

A Review on Curry Leaves (*Murraya koenigii*): Versatile Multi-Potential Medicinal Plant

Satish Chand Saini* and Dr. Gopu Bala Show Reddy

Shri Venkateshwara University, NH -24, Rajabpur, Gajraula, Distt. Amroha, Pin Code No. 244236 (U.P.), India

Address for Correspondence

Shri Venkateshwara University, NH -24, Rajabpur, Gajraula, Distt. Amroha, Pin Code No. 244236 (U.P.), India.

E-mail:
info@svu.edu.in

ABSTRACT

Objective: The aim of this review study is to update information about pharmacognostical, Phytochemical and pharmacological studies of *Murraya koenigii*. To evaluate the versatile multi-potential medicinal use of *Murraya koenigii*.

Methods: Literature of *Murraya koenigii* was collected and reviewed.

Results: *Murraya koenigii* is having broad types of characteristics such as antibacterial activity, antifungal activity, antiprotozoal activity. The medicinal utilities have been described especially for leaf, stem, bark and oil. The present review incorporates the description of *Murraya koenigii*, its phytochemical constituents and various pharmacological activities of isolated compounds as well as bioactivity of extract studies carried out by various numbers of laboratories.

Conclusion: As per available literature and its readily availability, *Murraya koenigii* can be used to cure the symptoms of variety of diseases.

Keywords: *Murraya koenigii*, Phytochemistry, Biological activity, Rutaceae, Medicine, Ayurvedic, Plant extracts, Review.

INTRODUCTION

Murraya koenigii, commonly known as *curry leaf* or *karipatta* in Indian dialects, belonging to Family Rutaceae which represent more than 150 genera and 1600 species¹. *Murraya koenigii* is a valuable plant for its characteristic aroma and medicinal value. It is an important export commodity from India as it fetches good foreign revenue. A number of chemical

constituents from every part of the plant have been extracted. The most important chemical constituents responsible for its intense characteristic aroma are P-gurjunene, P-caryophyllene, P-lemene and O-phellandrene. The plant is rich source for carbazole alkaloids². Bioactive coumarins, acridine alkaloids and carbazole alkaloids from family Rutaceae were reviewed by

Ito³. *Murraya koenigii* is widely used in Indian cookery from centuries and have a versatile role to play in traditional medicine. The plant is credited with tonic and stomachic properties. Bark and roots are used as stimulant and externally to cure eruptions and bites of poisonous animals. Green leaves are eaten raw for cure of dysentery, diarrhoea and vomiting. Leaves and roots are also used traditionally as bitter, anthelmintic, analgesic, curing piles, inflammation, itching and are useful in leucoderma and blood disorders^{4,5}. Several systematic scientific studies are also being conducted regarding the efficacy of whole plant or its parts in different extract forms for the treatment of different diseases. *Murraya koenigii* contains a number of chemical constituents that interact in a complex way to elicit their pharmacodynamic response. A number of active constituents responsible for the medicinal properties have been isolated and characterized. This plant has been reported to have anti-oxidative, cytotoxic, antimicrobial, antibacterial, anti ulcer, positive inotropic and cholesterol reducing activities⁶⁻¹⁰. Therefore the present review summarizes the available literature till date on isolation of phytoconstituents, biological activities of the isolated compounds and pharmacological actions of extracts along with the clinical studies. *Murraya koenigii* (Rutaceae) commonly known as Meethi neem, is an aromatic more or less deciduous shrub or a small tree up to 6 m in height found throughout India up to an altitude of 1500 m and are cultivated for its aromatic leaves¹¹. In traditional system of Medicine, it is used as antiemetic, antidiarrhoeal, dysentery, febrifuge, blood purifier, tonic, stomachic, flavoring agent in curries and chetneys. The oil is used externally for bruises, eruption, in soap and perfume industry¹². The phytoconstituents isolated so far from the leaves are alkaloids viz.,

mahanine¹³, koenine, koenigine, koenidine¹⁴, girinimbiol, girinimibine¹⁵, koenimbine, O-methyl murrayamine A, O-methyl mahanine, isomahanine, bismahanine, bispyrayafoline¹⁶ and other phytoconstituents such as coumarin glycoside viz., scopotin, murrayanine¹⁷, calcium, phosphorus, iron, thiamine, riboflavin, niacin, vitamin C, carotene and oxalic acid. The essential oil from leaves yielded di- alpha phellandrene, D-sabinene, D-_-pinene, dipentene, D-_-terpinol and caryophyllene¹⁸. It is reported to possess antioxidant, antibacterial, antifungal, larvicidal, anticarcinogenic, hypoglycemic, anti-lipid peroxidative, hypolipidemic, antihypertensive activity¹⁹ and proactive effect against carbon tetra chloride- induced hepatic damage in rats³⁸. It is also reported to contain 5, 8-dimethylfuranocoumarin, 1-al, 3[6', 6' dimethyl 5-hexene] carbazole and _-sitosterol²⁰.

Plant description and habitat

The plant is distributed and cultivated throughout India. It is found wild from Himalaya's, Uttarakhand, Sikkim to Garhwal, Bengal, Assam, Western Ghats and Travancore- Cochin. Propagation is done by seeds, which germinate freely under partial shade. Is also available in other part of Asian region like in moist forests of 500-1600 mheightin Guangdong, S Hainan, S Yunnan (Xishuangbanna), Bhutan, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Vietnamurraya Together with South Indian immigrants, curry leaves reached Malaysia, South Africa and Réunionisland. Outside the Indian sphere of influence, they are rarely found. *Murraya koenigii* is an unarmed, semi deciduous aromatic shrub or small tree with slender but strong woody stem and branches covered with dark grey bark, leaves are imparipinnate, glabrous, and very strongly aromatic. Leaflets 9-25 or more, short stalked, alternate, gland dotted and

strongly aromatic. The stem of *Murraya koenigii* is an aromatic and more or less deciduous shrub or small tree upto 7 meters in height and 14 to 42 cm in diameter²¹. The main stem is dark green to brownish. The bark of the stem can be peeled off longitudinally which exposes the white wood underneath. Flowers are small, white fragrant ebracteate, calyx deeply five cleft, pubescent. Petals five, free, whitish, glabrous and with dotted glands. Fruits occur in close clusters, small ovoid or sub-globose, glandular, thin pericarp enclosing one or two seeds having spinach green color²².

Traditional uses

Fresh leaves, dried leaf powder, and essential oil are widely used for flavouring soups, curries, fish and meat dishes, eggs dishes, traditional curry powder blends, seasoning and ready to use other food preparations. The essential oil is also utilized by soap and cosmetic aromatherapy industry²³. Curry leaves are boiled with coconut oil till they are reduced to blanked residue which is then used as an excellent hair tonic for retaining natural hair tone and stimulating hair growth. It is traditionally used as a whole or in parts as antiemetics, antidiarrheal, febrifuge, blood purifier, antifungal, depressant, anti-inflammatory, body aches, for kidney pain and vomiting.²⁴⁻³²

Pharmacological studies

Antibacterial activity

The essential oil from *Murraya koenigii* leaves showed antibacterial effect against *B. subtilis*, *S. aureus*, *C. pyogenes*, *P. vulgaris* and *Pasteurella multocida*. The pure oil was active against the first three organisms even at a dilution of 1: 500³³. The acetone extract of the fresh leaves of *Murraya koenigii* on fractionation gives three bioactive carbazole alkaloids named as

mahanimbine, murrayanol and mahanine, which has shown mosquitocidal, antimicrobial and topoisomerase I and II inhibition activities³⁴.

Antifungal activity

The essential oil from leaves of *Murraya koenigii* showed antifungal activity against *C. albicans*, *C. tropicalis*, *A. niger*, *A. fumigates*, *Microsporum gypseum* and *Murraya koenigii* was effective against *C. albicans* even at a dilution of 1:500. The ethanolic extract of the leaves showed fungitoxicity against *Colletotrichum falcatum* and *Rhizoctonia solani*³⁵. The ethanolic extract of the roots and also the whole plant excluding roots of *Murraya koenigii*, however, did not show any antifungal activity against *Cryptococcus neoformans*, *Trichophyton mentagrophytes* and *Microsporum canis*^{36,37}.

Antiprotozoal activity

Ethanolic extracts (55 %) of *Murraya koenigii* whole plant excluding roots (extract A) and roots alone (extract B) were screened for their pharmacological actions. Extract A showed antiprotozoal action against *Ent. Histolytica*, antispasmodic effect on isolated guinea pig ileum, whereas extract B showed antiprotozoal activity against *Ent. Histolytica* and as well as antihypertensive activity in cat/dog³⁹. (See table 1.)

CONCLUSION

Keeping in view the tremendous pharmacological activities and availability of literature, *Murraya koenigii* may be utilized to alleviate the symptoms of variety of diseases as evident from the pre-clinical data. Although crude extract from various parts of *Murraya koenigii* have numerous medical applications, modern drugs can be developed after extensive investigation of its bioactivity, mechanism of action, pharmaco-

therapeutics, toxicity and after proper standardization and clinical trials. The available literature and wide spread availability of *Murraya koenigii* in India thus makes it an attractive candidate for further pre-clinical and clinical research.

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Table 1. Active compounds of *Murraya koenigii* and their activities

Murraya koenigii compounds	Source	Biological activity
Lutein	Leaves	Antioxidant activity
Tocopherol	Leaves	Antioxidant activity
	Leaves	Hepatoprotective
Carotene	Leaves	Antioxidant activity
Koenimbine	Leaves	Antioxidant activity
Isomahanine	Leaves	Anticaries
Mahanine	Stem and bark	Antimicrobial
Murrayanol	Leaves	Mosquitocidal
	Leaves	Anti-microbial
Murrayanine	Stem bark	Antifungal
Girinimbine	Stem bark	Anti-cancer
	Stem bark	Antifungal and antibacterial
	Leaves	Hepatoprotective