



ORIGINAL RESEARCH PAPER

Botany

PRELIMINARY PHYTOCHEMICAL SCREENING OF LEAF EXTRACTS OF DOLICHANDRONE (FENZL) SEEM IN KERALA

KEY WORDS: DOLICHANDRONE ARCUATA, DOLICHANDRONE ATROVIRENS, DOLICHANDRONE SPATHACEA, LEAF EXTRACT

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ABSTRACT

The present paper deals with the phytochemical screening of leaf extracts of genus Dolichandrone. In Kerala, three species of Dolichandrone seen, Dolichandrone arcuata Dolichandrone atrovirens and Dolichandrone spathacea. These species are important medicinal plants used in the Indian traditional medicine and has widespread applications used by various tribal people across the State of Kerala. All the plants tested are rich in various phytochemicals such as Carbohydrates, Alkaloids, Glycosides, Protein and aminoacids, Tannin and phenolics, Flavanoids, Terpenoids, Saponins, Gum and mucilage, Fixed oil and fat and Phytosterols. More detailed investigations not only in vitro but also in vivo are needed for the development of new promising drugs which is the need of the hour.

Introduction

The use of medicinal plants as a source of treatment can be traced back to written documents of the early culture in China, India and the Near east, but it is, an art as old as mankind (Ekta, 2012). Medicinal plants play a key role in health care with about 80% of the world's population relying on the use of traditional medicine which is predominantly based on plants (Maher *et al.*, 2012). Herbal products prepared either from single or multiple botanical ingredients are usually complex and variable in nature. Many plant materials have a plethora of biological activities like antidiabetic, antibacterial, antioxidants, antiinflammatory, anticancer, analgesic and wound healing activity. Three species of Dolichandrone distributed in Kerala (*Dolichandrone arcuata Dolichandrone atrovirens* and *Dolichandrone spathacea*), which are ethnobotanically significant are used for the study.

Materials and Methods

Plant materials

Plant specimen were collected from Palakad, Wayanad And Kasargod districts of Kerala. The collected specimens were identified with help of Flora of Madras Presidency (Gamble, 1928).

Dolichandrone arcuata (Wight) Clarke, is a medium sized trees, which is distributed in dry deciduous forests of Palakad and Wayanad. Flowering & Fruiting in December-March. Taxonomic description of the plant is compound, imparipinnate, opposite, leaves; leaflets 5-11, opposite; lamina 4-7.5 x 2-4 cm, oblong, ovate, orbicular or elliptic-ovate; base oblique or obtuse; apex acute or acuminate; margin entire, pubescent, coriaceous; Inflorescence terminal corymb or panicle; Flowers bisexual, white, pleasantly scented; calyx spathaceous; corolla 4 cm across, tubular, widened at mouth, tube 6 cm, lobes 5, fringed; stamens 4, didynamous; disc annular; ovary 5 mm, sessile; ovules numerous, style 2 mm; stigma 2 lobed. Fruit a capsule, 2 valved, upto 45 x 1.5 cm, linear, terete, pubescent, speckled with white dots, curved.

Dolichandrone atrovirens (Heyne ex Roth) K.Schum, are deciduous trees, distributed in Palakad and Wayanad areas. Flowering and fruiting in Jan-April. Taxonomic description of plants - leaves opposite, imparipinnate; leaflets 2-3 pairs, 3-7.7x2-3.5cm, broadly elliptic, obtuse or acuminate apex; inflorescence corymbose raceme; peduncled, 1-7 fid; pedicels 1-3 cm long. flowers white, bisexual; calyx 2-2.5 cm long, spathaceous; corolla white, tube 2.5-3 cm long, lobes 5, rounded, crisped, crenate; stamen 4, didynamous, included; ovary sessile; ovules many; stigma 2 lobed. capsules upto 30 cm long, 2 valved woody, 25-40x1.5-2cm, speckled smooth.

Dolichandrone spathacea (L. F.) K. Schum, moderate sized deciduous trees. distributed in banks of river and mangrove swamps in the coastal areas of Kasaragode, Kollam, Kozhikkode,

Alappuzha. Leaves compound, imparipinnate opposite; leaflets 5-9, opposite; lamina 7.5- 15.2 x 2.5-7.5, rhomboid or ovate-lanceolate; base oblique; apex acuminate; margin entire, glabrous and shiny. Inflorescence terminal short erect corymbs with, 3-4 flowers; Flowers bisexual, white, open in night and then fall off; calyx spathaceous; corolla 10-18 cm long, tube long, slender below, widening half way to a funnel; stamens 4, didynamous, included; disc annular; ovary sessile; ovules many; style long; stigma 2 lobed. Fruit a capsule, to 45 x 2.5 cm, purplish-brown, cylindrical, rarely straight.

Preparation of extracts

The shade dried coarse powder of plant material are extracted with 80% v/v aqueous methanol by maceration and extract filtered, concentrated to dryness under reduced pressure and controlled temperature. Preliminary phytochemical screening was carried out by following standard procedure (Harborne, 1998).

Results and discussion

Ethnobotanical importance

Dolichandrone arcuata stem bark crushed extract used against dysentery by Kattunaika community of Wayanad district. *Doichandrone atrovirens* are used to treat ephemeral fever where the extract of stem bark crushed with *Anogeissus latifolia* is given orally. During odema paste of bark crushed with *Hygrophila auriculata*, pepper, garlic, turmeric and common salt are effective. The pods are used to treat abdominal pain and leaves for tooth ache. It has been used by Irula community of Attapady and native medical practitioner to treat various chronic disorders including diabetic (Kavimani *et al.*, 2014).

Dolichandrone spathacea leaf extracts are used to cure mouth ulcers. Its leaves and fruit are used as substitute for betel leaves. Its seeds are given with ginger in case of convulsive affections. Timber light weighed and good for carving. Seeds paste used as antiseptic - 200gm of fresh seed taken and ground to paste and the paste slightly warmed and applied on wounds and cuts. The treatment continued for 3-4 days until the wound is healed. The bark used in fish poisoning during fishing. It is also used to treat nervous disease and flatulence (Choudhury *et al.*, 2011).

The results of phytochemical screening are given in Table 1 which reveals that the tested plants are rich in various phytochemicals. Carbohydrates, glycosides, proteins, amino acids, tannins, phenolics, terpenoids, flavanoids and saponins are present in the aqueous methanolic leaf extracts of *Dolichandrone atrovirens* while in *Dolichandrone arcuata* carbohydrates, glycosides, flavanoids, phytosterols and fixed oil and fat present in leaf extract. Phytochemical screening of *Dolichandrone spathacea* leaf extracts revealed the presence of carbohydrates, alkaloids, glycosides, flavanoids, terpenoids and saponin.

Table 1. Preliminary phytochemical screening of aqueous & methanolic leaf extracts of the genus Dolichandrone in Kerala

Phytoconstituents	Name of test	D. atrovirens	D. arcuata	D. spathacea
Carbohydrates	Molisch	+	+	+
Alkaloids	Dragendroff	-	-	+
Glycosides	Kellerkilian	+	+	+
Protein and aminoacids	Ninhydrin	+	-	-
Tannin and phenolics	Braemer's	+	-	-
Flavanoids	shinoda	+	+	+
Terpenoids	Chloroform and sulphuric acid	+	-	+
Saponins	Foam test	+	-	+
Gum and mucilage	Absolute alcohol	-	-	-
Fixed oil and fat	Potassium hydroxide	+	+	-
Phytosterols	Salkowski	-	+	-

The presence of an array of secondary metabolites in all the plants tested suggests that the plant has medicinal importance and is the reason behind its use to cure various ailments from time immemorial. The presence of flavanoids has antioxidant, anti allergic, anti inflammatory, antimicrobial and anticancer activities (Kunle and Egharevba, 2009). Presence of tannin shows that the plant has antiviral and antibacterial activities and also it can aid in wound healing and burns (Haslem, 1989). The potential of saponin and glycosides to treat cardiovascular conditions (Oloyode, 2005) and anticancer and immunomodulatory properties (Kunle and Egharevba, 2009) are also well reported. Moreover, the family Bignoniaceae is a huge reservoir of variety of secondary metabolites like saponins, tannins, flavonoids, quinines, alkaloids, anthralene derivatives, reducing sugars, glycosides, carbohydrates, quercetin, kaempferol, β - sitosterol, iridoids, terpenes, steroids and coumarins. The crude extracts of the entire member species has antibacterial activity, antifungal activity, plasmodial activity, hepatoprotective activity, antioxidant activity, anti-inflammatory activity, anti-rheumatic activity, anti-cancer activity and antitumoral activities which paves the way for its use in traditional and modern medicine.

Conclusion

Herbs are commonly used by people across the globe, especially in developing countries through traditional medicine. Thus phytochemical screening studies are still relevant. In the present study the phytochemical constituents in different species of Dolichandrone was evaluated. The results showed that these plants are rich repository of secondary metabolities which impart various pharmacological potentials and development of promising treatment modalities. However, further detailed studies are required to make valid conclusions.

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