



Antibacterial Potential of Curry Leaf (*Murraya koenigii*)

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ABSTRACT:

This research set out to assess the antibacterial properties of three organic extracts made from the leaves of *Murraya koenigii* species. The zone of inhibition was found using Agar well diffusion. The minimal bactericidal concentration (MBC) and minimal inhibitory concentration (MIC) were determined using broth microdilution. Utilizing the agar well diffusion technique, the antibacterial properties of the leaves of curry (*Murraya koenigii*) extracts in methanolic, ethanolic, and aqueous forms were evaluated against four strains of Gram-positive, four strains of Gram-negative, and the fungus *Candida albicans*, respectively. Curry leaf aqueous extract did not demonstrate any antibacterial activity against any of the test microorganisms, depending to our results. A study was done in order to find out the extent to which *Murraya koenigii* leaf extract inhibited the growth of foodborne pathogens, specifically *Aspergillus niger* ATCC 16404, a strain of *Salmonella typhi* ATCC 14028, *Bacillus cereus* ATCC 11778, *Staphylococcus aureus* ATCC 25923, *Candida albicans* ATCC 10231, and *Escherichia coli* ATCC 25922.

KEYWORDS :- *Murraya koenigii*, Antibacterial Activity, Phytochemistry.

INTRODUCTION :

A native of India, curry leaf (*Murraya koenigii*) is a green leafy Vegetable Curry leaves have several health advantages and are a natural flavoring ingredient. They are anti-diabetic, antioxidant, antibacterial, anti-inflammatory, anti-carcinogenic, and have hepatoprotective characteristics along with other medical benefits. This study set out to look into curry leaves' antimicrobial properties [1]. Techniques: Samples of curry leaves were imported from India. Curry leaf powder was created by crushing the leaves once they were thoroughly dried at room temperature. Utilizing the paper disc diffusion method, this powder was utilized to create the ethanol and methanol extracts to determine the antibacterial activity against gram positive and gram-negative microorganisms. Using antibiotic samples, the inhibition zones surrounding the paper disc were evaluated and compared to conventional measures[4].

Curry leaves, or *Murraya koenigii*, are classified as part of the Rutaceae family and are prized for their distinct scent and therapeutic qualities. This tropical plant is frequently used to provide taste and spice. Although the plant originated in China, Hainan, India, Pakistan, and Sri Lanka, it is now commonly grown in portions of Australia and the United States. According to reports from multiple research projects, *Murraya koenigii* is extremely rich in a variety of organic components, including proteins, sterols, alkaloids, flavonoids, phenolic compounds, and saponins. 2018's Volume 7 of IHE: Lincoln University Journal of Science. *Murraya koenigii* has been shown in multiple studies to possess antibacterial and antioxidant properties against a range of microbes[6].

TAXONOMY :

- Kingdom:- Plantae
- Sub-kingdom:- Tracheobionta
- Super division:- Spermatophyta
- Division:- Magnoliophyta
- Class:- Magnoliopsida
- Sub-class:- Rosidae
- Order:- Sapindales
- Family:- Rutaceae
- Genus:- *Murraya*
- Species:- *koenigii*



Proteins, carbohydrates, fiber, minerals, carotene, nicotinic acid, vitamin C, vitamin A, calcium, and oxalic acid are all present in *Murraya koenigii* leaves. Crystalline glycosides, carbazole alkaloids, iso-mahanimbin, girinimbin, koenigin, koenine, koenidine, and koenimbin are also present[14].

The leaves also contain the triterpenoid alkaloids tetrahydromahanimbine and cyclomahanimbine. It has been possible to isolate Murrayastine, murrayaline, pyrayafoline carbazole alkaloids, and numerous other compounds from the leaves of *Murraya koenigii*[7].

Curry leaves (*Murraya koenigii*) are a well-liked leaf spice that is used sparingly because of its unique scent brought on by volatile oil and its capacity to aid in digestion. Asian cuisines frequently employ these leaves to spice dishes. The leaves taste mildly bitter, slightly acidic, and slightly pungent. They also hold onto other characteristics of their flavor even after drying[10].

As per estimates from the World Health Organization (WHO), two billion individuals worldwide may be infected with parasitic worms. These microbes not only infect humans but also cattle and crops, which reduces the amount of food produced[4].

Helminth infections, which are caused by intestinal parasitic worms that are spread through the air, food, and water, are among the most prevalent illnesses in humans. According to Aswaretal. (2009) and Kumar et al. (2011), they steal food and nutrients and produce poisons. Using a range of organisms, the current study set out to investigate and validate the antibacterial, antifungal, and anthelmintic action of *Murraya koenigii* leaves and other plant components[4].

Herbs and spices that are historically used in culinary preparations are known to include a number of bioactive compounds that promote health. Many nations employ complementary herbal treatment to treat a wide range of illnesses (Kamboj, 2000). These days, herbal remedies are sold as nutraceuticals, and health foods (Brower, 1998). It is estimated that Indian Ayurvedic medicine dates back more than 5000 years, and throughout the years, it has been extensively documented and practiced (Garodiaetal., 2007)[1]. Herbal medicines are typically used to promote health and healing or to prevent and treat a variety of illnesses and conditions (De Smet, 1997). Recognizing the value of conventional medicine, the World Health Organization (WHO) has established strict rules for assessing the efficacy, safety, and quality of herbal remedies[9].

Material And extraction:-

Curry leaves (*Murraya koenigii*) were bought Farmer's Market. The leaves were pulverized in a Warring blender, dried at 45 °C, and then stored at 4 °C. Two grams of ground curry leaves were combined with eight milliliters of distilled water, 95% methanol, and 95% ethanol in 50ml tubes to create aqueous, methanolic, and ethanolic extracts of the curry leaves. For 48 hours, the tubes were kept in a shaking incubator set at 150 rpm and 25C. Following a 20-minute centrifugation at 3,000 rpm and 25 °C, the supernatant was aseptically pipetted out, and the extracts were filtered through a 0.22 µm Millipore filter to ensure sterilization. Until they were used, sterilized extracts were stored at 4oC in the refrigerator^[16].

Significance And Application of curry leaves

Chemical constituents	Activity	Uses	Reference
Mahanimbine, Murrayanol and Mahanine,	Inhibition Of Topoisomerase I And Ii	Anti-Microbial Activity	21
Girinimbine, Mahanine	By Blocking 5-Lipooxygenase Activity	Effect On Bronchial Disorders	22
Mahanimbine And Essential Oil	Effect Against Lesion Index, Area and Percentage Of Lesion And On Ulcer	Anti-Ulcer Activity	23
Mahanimbilol, Murrayazolinine.	By Acting On Negative Chronotropic Effect	Vasodilation	24
Koenimbin	Reduction In Induced Chromosomal Damage	Chemoprotective Activity	25
Murrayacine, Murrayazolinine.	Decrease In Fever	Antipyretic Activity	26
Girinimbine, mahanine, mahanimbine, isomahanimbine, murrayazolidine, murrayazoline	Oxidative stress inducer	hepatoprotective activity	27
Girinimbine, mahanine, mahanimbine, isomahanimbine	Anti-nociceptive effects	Anti-analgesic activity	28

The source of 2,2-Diphenyl-1-picrylhydrazyl (DPPH) was Sigma Chemicals. We bought Mueller Hinton agar and broth from Hi-Media in Mumbai[3]. The remaining chemicals were all analytical grade products that could be purchased commercially in India .Five different bacterial strains were used to assess the organic extracts' antibacterial properties. The study just contained *Staphylococcus aureus* MTCC 96 (ATCC 9144), a Gram-positive bacterium. *Escherichia coli* MTCC 901 (ATCC 13534), *Klebsiella pneumoniae* MTCC 109 (ATCC 15380), *Salmonella para typhi* MTCC 735, and *Pseudomonas aeruginosa* MTCC 8291 were the four Gram-negative bacteria that were employed^[3]. The Microbial Type Culture Collection (MTCC) at the Institute of Microbial Technology in Chandigarh, India is the source of all of these bacteria, which were kept alive on nutrient agar^[3].The leaves of *M. koenigii* were gathered locally in several parts of Tamil Nadu, India, and verified by a botanist. Following a thorough washing, fresh leaves were shade-dried until their weight remained constant. Using a mixer grinder, the dried leaves were ground into a powder^[11].

After being cleaned, the curry leaves were dried at 40°C for three days in a hot air oven. Following total drying, the leaves were ground into a fine powder using a home electric mixer grinder, and the powder was weighed to improve the extraction potential^[15]. The effects of acetone, chloroform, ethanol, hexane, and methanol extracts on several species, including *Fusarium*, were studied. *moniliforme*, *Bacillus licheniformis*, *Bacillus aureus*, *Salmonella typhimurium*, *Macrophomina phaseolina*, *Rhizoctonia solanii*, *Staphylococcus aureus*, *Bacillus subtilis*, and *Fusarium oxysporum*^[12].

Conclusion-

According to pre-clinical evidence, *Murraya koenigii* may be used to treat the symptoms of a wide range of disorders, given its enormous pharmacological activity and the literature's accessibility. Even if there are many medical uses for crude extract from different portions of *Murraya koenigii*, current medications can only be created after a thorough analysis of the extract's bioactivity, mechanism of action, pharmacotherapeutics, toxicity, and after appropriate standardization and clinical trials. Because *Murraya koenigii* is widely available in India and has a wealth of literature supporting it, it is a compelling candidate for more pre-clinical and clinical research^[12].

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