importance thus giving evidence of the use of these plants in ethnomedicine. Some of these bioactive compounds which are synthesized as secondary metabolites as the plant grows also serve to protect the plant against microbial attacks and predation by animals. The increasing reliance on the use of medicinal plants by a sizeable proportion of the people in the so-called industrial world has been traced to the extraction and development of several drugs and chemotherapeutic agents from these plants as well as from traditionally used herbal remedies [24].

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TEST	*Corallocarpus epigaeus*			*Mukia maderaspatana*			*Diplocyclos palmatus*			*Lagenaria siceraria*		
Phytochemicals	Pet - Ether	Chloroform	Methanol	Pet - Ether	Chloroform	Methanol	Pet - Ether	Chloroform	Methanol	Pet - Ether	Chloroform	Methanol
ALKALOIDS												
Dragendorff's	-	+	+	+	+	+	-	+	+	-	-	+
Mayer's	-	+	+	+	+	+	-	+	+	-	-	+
Hager's	-	+	+	+	+	+	-	+	+	-	-	+
FLAVONOIDS												
Lead acetate	-	+	+	+	+	+	-	+	+	-	-	+
Ferric chloride	-	+	+	+	+	+	-	+	+	-	-	+
NaOH	-	+	+	+	+	+	-	+	+	-	-	+
PHENOLS												
Ferric chloride	-	+	+	-	+	+	-	-	+	-	-	+
Lead acetate	-	+	+	-	+	+	-	-	+	-	-	+
TANNINS												
Gelatin	-	+	+	+	+	+	+	+	+	-	-	+
ANTHRAQUINONES	-	-	-	-	-	-	-	-	-	-	-	-
SAPONINS												
Froth Test	-	-	-	-	+	+	-	+	+	-	-	+
Foam Test	-	-	-	-	+	+	-	+	+	-	-	+
DITERPENES												
Copper acetate	-	-	-	+	+	+	-	+	+	-	-	+
TRITERPENOIDS												
Lieebermann's	+	+	+	+	+	+	+	+	+	+	+	+
CARDIAC GLYCOSIDES												
Libermana's	-	-	+	+	+	+	+	+	+	+	+	+
Keller-Killiani	-	-	+	+	+	+	+	+	+	+	+	+
STEROIDS	-	-	+	+	+	+	+	+	+	+	+	+

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