

## **A Review on Medicinal Importance of *Murraya koenigii* (Curry Leaf Tree)**

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### **ABSTRACT**

*Murraya koenigii*, also known as the curry leaf tree, is a small tropical to subtropical tree that typically reaches heights of 6 to 15 feet. Curry leaf tree is native to moist forests in India and Sri Lanka. According to Ayurveda *Murraya koenigii* is named as Mahaanimba. The present study deals with the evaluation of medicinal importance according to Ayurvedic and modern pharmacological actions. Data was gathered from scientific articles published from Google scholar, PubMed, Research Gate following the PRISMA model and relevant Authentic Ayurvedic textbooks. This review summarized about *Murraya koenigii* is consisting of antioxidant, anti-inflammatory, hepatoprotective, immunomodulatory, neuroprotective, antimicrobial and anticancer activities. The green leaves of *M. koenigii* are used to treat bruising, diarrhoea, piles, inflammation, itching, and conditions that resemble edoema. It is a best home remedy for various conditions.

**Keywords:** Curry leaf tree, Mahaanimba, medicinal, pharmacological, ayurveda

### **INTRODUCTION**

Usage of plant-based natural products for the treatment and prevention of diseases and health enhancement is the best way at this era because of they can gives naturally nutritive importance and pharmacological benefits [1]. At this era medicinal herbs are easily available and require a cost-effective resource with minor side effects to create new drugs [2]. In Ayurveda medicine, *Murraya koenigii* (*M. koenigii*) is frequently used for both the treatment and prevention of disease. Various parts of these plants, including leaves, seeds, flowers, and fruit, contain various constituents and those are responsible for

the adjustment of several biological processes [3]. Curry Leaf in English, *Surabhinimba* in Sanskrit, *Karapincha* in Sinhala, *Mitha Neem* in Hindi and *Karuveppilai* in Tamil. *Murraya koenigii* is categorized under the family Rutaceae and which is consisting of 150 genera and 1600 species. This is native to moist forests in India and Sri Lanka. Curry leaf plant is more common among South Asian Dishes for its distinctive flavor and aroma. It has been used as a home remedy since antient times. The leaves are broadly used in flavoring curries to boost appetite and digestion [4].

### **Taxonomy of Plant**

Kingdom :Plantae  
Sub-kingdom :Tracheobionta  
Superdivision : Spermatophyta

Division : Magnoliophyta  
Class :Magnoliospida  
Subclass : Rosidae  
Order : Sapindales  
Family : Rutaceae  
Genus : Murraya J.Koenig ex L.  
Species :Murraya Koenigii L. Spreng [3].

**Morphological Parameters**

**Table 1:** Description about morphological parameters [3].

Morphological parameters	Morphological explanation
Tree	Shrub or tree 6 m in height and 15–40 cm in diameter of the trunk
Bark	Grey color bark with longitudinal striations and white bark is present beneath it
Leaf	Leaves are bipinnately compound, 15–30 cm long, bearing 11–25 leaflets alternate on rachis, irregular margins
Flowers	Bisexual, white, sweetly scented, stalked funnel-shaped, complete, diameter 1.12 cm terminal cymes each bearing 60–90 flowers
Fruits	Ovoid to subglobose, wrinkled, or rough with glands; 2.5 cm long and 0.3 cm in diameter purplish-black color when ripen; biseeded
Seeds	Spinach green color, 11 mm long, 8 mm in diameter and weighs up to 445 mg



**Fig. 1:** Different parts (a: leaves; b: flowers; c: seeds; d: fruits) of *M. koenigii* [5].

### STUDY DESIGN

Primary data were collected by using published journal articles with detailed information. Scientific articles were collected by using google scholar, PubMed

and Research Gate following the PRISMA model. Secondary data were collected using authentic text book in Ayurveda medicine

### Ayurvedic Description

<i>Rasa</i> (Taste)	- Astringent, bitter and sweet
<i>Guna</i> (Qualities)	- <i>Laghu</i> (easy to digest), <i>Snigdha</i> (unctuous)
<i>Virya</i> (Potency)	- <i>Shitha</i> (cold)
<i>Vipaaka</i> (Taste after digestion)	- <i>Katu</i> (Pungent)
<i>Karma</i> (Action)	- <i>Ruchya</i> (improve taste), <i>Deepana</i> (enhance the digestive power), <i>Paachana</i> (Improve digestion), <i>Vishaghna</i> (antitoxic), <i>Varnya</i> (Improve complexion) [6].

### The Major Bioactive Compounds of *M. koenigii* and their Pharmacological Activities

*Table 2: Description about bioactive compounds and pharmacological activities [7].*

Plant part	Chemical	Activity
Stem	Girinimbine	Antimicrobial/anticancer/antitumor
Stem/bark	Mukoeic acid	Antioxidant
	Murrayazolinine	Anticancer
Leaves/stem	Murrayanine	Antimicrobial/anticancer/antioxidant
Leaves/stem/bark	Mahanimbine	Antioxidant/anticancer
Leaves/bark	Koenine	Antioxidant/antidiarrheal
Stem/roots	Koenoline	Cytotoxic
Roots	9-Formyl-3-methylcarbazole	Anticancer
	Mukoline	Cytotoxic/antimicrobial
Leaves	O methylmurrayamine	Antioxidant
	Linalool	Antioxidant/antimicrobial
	Allo-ocimene	Antioxidant/antimicrobial
	Quercetin	Antioxidant/anticancer
	Koenigine	Antioxidant
	Murrayanol	Antioxidant/anti-inflammatory/antimicrobial
	Naringin	Antioxidant/anticancer
	Gallic acid	Antioxidant
	Koenimbine	Antioxidant/antidiarrheal/anticancer

### PHARMACOLOGICAL ACTIVITIES

#### Vasodilating Activity

Natural aqueous leaf extract of *M. koenigii* was arranged and indicated a dose related negative chronotropic result on cardiovascular system of frog heart

arrangements. This is due to straight actions on the heart and blood vessels [8].

#### Inotropic Activity

Natural aqueous leaf extract of *M. koenigii* effect on Increasing the availability of calcium from extracellular

sites demonstrated the produced positive inotropic effect in a single frog heart (dose dependent manner) [9].

#### **Anti-Microbial Activity**

The extract of hexane, methanol, and chloroform made with the *Murraya koenigii* root and tested against *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhi* and fungal strain of *Aspergillus niger*, *Candida albicans* and *Trichophyton rubrum*. This extract was effective on all the tested strains and specially methanol extract showed more substantial antimicrobial activity [10].

#### **Nephroprotective Activity**

Aqueous extract of *Murraya koenigii* leaves was administrated in a regularly 30 days in streptozotocin induced diabetic in male rats and result was found as significant reduction in serum urea and creatinine levels and promote tissue regeneration in kidney [11].

#### **Anti-Obese Activity**

Ethanol extract of *Murraya koenigii* leaves was administrated orally to male rats for 30 days and result was found as effective in the reduction of body weight, cholesterol, triglyceride. Also, it had marked results against the glycemic levels [12].

#### **Anti-Inflammatory Activity**

*Murraya koenigii* leaf methanol and aqueous extract were used to treat carrageenan-induced edema in male albino rats at a dose of 400 mg/kg [13].

#### **Anti-HYPERGLYCEMIC ACTIVITY**

Fresh juice of *M. koenigii* leaves has revealed an effect on reduced blood glucose levels. Also, it increases the effect of insulin by increasing its therapeutic

value in a study with healthy Wistar rats [14].

#### **Anti-Cancer Activity**

*M. koenigii* may play a crucial role in the cell's modulation of several signaling pathways. These constituents upregulate the tumor suppressor genes *p53* and downregulate the genes responsible for developing cancer, such as NF- $\kappa$ B [15]- (including Bcl-2, Bax, NF- $\kappa$ B, and TNF $\alpha$ , according to *in vitro* and *in vivo* models) [3]. These curry leaves contain coumarins and a number of carbazole alkaloids that cause apoptosis and activate the cyclooxygenase pathway. [16].

#### **Cytotoxic Activity**

Alkaloid extract from *M. koenigii* had reported the cytotoxic activities against the breast cancer cell line MDA-MB-231 with an IC<sub>50</sub> of 14.4  $\mu$ g/mL. Apart from that it has significant cytotoxic and anticancer activities in prostate cancer studies [17].

#### **Antioxidant Activity**

Medicinal plants have brilliant natural antioxidants and those helps to prevent diseases such as cancer, heart diseases, strokes, and inflammation [18]. A significant concentration of plant polyphenols, flavonoids, and alkaloids are said to be present in the majority of *M. koenigii*'s parts, and these compounds have powerful antioxidant properties [19-20]. A current study informed that total antioxidant action was the highest in *M. koenigii* (2691  $\mu$ mol of ascorbic acid/g sample) among green leafy vegetables [21].

#### **DISCUSSION**

*Murraya koenigii* has pharmacological activities including numerous anti-inflammatory, anti-amnesic, memory enhancer, anti-helminthic, anti-bacterial, anti-cancer, anti-diabetic, antidiarrheal, anti-fungal, radioprotective and

chemoprotective, analgesic, anti-oxidant, anti-lipid, anti-tumor, anti-ulcer, wound healing activity and phagocytic activity. Considering to this analysis curry leaf is mostly usable in hyperlipidemic conditions. Since antient times this is used for removed toxins from the body. *Murraya koenigii* is named as the “Magical plant of Indian Spice” and this is the folk medication for cure many disorders. According to ayurveda perspective *Murraya koenigii* has astringent, bitter and sweet taste and cold potency.

### CONCLUSION

*Murraya koenigii* identified as highly potential medicinal plant and its bioactive compounds are highly used at the antient times. *M. koenigii* makes a important role amongst the traditionally main medicinal plants due to their health benefits and therapeutic actions. In the current globalization era, all the peoples are suffering from various diseases including communicable and non-communicable therefor this herb can be used to for these situations with the minimalizing the side effects.

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