ETHNOPHARMACOLOGY AND PHYTOCHEMICAL PERSPECTIVES OF *MURRAYA KOENIGII* (CURRY LEAF)

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Abstract

The present work emphasizes traditional uses, phytochemical and pharmacology of a traditionally used and medicinally promising plant *Murraya koenigii*. It is traditionally used for various ailments such as diabetes mellitus, body pain, inflammation, vomiting, kidney pain, curing piles, leucoderma, blood purifier, snake bites, stomachic, carminative and osteoporosis. The plant contains alkaloids, sterols, triterpenoids, carotenoid, furocoumarins, flavonoids, tannins and glycosides are main class of phytochemical constituents. Curry leaves contain proteins, carbohydrates, fibre, minerals, carotene, nicotinic acid, vitamin C, oxalic acid, crystalline glycosides. The biocative compound are present like mahanine, koenine, koenigine, koenidine, girinimbiol, girinimibine, pinene, sabinene, caryophyllene, cadinol and cadinene. The plant has been reported to exhibit various pharmacological activities such as anti-oxidative, cytotoxic, antimicrobial, antibacterial, antiulcer, positive inotropic and anti- obesty, hepatoprotective, antispasmodic, anti-amoebic and anti-tumour. Also the plant has been explored for their traditional claims in preclinical studies. *Murraya koenigii* holds a great potential to be emerged as chemically potential medicine.

Keywords: *Murraya koenigii*, Traditional uses, Phytochemistry, Biological activity, Review.

Introduction

Murraya koenigii (L.) Spreng (known as Karipatta or Curry leaf tree), belongs to the family Rutaceae. It is a small tree or shrub with strong aromatic smell. The size is 6 m in height and 15-40 cm in diameter with short trunk [1].It is a native to Indian subcontinent and also distributed in India, Andaman Islands and throughout Central and Southeast Asia. South Asian immigrants spread the plant to Malaysia, South Africa and Reunion Island [2].This review stated a detailed description on the existing chemical constituents and traditional uses of *M. koenigii* plant.

Macroscopic characters

Macroscopic characters of *M. koenigii* are shown in figure 1.

- **Habit:** Perennial shrub with strong aromatic smell [3].
- **Flower:** White in colour, funnel shaped, sweetly scented, stalked, complete, ebracteate and 1.2 cm in diameter [4][5]
- **Leaves**: Spinach green colour, aromatic in nature, ovate lanceolate in shape, shiny smooth texture with paler undersides and size of each leaflet is 0.80–1.56 inch in length and 0.38–0.78 inch broad [6][7].
- **Stem and Bark:** Strong woody stem and brown to dark green in colour and branches are covered with dark grey bark. Size of stem is 16 cm to 6 m in height and 15 cm to 4 cm in diameter [8].
- **Fruit:** Green in colour and after ripening turns purple, aromatic in nature, ovoid or subglobose in shape, close clusters and size is 2.5 cm in length and 0.3 cm in diameter [4].
- **Seeds:** One or two seeds are enclosed by thin pericarp having spinach green in colour.They are poisonous in nature and should not be consumed for any purpose [5].

Microscopy

The leaves of *M. koenigii* areovate or rhomboid shape with irregular dentate margin and acute apex. The leaf has reticulate venation. The stomata are anomocytic type. Trichomes walls are ridged and uniseriate multicellular on both side [9]. The stem of *M. koenigii* is single layered, parenchymatous, uniseriate, unicellular, elongated surrounded by thick cuticle. Fresh leaves contain unicellular trichomes and parenchymatous cells are oval or polygonal bearing starch grains. Calcium oxalate crystal are sandy and prismatic [1].

Figure 1: Leaves and fruit parts of *M. koenigii*

Traditional Uses:

M. koenigii is used as an analgesic, febrifuge, stomachic, carminative and for the treatment of dysentery and skin eruption [10]. Fresh leaves, dried leaf powder, and essential oil are widely used for flavouring soups, curries, fish and meat dishes, eggs dishes and other food preparations [11]. The essential oil is also utilized by soap and cosmetic aromatherapy industry**.** Curry leaves are boiled with coconut oil which is used as an excellent hair toner and stimulating hair growth [12]. Bark and roots are used as stimulant and externally to cure eruptions and bites of poisonous animals [13].

An infusion of roasted leaves is used to stop vomiting. The green tender leaves are eaten as raw for the cure of dysentery. Powdered dry leaves mixed with honey and juice of betel nut used as antiperiodic, is recommended in Ayurvedic system of medicine [14]. Fresh juice of Curry leaves, with lime juice and sugar, is an effective medicine in the treatment of morning sickness, nausea and vomiting due to indigestion and excessive use of fat [15].

Leaves and roots are also used traditionally as bitter, anthelmintic, analgesic, curing piles, inflammation, itching and are useful in leucoderma and blood disorders. The juice of the root is taken to relieve pain associated with the kidneys. The fruits are edible, and the wood is used for making agricultural implements [16].

Alternative and complementary medicinal uses

For the treatment of amoebiasis, diabetes and hepatitis, Curry leaf mixed with buttermilk is given [17]. Ayurvedic physicians in Sri Lanka prescribe water extract of the plant for the treatment of anxiety disorders [18]. Curry leaves, mint leaves and coriander leaves can be used to treat excessive pitta conditions. The curry leaves are used to treat burn, bruises and skin eruption. The paste of curry leaves is applied on boils for quick relief. It contains calcium as a natural supplement for women who suffer from calcium deficiency [15].

Chemical constituents

Literature review has revealed that *M. koenigii* contains alkaloids, sterols, triterpenoids, carotenoid, furocoumarins, flavonoids, tannins and glycosides are main classes of phytoconstitutents. The leaves contain proteins, carbohydrates, fibre, minerals, carotene, nicotinic acid, vitamin C, oxalic acid, crystalline glycosides and carbazole alkaloids [19].

Class	**Name of chemical constituents**	**References**
Alkaloids	Mahanimbine, Koenimbine Koenine, Mahanine, Girinimbine, Murrayanine	[20] [21]
Triterpenoids	Cyclomahanimbine Tetrahydromahanimbine	[19]
Coumarin	Murrayaneimperatoxin, Indicolactone, Anisolactone Xanthotoxin	[4]
Carotenoids	β-carotene, Lutein, α-tocopherol	[17]
Phenolic acid	Gallic acid, Ferulic acid	[22]
Sesquiterpenes	α-pinene, β-caryophyllene, β-myrcene, Limonene, Humulene β-terpinol	[23] [24]
Flavonoids	Rutin, Quercetin, Catechin, Myricetin	[22]

Table 1: List of chemical constituents isolated from *M. koenigii.*

Conclusion:

M. koenigii is widely distributed from India, Central and Southeast Asia, Malaysia, South Africa and Reunion Island by immigrants of South Asia and used traditionally as analgesic, anthelmintic, anti-inflammatory, curing piles, itching, leucoderma and blood disorders. A thorough survey of literature reveal that the plant has been explored for their traditional claims in preclinical studies. *Murraya koenigii* holds a great potential to be emerged as chemically potential medicine.

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