



Review Paper

Medicinal Property of *Murraya Koenigii*- A Review

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Abstract

The medicinal plants are almost the exclusive source of drugs for majority of world population today. People want to use herbal drugs because they are considered as safe, inexpensive and have no adverse effects. Plants are also very useful because they can self-generate and can produce a range of beneficial bioactive products. *Murraya koenigii* belongs to family Rutaceae which can be used as medicines to cure various ailments. It is seen that the different tribal communities have used the various parts of this plant. The present review is an attempt to highlight various ethno-botanical and traditional use as well as phytochemical reports of *Murraya koenigii*.

Keywords: *Murraya koenigii*, phytochemistry, medicinal property.

Introduction

In preparing traditional medicine, plants have been used since ancient times. India is rich in the medicinal herbs and therefore, it can be accurately called the "Botanical Garden of the world"¹. Medicinal plants have been used by mankind for its curative quality since the starting of human civilization. We have been getting a huge amount of medicinal agents since a long time from nature and we can produce multitude of modern drugs with the help of these agents. Nowadays, it has been seen that people are craving towards the use of herbal medicine for any kind of treatment because it is far better than the high cost of modern medical care which is beyond the reach of poor. Besides, it has no side-effect and can cure the patient for any kind of infectious diseases². The basic medicinal property of these plants lies in some chemical substances. These chemical substances produce a definite physiological action on human body which is generally known as phytochemicals. These chemicals are non-nutritive and act like shield against diseases. The most important of these phytochemicals are alkaloids, flavonoids, tannins and phenolic compounds³.

Plant Profile: Kingdom- Plantae, Sub-kingdom- Tracheobionta, Superdivision- Spermatophyta, Division- Magnoliophyta, Class- Magnoliopsida, Subclass- Rosidae, Order- Sapindales, Family- Rutaceae, Genus- *Murraya* J.Koenig ex L., Species- *Murraya Koenigii* L. Spreng.

Murraya koenigii, popularly known as curry leaf in any Indian languages. It is basically known for its' aroma and medicinal property. Most part of plant is covered with fine down and has a strong peculiar smell. It is more or less deciduous shrub or tree up to 6 m in height and 15-40 cm in diameter with short trunk,

thin smooth grey or brown bark and dense shady crown^{4,5}. Leaves, exstipulate, bipinnately compound, 30 cm long, each bearing 24 leaflets, having reticulate venation; leaflets, lanceolate, 4.9 cm long, 1.8 cm broad, having 0.5-cm-long petiole⁶. Flowers are white, ebracteate, scented and small in size. Calyx deeply five cleft, pubescent. Petals five, free, whitish, glabrous and with dotted glands. It bears fruits in close clusters/bunches, small, ovoid or sub-globose, glandular, thin pericarp enclosing one or two seeds having spinach green color⁷.

Distribution

Murraya koenigii is basically found in tropical Asia like the foothills of Himalayas of India, Sri Lanka, Myanmar, Indonesia, Southern China and Hainan. In India, one can find it Sikkim, Garhwal, Bengal, Assam, Western Ghats and Travancore-Cochin. It reproduces the means of seeds which germinate freely under partial shade. It is also available in other part of Asian region like in moist forests of 500-1600 m height in Guangdong, S Hainan, S Yunnan (Xishuangbanna), Bhutan, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam. Together with South Indian immigrants, curry leaves reached Malaysia, South Africa and Réunion island. They are hardly found outside the Indian sphere of influence⁸⁻¹⁰.

Ethnobotanical Use

People generally use the fresh leaves, dried leaf powder and essential oil for flavoring soups, curries, fish and meat dishes, egg dishes, traditional curry powder blends etc. The aromatherapy industry uses the essential oil in the making of soaps and cosmetics¹¹. For natural hair tone and hair growth,

one can use the blanked residue of boiled curry leaves along with coconut oil. It can be used as antihelmets, it also acts as febrifuge, blood purifier, antifungal, depressant, anti-inflammatory, body aches, for kidney pain and vomiting¹²⁻¹⁶. *Murraya koenigii* is used as a stimulant and antidysentric. It is also effective against diabetes Mellitus^{17,18}. Leaves are applied externally to bruises and eruption¹⁹. The leaves and roots are bitter in taste analgesic, cure inflammation and itching. It is also useful in leucoderma and blood disorders and also cures diseases like piles. It can be also used to stop vomiting²⁰ by infusion of the toasted leaves. If someone is bitten by poisonous animals, local application of the leave paste is effective²¹.

Phytochemistry

Mature leaves contains 63.2 % moisture, 1.15 % total nitrogen, 6.15 % fat, 18.92 % total sugars, 14.6 % starch, 6.8 % crude fiber, ash 13.06 %, acid insoluble ash 1.35 %, alcohol soluble extractive 1.82%, cold water (20°C) extractive 27.33% and a maximum of hot water soluble extractive 33.45%²². Leaves are aromatic and contain proteins, carbohydrates, fiber, minerals, carotene, nicotinic acid and vitamin C. It is rich in vitamin A and calcium The leaves contain high amount of oxalic acid, leaves also contains crystalline glycosides, carbazole alkaloids, koenigin, resin, fresh leaves contain yellow color 2.5 % volatile oil²³. It also contains girinimbin, iso-mahanimbin, koenine, koenigine, koenidine and koenimbin²⁴. Mahanimbicine and bicyclomahanimbicine, phebalosin, coumarine as Murrayone imperatoxin etc isolated from leaves²⁵. Bark mainly contains the carbazole alkaloids as murrayacine, murrayazolidine, murrayazoline, mahanimbin, girinimbin, koenioline, xynthyletin²⁶.

Antibacterial activity

The essential oil from *M. koenigii* leaves showed antibacterial effect against *B. subtilis*, *Staph. aureus*, *C. pyogenes*, *P. vulgaris* and *Pasteurella multocida*. The pure oil was active against the first three organisms even at a dilution of 1: 500²⁷. The acetone extract of the fresh leaves of *M. koenigii* on fractionation gives three bioactive carbazole alkaloids named as mahanimbin, murrayanol and mahanine, which has shown mosquitocidal, antimicrobial and topoisomerase I and II inhibition activities²⁸.

Antifungal Activity

Acetone extract of *M. koenigii* is active against *Aspergillus niger*, benzene extract is most active against *Alternaria solani* and *Helminthosporium solani* and ethanol extract is active against *Penicillium notatum*²⁹.

Antioxidant Activity

The literature showed that the antioxidative properties of the extract of *M. koenigii* leaves were done using different solvents. They were evaluated on the basis of oil stability index (OSI) together with their radical scavenging ability against 1-1-

diphenyl-2-picrylhydrazyl (DPPH). The methylene chloride (CH₂Cl₂) extract and the ethyl acetate (EtOAc) soluble fraction of the 70 % acetone extract was prolonged the OSI values significantly compared to those of α -tocopherol and BHT. Five carbazole alkaloids were isolated from the CH₂Cl₂ extract and their structures were identified to be euchrestine, bismurrayafoline, mahanine, mahanimbicine and mahanimbin based on 1H and 13C NMR and mass (MS) spectral data³⁰.

Cytotoxic Activity

Alkaloid Koenoline isolated from the root bark of *M. koenigii* is found to exhibit cytotoxic activity against KB cell culture system³¹. Carbazole alkaloids isolated from the stems are found to effects the growth of the human leukemia cell line HL-60. Mahanine, Pyrafoline-D and murrayafoline-I (Carbazole alkaloids) showed significant cytotoxicity against HL-60 cells and also induced loss of mitochondrial membrane potential³².

Anti-inflammatory activity

The alcohol extract of stem bark (1 gm/kg body weight) is effective against carrageenan-induced inflammation. Crude root extract also showed anti-inflammatory activity. Ethanolic extract of *M. koenigii* (EEMK) (300 and 400 mg/kg) showed antihistaminic actions in the histamine-aerosol protocol. The mast cell stabilization and antihistaminic effects of EEMK were suggested to be the probable mechanisms for its anti-inflammatory action³³.

Antidiarrhoeal activity

Bioactive alkaloids, kurryam and koenimbin obtained from fractionated n-hexane extract of the seeds of *M. koenigii* were found to exhibit inhibitory activity against castor oil-induced diarrhoea and prostaglandin E₂-induced enteropooling in rats in charcoal meal test in Wister rats, these compounds were found to exhibit significant reduction in gastrointestinal motility³⁴.

Summary: From the available literature it can be stated that *Murraya koenigii* is a versatile medicinal plant and it has a rich source of biologically active compound which makes it a multipotential medicinal plant. In future study, the isolated principles from curry leaf needs to be evaluated in scientific manner using scientific experimental animal models and clinical trials to understand the molecular mechanism of action, in search of lead molecule from natural resource

Conclusion

Murraya koenigii is a multipotential medicinal plant. Almost each and every part of the plant has numerous medical applications. Thus it can be consider being a most suitable candidate for new drug discovery.

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