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A Phyto-pharmacological review of *Blepharis maderaspatensis* (L.) B. Heyne ex Roth

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ABSTRACT

The present highlight the comprehensive ethano-medicinal uses of *B. maderaspatensis,* to enlighten its phytochemical constituents and pharmacological uses which may useful in various types of diseases. *Blepharis* is a genus of plant in family Acanthaceae and it contains around 126 species found in seasonally dry to arid habitats. One of its plants, *Blepharis maderaspatensis* (L.) B. Heyne ex Roth has been recognized by the *Utinjan, Otigan, Utagan,* and *Chatushpatri* in Hindi, Gujarati, Marathi, and Sanskrit respectively. Leaf extract of *B. maderaspatensis* rich in phytoconstituents like saponins, mucilage, flavonoids like caffeic acid, rutin, quercetin and ferulic acid. It is useful in various types of diseases as proved by pharmacological studies as an anti-hyperlipidaemic, anti-atherogenic activities, anti-inflammatory, anti-nociceptive activity, anti-ulcer activity, wound healing activity and in diabetic wound. The review suggests the similar uses and nomenclature of *B. maderaspatensis* to *Blepharis edulis* as mentioned in Wealth of India*. Blepharis maderaspatensis* (L.) B. Heyne ex Roth has rich phytoconstituents and varied pharmacological activities. Further, it has similar uses as *Blepharis edulis* mentioned in Wealth of India. *Blepharis maderaspatensis* (L.) B. Heyne ex Roth is the species of original *Utingan* stated in *Ayurveda.* Likewise, it has similar properties and action to the *Blepharis edulis* (Forssk.) Pers. which could be useful for different types of diseases like inflammation, ulcer, wound, diabetic wound. Present review highlights the phytoconstituents and different ethanomedicinal claims and some proven pharmacological activities.

Keywords: Acanthaceae, *Blepharis maderaspatensis*, *Blepharis edulis*, *Utingan*.

INTRODUCTION

India has been conventional towards traditional medicine and ethnopharmacology for practice. Remarkably, the formulations of Indian traditional medicine have been mixtures of multi-component and their therapeutic uses have been based upon practical skills rather than a mechanism of active ingredients of a mixture [1]. The traditional system like *Ayurveda* and the innovative approach of predictive, protective, and personalized medicine (PPM) have a resemblance between their relationship [2]. European Union rightly considered PPM because of the core of its strategy [3].

More than 1500 herbals are sold as nutritional supplements and/or traditional medicines [4]. *Blepharis* is a genus of plant in the family Acanthaceae and contains around 126 species found in seasonally dry to arid habitats. In *Blepharis* genus *Blepharis persica* is well-known plant which is recognized as a *utingan* in *Ayurveda* and the wealth of India. The leaves are reportedly useful in wounds, asthma, throat inflammation, disorders of liver and spleen, and as a beneficiary in *mutrakruccha* and dysmenorrhoea. Seeds of *Utingan* have been useful in *Mutrakruccha* (dysuria), *Svasa, Kasa*; in *Vajikaran*, and useful in strangury and eye disorder. The present review is about one of the lesser well-known plant of *Blepharis* genus; *Blepharis maderaspatensis* (L.) B. Heyne ex Roth which is known for its similar uses as *Blepharis persica* like the juice of leaves have been administered for throat troubles and asthma; egg albumin triturated with leaves of *Utingan* along with onion applied externally for bone fractures; the whole plant has been beneficiary in urinary problems [5]. It is known as *Utingan* and/or *Utingan* in Gujarati [6] which is a similar name to *B. persica*. *Blepharis maderaspatensis* (L.) B. Heyne ex Roth is also recognized by the *Utingan* from Gujarat, *Utinjan* in Hindi, *Utagan* in Marathi and *Chatushpatri* in Sanskrit [6] and *Kodali sappu* in Kannada language [7]. The synonyms are *Blepharis boerhaavifolia* [6], *B. maderaspatensis* (L.) Roth, *Acanthus maderaspatensis* L., [7]. So, *B. maderaspatensis* is one of the less known folklore plants in therapeutics. However, it's a useful plant according to its tribal claims and from various books, and many of their actions are proved pharmacologically based on chemical constituents present in it. And, it was found that the detailed scientific review is yet not available. So, the present review article represents the ethnomedicinal uses, phytochemical and pharmacological properties of *B. maderaspatensis.*

MATERIALS & METHODS

Different available kinds of literatures like Vanaspati shastra, Flora of Davanagere district, Flora of Saurashtra, the flora of Orissa, Medicinal plants of India. Vol. I – Karnataka and also digital search as well as all the articles found regarding *B. maderaspatensis* were searched up to September – 2020. The search criteria include ethnobotanical uses, ethnopharmacological uses, and phytoconstituents of *B. maderaspatensis* and research work carried out on *B. maderaspatensis* about its phytochemical and pharmacological properties.

REVIEW RESULTS

Botanical description [8]

Table 1: Taxonomical classification of *Blepharis maderaspatensis* (L.) B. Heyne ex Roth

Scientific classification	
Domain:	Eukaryota
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Asterids
Order:	Lamiales
Family:	Acanthaceae
Subfamily:	Acanthoideae
Tribe:	Acantheae
Genus:	*Blepharis* Juss.
Species	*Maderaspatensis* (L.) B. Heyne ex Roth

Taxonomical classification of the *Utingan* has been shown in table no. 1. A diffuse prostate herb, 30-90 cm tall; stems branched, smooth, internodes in the root. Leaf 4 in a whorl, unequal, 2.5-8 X 1-3.5 cm somehow pointed, smooth, elliptic, acute: petioles lesser in size. Flowers single, or together, about 1 cm long, bracteoles cuneiform below, broadly spathulate and rounded above, 6-8 mm long. Calyx with outer lobe 2 mm long, pubescent, upper lip narrow; lower lip 3- angled, broad, pale blue with a yellow spot and red or sky-blue lines. Capsules ovoid, compressed, 2 – seeded. Seeds echinate with obtuse spines.

DISTRIBUTION

The plant is recorded from Ghumli; Shriwan, outskirts of Gir; Veraval to Sasan [9]; Deccan Peninsula; Sri Lanka; Myanmar; tropical Africa [10]; Bangalore, Belgaum, Bellary, Bijapur, Chikmangalur, Chitradurga, Coorg, Dharwar, Hassan, Kolar, Mysore, Raichur [11].

Ethnomedicinal claims

Blepharis maderaspatensis L. Roth (Acanthaceae) which is known as *Pappadak-kodi*, in southern India is employed to cure diseases like boils, fracture of bones, diarrhoea, and lactation also [12]. Seeds of *Utingan* are applied for open cuts and wounds [13], and *Swarasa* obtained by pounding leaves are heated with ginger oil and externally smeared on an area to heal the excision wound [14]. Dry seeds of this plant which is known as *Nethirs poondu* within the local language have been containing steroids and *Utingan* have been used for disorders of the Central Nervous System (CNS) [15].

This plant also includes the usage of *Kshara* in dropsy, inflammations, oedema, gout. Dehydrated alcoholic extracts of *Utigan* have been served effective in diuretic; it is also used in venereal disorders by crushing all the plant parts together. The juice of leaves is also administered for throat troubles and asthma; *Kalka* of *Utingan Patra* triturated with the ovum of hens and with *Allium cepa* for bone fractures via an external application and has been known as *Dudhiya choti* in the local language [34]. The *panchaga* of a plant is used to treat urine problems [5]. Seeds of *B. maderaspatensis* are said as a tonic and known as *Utingan* in the local language in Gujarat and they are soaked water for administered in a disease like ulcers, micturition [8]. Further seeds are used as a tonic, in headaches, ulcers, and urinary problems [16]. Seeds are employed in dysuria, diseases of the nervous system and it is also used as a diuretic and as an aphrodisiac [11]. Leaves and seeds are used to treat headaches, nervous disorders [7].

Chemical constituents

The alcoholic extract of *Utingan* revealed the presence of XVII different compounds during GC-MS analysis. Phytoconstituents had been obtained in the mass spectra were authentified with the library of NIST. Chemical constituents which have been presented in the plant are 9- Eicosyne, Sqalene, Phytol, 3,4-Dihhdro-3,5,8-trimethyl-3-(4,8,12trimethyltridecyl)-(2H)-benzopy-ran-6-acetate, 3,7,11,15 Trimethyl-2- hexadecen-1-ol and Cholestan-3-ol, 2 methylene,(3á,5à). The leaf extract of showed Caffeic acid, Rutin, Quercetin, and Ferulic acid [17].

Pharmacological properties

Anti-hyperlipidaemic and Anti-atherogenic activities: The anti-hyperlipidaemic and anti-atherogenic activities of *B. maderaspatensis* were evaluated using Triton WR-1339 induced hyperlipidaemic rats in experimental models. Pre-treatment of ethanol extracts of *B. maderaspatensis* (100 mg/kg, po) decreased the lipid levels in albino rats [18].

Anti-inflammatory and Anti-nociceptive activity: Extract of *B. maderaspatensis* (50 and 75 mg/kg) in carrageenan-induced and xylene-induced tests caused a major inhibition of paw oedema. In a histamine-induced produced substantial inhibition and serotonin-induced test show modest inhibition 90.9 % and 54.10% of paw oedema correspondingly. The extract had been up to a considerable inhibition in the mouse writhing and tail clip tests [19]. In another study, different extracts of the *B. maderaspatensis* and *B. molluginifolia* have been evaluated for *in vitro* anti-inflammatory activity using membrane equilibrium procedure. Ethyl acetate extract of *Utingan* exhibited superior membrane stability in comparison to ethanolic extract of *Utingan* [20].

Antioxidant activity: comparatively studied between *B. repens* and *B. maderaspatensis* had been undertaken for *in vitro* antioxidant protocols such as DPPH, free radical ion during current protocol in three different extracts such as petroleum ether, ethyl acetate, and ethanol. Rutin had been taken as a reference standard for the present

protocol. The IC50 value was found to be about 39.33±0.58 µg/ml and 49.67±0.58 µg/ml for *Utingan* ethyl acetate extract and *B. molluginifolia* ethanolic extract respectively. The present protocol shows the highest antioxidant activity [21].

Anti-microbial activity: Ethyl acetate extract and acetone extract of *Utingan* exhibited maximum activity against *E. coli* (20 mm) and *E. faecalis* (18 mm) by well and disc diffusion method respectively [22].

***In vitro* antioxidant and antiproliferative activity:** *B. maderaspatensis* had been extracted with n-hexane, ethyl acetate, and methanol respectively and it had been tested for antioxidant activity using DPPH, NO, and MTT test on 4 different cancer cell lines and with one normal cell line. *Utingan* had been shown moderate activity during the experiment as an antioxidant and for antiproliferative protocols [23].

Anti-ulcer activity: Anti-ulcer activity of *Utingan* was evaluated using pyloric ligation and hydrochloric acid and alcohol induce ulcer in rodent animals. Alcoholic extract of *B. maderaspatensis* has a highest effect (67.5%) in reducing ulcers from the stomach at a dose of 200 mg/kg when compared to a normal control group [24].

Wound Healing activity: Excision and incision wound healing models in rats were used for evaluating the excision wound healing effect of *A. baccifera* and *B. maderaspatensis*. 5% ethanol and 5% chloroform portion of *Utingan,* as well as ethanolic leaf extracts of *A. baccifera* show the significant results in excision wound healing effect. *Utingan* sample showed notable excision healing activity compared to *A. baccifera* was supported by histopathological study of both the drugs [25].

Wound healing activity in diabetic rats: The extract of *Utingan* was prepared according to ancient text by making *Kalka* with *Citrus lemon* and ovalbumin by mixing black gram powder and it was evaluated against streptozotocin (STZ) induce diabetes in the rat. The wound was completely healed by 20% extract when compared to the normal control group [26].

DISCUSSION

Blepharis maderaspatensis (L.) B. Heyne ex Roth belongs to the family Acanthaceae is known by the *Utinjan. Utingan* is mainly helping to prevent and/or cure inflammation, wound, diabetic wound, ulcer, as an anti-oxidant, anti-hyperlipidaemic type of the diseases. *B. maderaspatensis* showed availability of secondary and primary chemical constituents into a plant which is mainly liable for the prevention and cure of many sorts of disorders. *Utingan* contain secondary metabolites like flavonoid like rutin, (3,3',4',5,7-pentahydroxyflavone-3-rhamnoglucoside) which have been useful in hypoxic, glutamate and oxidative stress [27], and it also useful in anti-hypercholesterolemic by significantly reduce triglyceride [28], total cholesterol and HDL-cholesterol level of plasma in animals [29]. Rutin is additionally useful as an anti-ulcer by inhibiting proton pump inhibition [30]. Rutin is beneficial as an anti-microbial by inhibiting various strains of the bacteria [31, 32, 33]. The activity of *B. maderaspatensis* has been especially because of the presence of its primary and secondary metabolites which mainly help to cure the disease and help to claim to tribal and other claims of the govt. books.

CONCLUSION

The present review shows the ethnomedicinal importance of the *Blepharis maderaspatensis* (L.) B. Heyne ex Roth. Various parts of the *Utingan* have been utilized in different aliment like inflammation, ulcer, wound, diabetic wound. And, pharmacologically it is found that it can be used as an anti-ulcer, anti-microbial, anti-inflammatory, anti-hypercholesteromic, anti-proliferative, and in wound healing activity due to the presence of the phytoconstituents. However, a clinical study should be necessary to verify and to evaluate its tribal claim in humans.

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Conflicts of interest

There are no conflicts of interest.

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