

Murraya Koenigii (Curry Leaves): A Miracle Plant in Traditional and Modern Medicines

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Abstract: Curry leaf, or *Murraya koenigii*, is a delicious tropical and subtropical plant that is indigenous to India. It is a tiny tree or huge shrub with pinnate leaves that is often used to spice dishes in Indian cooking. Curry leaves provide several health advantages in addition to being a common component in many South Indian curries. They are advantageous for women with osteoporosis and calcium shortage since they contain nutrients and may be used as a natural calcium supplement.

Keywords: Murraya koenigii, Mahanimbine, Antioxidant

I. INTRODUCTION

Murraya koenigii Spreng, sometimes known as curry leaf, belongs to the Rutaceae family and is sometimes referred to in Sanskrit as Surabhinimba. Different regions of India refer to it by different colloquial names, such as Kurrypatta in Hindi, Karivempu in Tamil, and Barsunga in Bengali. Of the fourteen species in the genus *Murraya*, only two are indigenous to India: Linn's *Murraya paniculata* and Spring's *Murraya koenigii*. The Rutaceae family has more than 150 genera and 1,600 species worldwide. The complex blend of volatile chemicals that give *M. koenigii* leaves, which are widely used in Indian cookery, their unique perfume includes P-gurjunene, P-caryophyllene, P-element, and O-phellandrene(2). Anti-diabetic, antioxidant, anti-fungal, anti-microbial, anti-inflammatory, hepatoprotective, and carcinogenic properties are only a few of their many medicinal attributes. The plant's heart-healthy, anti-diabetic, cholesterol-lowering, antibacterial, antiulcer, antioxidative, cytotoxic, antidiarrheal, and phagocytic qualities are only a few of its numerous noteworthy pharmacological characteristics. The chemical composition of fresh *Murraya koenigii* leaves is mostly composed of volatile oil. The stem bark and roots of *Murraya koenigii* have yielded triterpene and carbazole alkaloids(3). A little spreading shrub can grow up to around 2.5 meters in height. Its main stem is 16 cm in circumference, and the dinghy on it can be hulled off longitudinally to reveal the white wood underneath. The leaves are bipinnately complex, exstipulate, and contain reticulate veining. They each have 24 4.9 cm long, shaft-shaped leaflets 0.5 cm wide, supported by a petiole that is 0.5 cm long. They measure around 30 centimeters in length. The inflorescence is each terminal cyme that produces 60 to 90 flowers. The blooms are bisexual, white, funnel-shaped, stalked, ebracteate, regular, actinomorphic, pentamerous, hypogynous, and have a nice scent(1).



Fig .1 Curry leaves(10)



Plant Profile :-

Murraya koenigii is well-known for its fragrant leaves, which are used as a culinary spice. The primary chemical components that give it its intense, unique scent are p-gurjunene, O-phellandrene, p-elementene, and p-caryophyllene. Mahanimbine, murrayanine, murrayacine, girinimbine, isomurrayazoline, mahanine, koenine, koenigine, koenidine, koenimbine, O-methylmahanine, O-methylmurrayamine, isomahanine, bismahanine, and bispyrayafoline are among the carbazole alkaloids that are abundant in this plant. In addition to its anti-inflammatory and depressive benefits, this plant has long been utilized for its stimulant, stomachic, antipyretic, analgesic, and therapeutic qualities in the treatment of bug bites, diarrhea, and dysentery. Toxins from animal bites can be neutralized by topically applying a paste produced from fresh leaves. Murraya koenigii is a plant that contains a variety of chemical compounds that are extracted using solvents such as ethanol, water, petroleum ether, ethyl acetate, and chloroform. Alkaloids, phenylpropanoids, alkanes, sesquiterpenes, flavonoids, and other chemical groupings have all been discovered thus far. (4)

Taxonomic Status

- a. Plantae is the kingdom where
- b. The Tracheobionta sub-kingdom
- c. Spermatophyta Superdivision
- d. Magnoliophyta Division e. Magnoliopsida Class
- f. The Rosidae subclass
- g. Sapindales Order
- h. Rutaceae family
- i. Murraya J. Koenig ex L. Genus
- j. Species: L. Spreng, Murraya koenigii(9)



Fig2 .Murraya koenigii plant(10) History of curry leaves :-

Murraya koenigii was first seen in the first to fourth centuries AD. In Tamil and Kannada literature, it was curry. Curry leaves first appeared from the Tamil word "kari," which means "spiced sauce," and is currently known as Murraya koenigii (Parrota JA, 2001). Murraya Koenigii was used in early Tamil and Kannada texts as an enhancing specialist in a variety of foods and vegetables (Prajapati et al., 2003). As a flavoring ingredient for a variety of foods, it has been cultivated and developed in many Indian districts as well as in Sri Lanka, South East Asia, Australia, Africa, and the Pacific Islands (Bonde et al., 2007). (5)



Origin of curry leaves:-

The exception of the upper regions of the Himalayas, curry leaf trees are naturally found in forests and waste areas across the Indian subcontinent. Its range stretches eastward from Pakistan's Ravi River. towards Bangladesh's Chittagong and India's Assam, as well as southward to Tamil Nadu. South Asian immigrants brought the plants to Reunion Island, South Africa, and Malaysia (Singh et al., 2014). The Andaman Islands, Bangladesh, Sri Lanka, and India are the natural habitats of curry leaf trees. They are currently growing in various parts of the world where Indian immigrants have settled after being dispersed by them (7).

Traditional Use:

Due to its unique flavor and aroma, the curry leaf plant is widely used in South Asian cooking. It has been utilized as a natural remedy for a long time. It is common practice to flavor curries with the aromatic leaves to boost hunger and digestion. In the area, leaves are used to treat burns, rheumatism, external wounds, and poisonous animal attacks. Use baked (cooked, crisped) leaves to avoid throwing up. Finely crushed leaves are helpful for stomach issues and act as a laxative when taken on an empty stomach (6).

Pharmacological activity:-

Iron, zinc, copper, and other trace minerals are abundant in curry leaves. In a study that was published in January 2007 in "Chemico-Biological Interactions," researchers suggested that using curry leaves in the diet might help diabetics.

Curry leaf extract contains minerals that are crucial for preserving normoglycemia, or the blood's normal glucose level. This is accomplished by stimulating the beta cells in the pancreas, which produce insulin. Although the nutrients in curry only make up 1% to 2% of the daily needed consumption, the researchers hypothesized that curry leaves might help manage diabetes since they are bioavailable, or easily absorbed by the body. A review of the literature indicates some significant pharmacological effects of the plant, including cholesterol, cardiac, and anti-diabetic properties. reducing, antibacterial, anti-ulcer, antioxidative, cytotoxic, anti-diarrhea, and phagocytic properties. (Syam, Suvitha, and others, 2011) Using various solvents, the antioxidative qualities of *Murrayakoenigii* leaf extracts were assessed using the oil stability index. In 2007, Arulselvan P. et al.

In rats with STZ-induced diabetes, *M. koenigii* has statistically significant hypoglycemic potential. The well-known antidiabetic medication glibenclamide seems to be less effective than the *M. koenigii* extract. (9)

Cold maceration process of curry leaves

1. Making the Powder:-

Take 50 g of powdered curry leaves that have been shade-dried. A coarse, rather than fine, powder is what you want.

2. Solvent Addition

Pour the 50 g of powder into a conical flask that holds 1000 mL. 500 mL of 70% ethanol should be added (drug:solvent ratio = 1:10).

3. Maceration

Use aluminum foil or a cork to seal the flask.

Store it between 25°C and 30°C at room temperature. Let it stand for seven days.

To enhance extraction, gently shake the flask two or three times a day.

4. Filtration

Use Whatman No. 1 filter paper to filter the mixture after seven days. Gather the filtrate in a sanitized beaker.

5. Focus

Use a water bath at 40 to 45 degrees Celsius to evaporate the solvent. Dry until the extract is semi-solid.

6. Storage

Pour the extract into a well sealed jar. Keep at 4°C.



Standardisation :-

1. Uniformity

Both Microscopic and Macroscopic Examination

Both macroscopic and microscopic features of the fresh *Murraya koenigii* leaves were investigated.

2. Features at the Macroscopic Level

The leaves' texture, color, and form were examined.

3. Microscopic Features:

Safranin was used to stain the leaf peel for quantitative microscopic examination. The following criteria were evaluated:

At least 10 observations from various leaf areas were used to compute the average number of stomata per square millimeter of epidermis.

The following formula was used to calculate the stomatal index (S.I.):

$S.I = \frac{S}{E + S} \times 100$, where S is the number of stomata per unit area and E is the number of epidermal cells in the same unit area.

4. Observations from Powder Microscopy

After being sieved, the leaf powder was examined under a microscope and using an organoleptic method. Under a microscope, distinctive characteristics were seen following phloroglucinol treatment.

5. Chemical and Physical Constants

Standard methods were used to ascertain the powdered leaves' physico- chemical characteristics:

- Drying Loss: The powder was dried at 105 °C for five hours in order to assess the moisture and volatile oil content. The weight loss % was then noted.
- Total Ash: The fraction of the inorganic residue remaining after combustion is represented by the total ash content.
- Acid-Insoluble Ash: This metric calculated the percentage of silica (such as sand and siliceous materials) in the ash.
- Water-Soluble Ash: The difference between the total amount of ash and the residue left behind after water treatment was used to calculate the water-soluble ash fraction.
- Sulphated Ash: After igniting the sample with sulfuric acid, the amount of ash that remained was weighed to ascertain sulfur-containing ash content.
- Alcohol-Soluble Extractives: A measurement was made of the quantity of ethyl alcohol-soluble components that were taken out of the powdered material. (1)

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IV. CONCLUSION

Murraya koenigii is a highly useful medicinal plant with a variety of pharmacological properties, according to the studied literature.



Significant therapeutic promise for the treatment of diabetes, oxidative stress, infections, inflammation, and liver problems is attributed to its rich phytochemical composition. The plant is a viable option for the production of herbal medicines since it is inexpensive, readily accessible, and well-recognized.

Nevertheless, the majority of research is preclinical, and more carefully planned clinical trials are needed to verify its effectiveness and safety in people. The production of a scientifically verified herbal composition requires standardization of extract extraction, identification of active ingredients, and optimization of dose. All things considered, curry leaves show promise as a natural source for upcoming pharmacological and nutraceutical uses.

V. RESULT

According to a thorough review of the literature on *Murraya koenigii*, curry leaves have important pharmacological and therapeutic qualities because they contain bioactive components like flavonoids, phenolic compounds, tannins, carbazole alkaloids (mahanimbine, girinimbine), and essential oils. Strong antioxidant, antidiabetic, antibacterial, anti-inflammatory, hepatoprotective, anticancer, and cardioprotective properties have been documented in a number of in-vitro and in-vivo investigations. Its capacity to increase insulin secretion, boost glucose absorption, and lessen oxidative stress is primarily responsible for the antidiabetic action. Antioxidant qualities aid in avoiding chronic illnesses by lowering damage caused by free radicals. Studies on antimicrobials demonstrate their efficacy against both Gram-positive and Gram-negative bacteria. Curry leaves also have lipid-lowering properties, which supports their use in the treatment of cardiovascular diseases and hyperlipidemia. Carbazole alkaloids are the main active substances in charge of the majority of biological activities, according to phytochemical studies. Curry leaves are comparatively harmless when taken at the prescribed dosages, according to toxicity assessments.

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