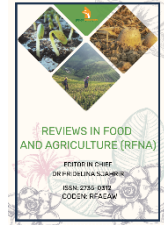


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## REVIEW ARTICLE

# CURRY LEAF: A REVIEW

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## ABSTRACT

Curry Leaf (*Murraya koenigii*) is native to South Asia famous among various cuisines for its flavor and aroma. Herbal drugs being relatively low cost with minimal side effects are used extensively in treating various diseases since ages. Curry Leaf occupies a huge space in traditional Ayurveda medicine. Small deciduous shrub with every part of medicinal properties and nutrition makes it a potential future industrial crop. Literatures suggest the antibacterial, antifungal, antiprotozoal activity of *Murraya koenigii* especially in leaf, stem, bark, and oil. The whole plant is used as tonic and stomachic properties. The aim of the present study is to review classification, origin, morphological characters, traditional use of curry leaf around the globe.

### KEYWORDS

Curry Leaf (*Murraya koenigii*), Extracts, Leaves, Alkaloids.

## 1. INTRODUCTION

Curry leaf (*Murraya koenigii*) belongs to the family Rutaceae consisting 150 genera and 1600 species (Sangam et al., 2015). It is found to be native to South Asia particularly India, Sri Lanka and Bangladesh (Mustafa and Oktavia, n.d.). The use of *Murraya koenigii* dates back to 1<sup>st</sup> and 4<sup>th</sup> century AD. Tamil and Kannada literature describes *Murraya koenigii* as Kari used as a flavoring agent (Mittal, 2017). It is considered as one of the important ingredients in South Asian cuisine for its fragrance and aroma (Ghimire and Magar, 2018). It maintains its flavor and other qualities even after drying, making it to be used as a popular spice and condiment in tropical countries (Verma, 2018). The leading component for flavor and aroma of curry leaf includes pinene, sabinene, caryophyllene, cardinol, and cadinene (Plant et al., 2015). The whole plant is regarded as tonic and stomachic and has traditional uses (Ajay S et al., 2011; Plant et al., 2015). *Murraya koenigii* has been found to have bioactive phytochemicals like alkaloids, essential oils, phenolics, minerals and proteins (Singh et al., 2011), terpenoids, tocopherol,  $\beta$ -carotene and lutein (Patterson and Verghese, 2015). It can be used fresh, dried, powdered or in cooked form. It has many name forms i.e. Curry Leaf in English, Mitha Neem in Hindi, Karuveppilai in Tamil and Surabhinimba in Sanskrit (Henry, 2015). Curry Leaf plants can also be used as hedge and ornamental shrub due to its compound leaves (Parmar and Kaushal, 1982). *Murraya koenigii* is distributed in the moist forest of Asian regions particularly Nepal, Bhutan, Laos, Pakistan, Thailand and cultivated all over India. It is rarely observed outside the Indian sphere of influence (Kumar et al., 2013). Herbal drugs are highly effective with minimum side effects and are to be used extensively in treating various diseases and they are relatively low cost. This review explains the different uses and potentials of curry leaf.

## 2. METHODOLOGY

This review paper uses the secondary sources of information from different literatures including research papers, review articles, books related to curry leaf.

## 3. DISCUSSION

### 3.1 Plant Profile

Kingdom: Plantae, Subkingdom: Tracheobionta, Superdivision: Spermatophyta, Division: Magnoliopsida, Subclass: Rosidae, Order: Sapindales. Family: Rutaceae, Genus: *Murraya* J.Koenig ex L., Species: *Murraya koenigii* L. Spreng.

**Table 1: Nutritional Value**

S.N.	Nutrients	Value of fresh curry leaves(100gm)	Value of dehydrated curry leaves(100gm)
1.	Proteins	6 g	12 g
2.	Fat	1 g	5.4 g
3.	Carbohydrate	18.7 g	64.31 g
4.	Calcium	830 mg	2040 mg
5.	Iron	0.93 mg	12 mg
6.	$\beta$ carotene	7560 $\mu$ g	5292 $\mu$ g

Source: Plant, S. A. M., Singh, S., Omre, P. K. B., and Madan, S. (2015). CURRY LEAVES ( *Murraya koenigii* Linn.

*Murraya koenigii* is a small deciduous aromatic shrub reaching to the height of about 6-9m grown 1500m above sea level. Main stem is dark green to brown colored bark with several dots on it that can be flaked off lengthways to expose the white wood beneath (Ajay S et al., 2011). The leaves are 15-30 cm long bipinnately compound supporting 11-25 leaflets, leathery and glandular. Leaves are bitter in taste, slightly acidic and feebly pungent (Ns et al., 2018). Flowers are sweet odor, funnel shaped, inflorescence bearing 60-90 flowers, bisexual, complete and stalked with diameter 1.12 cm when fully opened (Mishra, 2018) with 4-5 sepals and

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10 straight stamens (Prakash and Natarajan, 1974). The flowering starts from mid-April to mid-May whereas fruiting occurs from mid-July to end of August (Parmar and Kaushal, 1982). It is a self-pollinated crop (3.2.3, n.d.). Fruit is edible black berry each with 1.4 to 1.6 cm long and 1 to 1.2 cm diameter with shiny surface containing 0.76% of yellow volatile oil. The fruits occur in close bundles containing 32-80 fruits per bundle (Gahlawat et al., 2015). Roots are extensively laid out and are woody giving rise to suckers. The propagation is generally done with seed but root suckers and air layering can also be used and germination can occur in partial shade (Jain et al., 2012; Chauhan et al., 2017). Curry Leaf plant is true diploid with chromosome number 18 (Raghavan, 1957).

### 3.1 Applications

#### 3.1.1 Traditional Uses

Curry leaf plant is popular among South Asian Dishes for its peculiar taste and aroma. It has been used as a home remedy since ages (Chauhan et al., 2017). The scented leaves are widely used in flavoring curries to promote appetite and digestion (Kataria et al., 2013). Leaves are locally used to treat external injuries, burns and remove poison from the bite of poisonous animals (Mustafa and Oktavia, n.d.) and for treating rheumatism (Tan et al., 2014). Baked (cooked, crisped) leaves are used to check vomiting (Kumar et al., 1999). Finely grinded leaves mixed in butter milk have positive effects for stomach upsets and act as laxative when taken in an empty stomach (Plant et al., 2015). Fresh leaves juice mixed with lime and sugar is used to treat morning sickness and root juice consumption gives renal pain relief (Nishan and Subramanian, 2015). Stem is used to cleanse teeth that lead to reinforcing the gums (Yankuzo et al., 2011). Fruit has anti-astringency properties. Root juice is used in kidney pain (Joseph and Peter, 1985). Curry leaf can be used in treating calcium, vitamin deficiencies and anemia. Moreover antitumor, hypoglycemia, anti-hyper-cholesterol emic effects of the plant have been found (Kumari and Papiya, 2014). Piles, body heat, inflammation and itching are controlled with curry leaves (Bhandari, 2012). Traditional Ayurveda includes the use of curry leaf parts as a cure of cough, hypertension, hepatitis, rheumatism and hysteria (Ghasemzadeh, 2014). Traditionally curry leaves are boiled together with coconut oil until reduction to blanked residue to be used as hair tonic for keeping natural hair tone and invigorating growth of hair (Saini et al., n.d.).

#### 3.1.2 Medicinal Uses/ Pharmacognosy

*Murraya koenigii* is a proven medicinal plant. The plant contains different essential oils particularly  $\alpha$ -pinene (39.93%), sabinene (13.3%) and trans-caryophyllene (9.02%) that has been reported to have antibacterial effects against *Bacillus subtilis*, *Proteus vulgaris*, *Corynebacterium pyogenes* (Kumar et al., 1999). The carbazole alkaloids are present in leaves, fruits, roots and bark of the plant having antidiabetic, anticancer, antibacterial and anti-oxidant properties (Shyamala, 2005). N-hexane seeds extract produces three bioactive carbazole alkaloids namely kurryam (I), Koenimbine (II) and koenine(III) out of which I and II compounds has repressive action opposed to castor oil induced diarrhea and PGE<sub>2</sub>-induced enteropooling in rats (Mandal et al., 2010). Acetone extraction of fresh leaves contains three bioactive carbazole alkaloids namely mahanine, mahanimbine and marayanol having astonishing antimicrobial and topoisomerase I and II inhibition activities (Kumar et al., 2012). Mahanimbine has also been observed to decrease the blood sugar level in Swiss mice (Bhandari, 2012). Ether extracts from curry leaves has been observed to decrease the cancer cells in mice (Ghosh et al., 2012). Aqueous extracts of curry plant speeds up the wound healing process (Syam et al., 2011). Aqueous extracts contain tannins and carbazole alkaloids that have hepatoprotective activity (Shivashankara, 2012). Alcohol extracts of stem bark and crude root extract of *Murraya koenigii* have anti-inflammatory activities (Darvekar et al., 2011). *Murraya koenigii* alcohol: water (1:1) extract has been found to have the highest antioxidant and free radical scavenging activity (Ningappa et al., 2008).

#### 3.1.3 Industrial Uses

The essential oils from the plant can be used in sun protection creams and erythema formulations. It can also be used for aromatherapy in the soap and cosmetic industry (Mittal, 2017). Few Industrial products of Curry leaf plant are produced with a volatile oil, crystalline glycoside and murragin obtained from the flowers (Pharmacognosy of Ayurvedic Drugs, 1957). The beta carotene, folic acid, riboflavin, calcium and zinc present in curry leaf are useful for oral health and can be during production of mouthwashes (Math and Balasubramanian, 2004). Curry leaf oil (yellow, clear and transparent) is widely exported from India that can be extracted from the seeds of the plant (Joseph and Peter, 1985). Stem extract can be used in skin lightening and rough skin improving creams (Dhongade et al.,

2013). Petroleum ether extracts and acetone extracts from leaves can be used to prepare larvicide against *Aedes aegypti* (Nishan and Subramanian, 2015).

## 4. CONCLUSION

*Murraya koenigii* is a highly potential medicinal plant. The bioactive compounds are highly used in the developing world for primary traditional healthcare systems since ages. Curry Leaf being a valuable herbal medicine, needs high prioritization in discovering new drugs. Keeping the view towards its different applications, *Murraya koenigii* must be considered for different clinical and non-clinical researches for extensive investigation of its bioactivity, mechanism of action, pharmacotherapeutics, toxicity proper standardization and clinical trials.

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