SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

A PERCEPTIVE STUDY ON ANTI-INFLAMMATORY, ANTI-MICROBIAL, AND ANTI-FUNGAL PROPERTIES OF *Murraya koenigii* LEAVES

Nandani Tripathi[1], Ekta Pandey[2], Sanjay Kumar Singh[3], N.P. Singh[4], Vivek Chauhan[5]
[1]*Research scholar, Department of Chemistry Mansarovar Global University, Bhopal (M.P.)*
[2] *Associate Professor, Department of Basic Science and Humanities, Bundelkhand Institute of Engineering and Technology, Jhansi U.P.)*
[3]*Associate Professor, Department of Chemistry, DBS P.G. College Govind Nagar Kanpur (U.P.)*
[4]*Associate Professor, Department of Chemistry, DBS P.G. College Govind Nagar Kanpur (U.P.)*
[5]*Assistant Professor, Department of Paramedical Sciences, Vivekananda Global University, Jaipur (Rajasthan)*

Article DOI: https://doi.org/10.36713/epra20653
DOI No: 10.36713/epra20653

ABSTRACT
The aim of the present study is to evaluate the anti-inflammatory, anti-microbial and anti-fungal activity of Murraya koenigii leaves. The male wistar rats having weight (150-200g) were used. The petroleum Ether, chloroform and ethanol extracts were prepared by using soxhlet extraction method. The petroleum ether, chloroform and ethanol extracts of Murraya koenigii leafs were screened at dose of (250 mg/kg) for anti-inflammatory activity by using acute carrageen induced paw oedema method and yeast induces hyperpyrexia method respectively. The ethanolic extract shows significant effects in anti-inflammatory activity. This study had rationalized the ethanomedicinal use of the plant for cut, injury & alignment of body temperature by treble people. The Methanolic Extract of Murraya Koenigii Leaves (curry leaves), were investigated against different spices of Gram –ve bacteria i.e. Pseudomonas aeruginosa, Escherichia Coli, Klebsiella and Gram +ve Staphylococcus aureus and fungus Candida albicans in present study. The screening was performed by standard disc diffusion method. It is demonstrated moderate antibacterial activity against Staphylococcus aureus having the diameter of zone of inhibition of 15 mm and good antibacterial activity against E. coli with zone of inhibition of 20 mm and Pseudomonas aeruginosa with zone of inhibition of 10 mm and no zone of inhibition on Klebsiella, The leaf extract has shown anti-fungal activity on Candida albicans with16mm zone of inhibition.
KEYWORDS: - *Murraya Koenigii, Anti-Inflammatory Activity, Anti-Fungal Activity*

1. INTRODUCTION

Research in the field of photochemistry continues to develop from year to year for the sustainability of human health. Thousands of new compounds have been discovered every year in the development of drugs from natural ingredients, especially plants (Pandey et al., 2013). Plants can create secondary metabolites that can be used as pesticides, fragrances, colours, antioxidants, food enhancers, and medications, including ones that treat hypertension (Ochatt et al., 2022). There are 150,000 secondary metabolites that have been identified and 4000 new secondary metabolites per year. Phytochemicals are natural bioactive compounds that produce physiological actions in the human body, interacting with nutrients and fiber will protect the human body against disease (Kumar et al., 2023). Phytochemicals that are highly significant include alkaloids, flavonoids, tannins, saponins, and phenols. Green plants generally contain phytochemical compounds, such as vegetables and plants that add aroma to dishes, one of which is curry leaves *(Murraya Koenigii)* (Balakrishnan et al., 2020). Temurui or what is known as the curry plant *(Murraya koenigii* (L.) Spreng) belongs to the Rutaceae family (Amna et al., 2019). This plant comes from India and Sri Lanka and thrives in tropical climates. The curry plant is a plant typical of India, Sri Lanka and several regions in Southeast Asia such as Indonesia (Wang et al., 2023). These curry leaves are often found in Aceh Province, where they are known in the regional language as 'temurui leaves'. The majority of Acehnese people use the curry plant as a cooking spice. Traditionally, curry plant has also been used as a treatment for rheumatism, wounds, dysentery, diarrhoea and snake bites (Rahayu et al., 2019). Even though this plant is found quite often, in India this plant has not been widely used by the public. For India, another challenge is that most of the raw materials for this medicine still depend on imports. Nearly 95% of medicinal raw materials are imported from various other countries (Vaou et al., 2021). A number of studies have proven that there are various bioactive compounds contained in curry leaves which provide medicinal properties. Exploration carried out by Jelita et al., (2019) found alkaloid, flavonoid, saponin, phenolic and tannin compounds in the ethanol extract of curry leaves (Jelita et al., 2019). These compounds are known to act as medicinal ingredients so they have the potential to be used in the food and pharmaceutical industries. The various secondary metabolite compounds explored in curry leaves have

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

the potential to be further developed to find sources of medicinal raw materials. Many chemical compounds found in *M. koenigii* leaves have been reported to have benefits as bioactive compounds, such as antidiabetic, larvicidal activity, antianxiety, antioxidant and antimicrobial activity (Balakrishnan et al., 2020). Curry leaves (*Moringa koenigii* (L.) Spreng) are compound leaves and the leaf shape is pinnate. The shape of curry leaves is almost the same as bay leaves, only the size is smaller and the smell is sharper than bay leaves. Curry trees have small, white flowers, blackish-brown fruit, long stalks with an odd number of leaves on each stalk, and a maximum height of 4-6 meters. Curry leaf stems have a dark brownish green colour, while immature leaves are light green and fully grown leaves are dark green in colour (Toma et al., 2020). Curry leaf extract as a producer of bioactivity has been widely known and reported in developed countries and is known to be active as an antitumor, antioxidant, antimutagen, anti-inflammatory, antidiabetic, antidysentery, stimulant and antibacterial. This research aims to identify the phytochemical compounds contained in curry leaves. It is believed that this study's findings would help curry leaves become a more viable traditional therapeutic component. Medicinal plants play vital roles in primary healthcare system of various developing countries due to lack of modern healthcare infrastructure, traditional acceptance, high cost of pharmaceutical drugs as well as efficacy of medicinal plants against certain disorders that cannot be treated by modern therapeutic drugs (Megersa and Tamrat, 2022). Numerous patients in these developing countries combine folklore medicines with standard medicines and use them for the treatment of chronic diseases (Kigen et al., 2013). The study was undertaken to evaluate the anti-inflammatory of *Murraya koenigii* in rats. Various antimicrobial peptides, proteins, and small molecular weight organic substances are present in Plants acting as host defence mechanisms (Gopalan et al., 1984). Medicinal herbs and plant products were used in treating a wide spectrum of infections and other diseases in traditional medicine like Ayurveda and Unani (Satyavathi et al., 1983). As many microorganisms developed resistance due to the indiscriminate use of antibacterial drugs, there is a need to develop new molecules with minimum side effects. Therefore investigation of the chemical compounds within medicinal plants has become desirable (Ahmad et al., 1998). *Murraya Koenigii* is a medically important herb of Indian origin. Meethineem (Hindi), karivepaaku (Telugu), its extract is known to show antidiabetic (Arulselvan et al., 2006) ,cardio protective, antimicrobial, antifungal, and antiulcer, antioxidant (Ningappa et al., 2006), 8antiinflammatory (Ghani, 2003), hypolipidemic activities (Iyer and Uma, 2008), anticancer (Syam et al., 2007), analgesic properties and indigenous medicine as tonic, stomach stimulant and carminative. This plant has been used in poly herbal formations like Siddha medicine The extracts were also proved to be effective in gastric ulceration and was suggested as protective as ranitidine. Biologically active carbazole alkaloids are reported to have antimicrobial properties (Ramsewak et al., 1999). Curry leaves have been reported to contain tocopherol, b-carotene, lutein and alkaloids (Khanum et al., 2000). The aim and Purpose of this study was to evaluate antimicrobial activity of *Murraya Koenigii* (curry leaves) against different bacteria and fungi mainly *Staphylococcus aureus* , *E.coli*, *Klebsiella* species and *Candida albicans*.

1.1 Curry Leave

Curry leaf can be cultivated on red sandy, loam soils with good drainage are ideal for better leaf yield. The optimum temperature requirement is 26^0C to 37^0C (Gupta and Chandra, 1995). The main season of availability of curry leaf fruits is July to August. Within 3-4 days of collection of fruits, the seeds should be pulped and sown in nursery beds or poly bags. One year old seedlings are suitable for planting; one seedling is planted at the centre of the pit. Immediately after planting the pits are irrigated or the third day, the second irrigation is given once in a week (Handa, 1996). Fresh curry leaves with stalks, can be stored in Zip lock bags and refrigerated for a maximum of 5 days after then they turn black and stinks. Curry leaves can also be stored by pat drying to make sure all water content is completely wiped off. The leaves are them spread over a paper towel and microwave for 1 minute (1000 watts) and then cooled. They are then stored in air-tight bottle which would stay for few months. Fresh curry leaves with stalks removed are wiped stalks removed are wiped clean, lightly dry toasted and dried for dew days, this results in dry curry leaves. This stays for 6months if stored in air tight box. The history of curry leaves dates back to the ancient period. The curry leave is native to India, Sri Lanka, Bangladesh and the Andaman Islands. Later spread by Indian migrants, they are now grown in other areas of the world where Indian immigrants settled (Satyavathi et al., 1999). The curry leafs are naturalized in forests and waste land throughout the Indian subcontinent except in the higher parts of the Himalayas. It is basically used as a spice and is an aromatic deciduous tree which is 5 meters tall and fifteen to forty centimeters in diameter. Curry powder made after grinding curry leaves, is used in the cooking of stew, and a variety of soups, chutneys, breakfast dishes like upma etc. In some parts of Southeast Asia, curry leaves are chewed because they are believed to be beneficial to digestion and especially good for preventing diarrhea. Curry leaves have been used for centuries almost in all the parts of the world. This herb has several medicinal properties. For instance, its leaves and bark can be used as a tonic, stomachic, stimulant and carminative (Kirtikar and Basu, 2006). It can also help in reducing blood sugar if these leaves are consumed early in the morning in empty stomach. Curry leaves are also a good source of vitamin A and they provide a rich source of calcium. Curry leaves are a great source of various vitamins and minerals. These include vitamin C, Vitamin A, folic acid, niacin, thiamin and riboflavin. Each of these vitamins plays an important role in development. Vitamin C is important for strengthening the immune system. Thiamin is known to have a role in organ and nervous system development. Other than vitamins and minerals, studies have shown that curry leaves contain antioxidants which are useful against free radical damage and oxidative stress in the body (Gupta and Chandra, 1995).A paste of curry leaves can be prepared against diseases like diarrhea and dysentery which often affect infants and toddlers (Satyawati et al., 1999). Brian (2012) also identified that curry leaf extracts can assist the immune system and strengthen it. Evergreen shrubs or small tree are up to 4mm tall. Leaves are arranged spirally, imparipinnate with 17-31 leaflets, stipules are absent. Leaflets are alternate, ovate to ovate lanceolate or orbicular, 2-5cm. Glandular are dotted, base obtuse to rounded and slightly asymmetrical, apex notched, margin is entire or irregularly toothed (Adewunmi, et

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

al., 2001). Flowers are bisexual, regular aromatic, pedicel is short, carlyx are with tiny ovate teeth, petals are oblanceolate to oblong, 5-7mm long, glandular, white. Stamens are 10 in number, ovary is superior, stigma capitates, fruit is ovoid to oblong, grandular berries. Murraya koenigii comprises about 15 species which are distributed from continental Asia throughout the Malaysian region to north- eastern Australia and New Caledonia. Several species are cultivated throughout the tropics. Curry leaves are propagated mainly from seeds must be ripe and fresh to plant, dried or shriveled fruits are hot viable. The whole fruit can be planted, but it's best to remove the pulp before planting in potting mix that is kept moist hot wet. Stem cutting can also be used for propagation. *Murraya Koenigii* grows best in deep well-drained soil in full sun to partial shade; in Africa it is either kept in large pots or grown in home garden (Akobundu and Agyakwa, 1998.) flowering is from March to June and fruiting from June to August. After transplanting it takes 12-15 months before the leaves can be harvested. Leaves can be refrigerated in airtight containers for up to 2 weeks without loss of flavour. They can also be frozen from storage for year round use.

2. MATERIAL AND METHODS

Freshly collected leaves of ***Murraya koenigii*** from local habitat after authentication were shade dried and powdered to course powder size.

2.1 Extraction:- The powdered material was subjected to successive hot extraction with various solvents in increasing order of polarity from Petroleum ether, Chloroform and Ethanol. After the complete extraction, the solvent was distilled off and concentrated on a water bath (Mukherjee, 2003).

2.2 Preliminary Phytochemical Screening of extracts: -The plants may be considered as biosynthetic laboratory for multitude of compounds like alkaloids, glycosides, volatile oils, tannins, saponins, flavonoids, sugar etc. that exerted physiological effect. These compounds are termed as secondary metabolites. To check the presence or absence of primary and secondary metabolites all the extracts were subjected to a battery of chemical tests (Khandelwal, 2000).

2.3 Pharmacological Screening

2.3.1 Animal:-Albino rats, Wister strain, of weighing 150-200 gm were used for acute model. Rats were kept in polypropylene cages and fed on standard laboratory diet. The animals were exposed to 12 hours of darkness and light each. The bedding material of cages was changed every day.

2.3.2 Acute Toxicity Study: -Acute toxicity study was carried out according to OECD guidelines. The extracts were suspended in saline. The extracts were given to rats by oral route at a dose level of 500, 1000 and 2500 mg/kg body weight, to groups of 4 animals. After administration of extracts the rats were observed for gross behavioural, neurological, autonomic and toxic effects. The toxicological effects were observed in terms of mortality. No death occurred within 24 h of dose of 500, 1500 mg/kg but at a dose of 2500 mg/kg 50% mortality was observed. As dose was increased further up to 5000 mg/kg, at that dose all the animals were died. Hence 2500 mg/kg dose was considered as LD_{50}. 1/10th of the LD_{50} was considered as an effective dose i.e. 250 mg/kg (OECD, 2000).

2.4 Assessment of Anti-Inflammatory Activity, Carrageenan Induced Rat Paw Edema Method (Vogel, 2002): - Thirty minutes after drug or test compound administration, 0.1 ml. of 1% carrageenan in distilled water was injected into the sub plantar region of right hind paws of all groups. A mark was put on the leg at the malleolus to facilitate uniform dipping at subsequent readings. The paw edema volume was measured with the help of plethysmometer at zero hr. (Immediately after injecting carrageenan). The same procedure was repeated at 30 minutes 1, 2, 3 hours. The difference between 1 hours and subsequent hours reading was taken as actual edema volume. The percentage inhibition of paw edema in the various treated groups was then calculated by using the formula;

Percentage inhibition = $(1 - V_t / V_c) \times 100$

Where $\mathbf{V_t}$ = is the edema volume in the drug treated group.

$\mathbf{V_c}$ = is the edema volume in the control group.

2.5 Test Micro-organisms: - Antimicrobial activity of plant extract in different concentrations-10000,30000,50000 µg/ml is tested against microorganisms *Staphylococcus aureus, E. coli, Klebsiella pneumonia*, *Pseudomonas aeruginosa* and *Candida albicans* by kirbybauer's disc diffusion method with Amikacin / ketoconazole as positive control and normal saline as negative control.

2.6 Antimicrobial Screening: - Antimicrobial Assay / Antimicrobial activity was evaluated by the Disc diffusion method on nutrient agar medium (NAM) for bacteria and sabouraud's dextrose agar medium (SDA) for fungi. The Nutrient Agar Medium was prepared by dissolving Beef extract- 0.3%, Yeast extract- 0.3%, Peptone-0.5%Nacl-0.5%, Agar medium- 1.0 gram, Distilled water-1000ml and maintained PH 7.0. The sabouraud's Dextrose Agar Medium was prepared by dissolving Peptone 10 grams, Dextrose- 20.0grams, Agar-15.0 grams, cycloheximide and Chloramphenicol in 1000ml water and pH maintained at 5.4 and autoclaved at 115^0C for 15 mints. The sterile medium (20 ml) was uniformly inoculated by using sterile cotton swabs with test pure cultures of bacteria *Escherichia Coli, Pseudomonas aeruginosa, Klebsiella, Staphylococcus aureus* and fungus *Candida albicans*. The discs (5mm in diameter) were impregnated with10000µg/ml, 30000µg/ml and 50000µg/ml extract of *Murray Koenigii* curry leaves followed by air drying and were placed on seeded agar plates. A disc with normal saline kept as negative control. Another disc with Amikacin kept as Positive Control and Ketoconazole was kept as positive control for *Candida albicans*. For each treatment two replicates were prepared. The plates were incubated for bacteria at 37^0Cfor 24 hours and for fungi 28^0C for 48 hours. After incubation the resulting zone of inhibition were measured.

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

3 RESULTS

S. No.	Solvent	Nature of Extract	Colour	%Yield
1	Pet.Ether (40-60°C)	Semisolid	Greenish black	3.9
2	Chloroform	Semisolid	Dark green	3.1
3	Ethanol	Semisolid	Green	6.3

Table No.1:- The Percentage Yield of Petroleum Ether, Chloroform and Ethanol

Plant constituents	Ethanolic Extract	Pet. Ether Extract	Chloroform Extract
Alkaloid	+ve	+ve	+ve
Carbohydrates	-ve	-ve	-ve
Proteins	+ve	+ve	+ve
Tannins	-ve	-ve	-ve
Steroids	+ve	+ve	+ve
Saponins	-ve	-ve	-ve
Amino acids	-ve	-ve	-ve

+ indicate Present and – Indicate Absent

Table 2: The result of preliminary phytochemical screening of the plant extract

G. No.	Treatment	Dose	1hr	2hr	3hr	Average reading	% Inhibition
			Mean±S.D	Mean±S.D	Mean±S.D		
1	Carrageenan	0.1mL.1% sol.	1.43±0.08	1.50±0.06	1.42±0.04	1.45	……
2	Ibuprofen	50 mg/kg	0.50±0.05	0.60±0.06	0.64±0.04	0.58	60
3	Pet. Ether extract	250 mg/kg	0.79±0.12	0.92±0.15	0.96±0.11	0.89	39
4	Chloroform extract	250 mg/kg	0.89±0.17	0.90±0.09	1.10±0.12	0.93	36
5	Ethanol extract	250 mg/kg	0.75±0.09	0.72±0.1	0.66±0.12	0.71	52

Table No. 3:- Results of Anti-inflammatory activity of extracts

Organism	Negative Control (Normal Saline)	Positive Control	MEMKL 10000µg/ml	MEMKL 30000µg/ml	MEMKL 50000µg/ml	% of Inhibition
Staph. aureus	Nil	Augmentin 23 mm	Nil	Nil	15 mm	65.21%
E. coli	Nil	Amikacin 24mm	Nil	Nil	20mm	83.33%
Pseudomonas aeruginosa	Nil	Amikacin 28mm	Nil	Nil	10mm	45.5%
Klebsiella pneumonia	Nil	Amikacin 22mm	Nil	Nil	Nil	Nil
Candida albicans	Nil	Ketoconazole 22 mm	Nil	Nil	16mm	72.72%

MEMKL- Methanolic Extract of *Murraya Koinigii* Leaves, Positive-Control Discs = Amikacin for *E. coli, Klebsiella, Pseudomonas aeruginosa*, Augmentin- Amoxicillin/Cloxacillin combination) for *Staphylococcus aureus, Ketoconazole* for *Candida albicans*

Table No. 4:- Minimum Inhibitory Concentration of Methanolic Extract of *Murraya Koinigii Leaves* (MEMKL) and Amikacin / Ketoconazole in Serial

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

3.1 Dilution Method: - Evaluation of Anti- inflammatory Activity of Extract It was observed that Petroleum ether and chloroform extract did not show significant decrease in paw edema volume with respect to corresponding control. The Ethanolic extract gives significantly reduced paw edema volume. Results are given in Table No.2

4.DISCUSSION

Curry leaves (*Murraya koenigii*) are a type of leaf spice with authentic characteristics in Asian Indian cuisine and are used in small quantities to add aroma and to extend the shelf life of food.12 Curry leaves are a popular plant among the people. These leaves are used as a seasoning for various typical dishes because they give a delicious aroma and delicious taste to the food. Curry leaves contain water (66.3%), minerals (4.2%), carbohydrates (16%), fiber (6.4%), protein (1%), and fat (1%).13 The main mineral content per 100 g of leaves is phosphorus (600 mg), iron (2.1 mg), and calcium (810 mg) (Nadeeshani et al., 2018). The vitamin content is nicotinic acid (2.3 mg), carotene (12,600 i.u.), and vitamin C (4 mg) (Mankar et al., 2021). Meanwhile, it is reported that there are 34 types of essential oil components found in curry leaves, including α-pinene (51.7%), α-humulene, β-pinene (9.8%), β-phellandrene (24.4%), β caryophyllene (5.5%), γ- terpinene (1.2%), sabinene (10.5%), bornyl acetate (1.8%), limonene (5.4%), terpinen-4- ol (1.3%), and contains alkaloids (Rajendran et al., 2016). In this study the fresh leaves of *Murraya koenigii* was collected from local habitat after authentication were shade dried and powdered to course powder size. The powdered material was subjected to successive hot extraction with various solvents in increasing order of polarity from Petroleum ether, Chloroform and Ethanol. After the complete extraction, the solvent was distilled off and concentrated on a water bath. The preliminary phytochemical screening of extracts of *Murraya koenigii* shows presence of mucilage, proteins, sterols and Triterpenoids, alkaloids, flavonoids, phenolic compounds. Thus these activities of *Murraya koenigii* could be due to alkaloids, flavonoids and triterpenoids. Albino rats, Wister strain, of weighing 150-200 gm were used for acute model. Acute toxicity study was carried out according to OECD guidelines. The extracts were given to rats by oral route at a dose level of 500, 1000 and 2500 mg/kg body weight, to groups of 4 animals. No death occurred within 24 h of dose of 500, 1500 mg/kg but at a dose of 2500 mg/kg 50% mortality was observed. As dose was increased further up to 5000 mg/kg, at that dose all the animals were died. Hence 2500 mg/kg dose was considered as LD_{50}. $1/10^{th}$ of the LD_{50} was considered as an effective dose i.e. 250 mg/kg. The Carrageenan induced rat paw oedema has been a popular inflammatory model to investigate the anti-inflammatory effect of compounds. It has a biphasic effect. The first phase is due to release of histamine and serotonin (5HT) (0-2hr), plateau phase is maintained by kinin like substance (3hr) and second accelerating phase of swelling is attributed to P.G. release (>4hr). In this work ethanolic extract of *Murraya koenigii* (250mg/kg, p. o.) significantly reduces oedema induced by carrageenan in all the phases. Hence it can be concluded that ethanolic extract of *Murraya koenigii* possess anti-inflammatory activity that may be mediated by alkaloids, flavonoids and triterpenoids. The antimicrobial and antifungal action of extract of *Murray Koenigii* curry leaves (MEMKL) was confirmed in present study. The extract showed inhibition of bacterial growth. The zones of inhibition for bacteria i.e., *Escherichia Coli* is 20 mm for 50000µg/ml; showing 83.33% inhibition zone. For *Pseudomonas* the inhibition zone was10 mm with 50000µg/ml exhibiting 45.5 % inhibition. There was no inhibition zone with *Klebsiella pneumonia* with 50000µg/ml. *Staphylococcus aureus* exhibited 15 mm inhibitory zone with 65.21% of inhibition when compared with positive controls Amikacin for gram negative and Augmentin (Amoxicillin / Cloxacillin combination) for gram positive. Whereas *Candida albicans* has shown 15mm inhibitory zone with 50000µg/ml extract, the percentage of inhibition being 65.21 when compared to Positive Control ketoconazole as shown in Table 4. Comparison of the growth inhibition of various extracts and their respective dilutions shows a strong dependent effect on extract concentrations. These results revealed that antifungal activity of various extracts was enhanced by increasing the concentration of the extracts, thus the inhibition activity of the extracts was concentration dependent. This finding is in agreement with the report of Banso et al., (1999), who also observed that higher concentrations of substances showed more growth inhibition. In addition, the antifungal activity of plant extracts might not be due to the action of a single active compound, but the synergistic effect of several compounds that are in minor proportion in a plant (Davicino et al., 2007). Therefore these data indicate that the appropriate extract concentration to show a specific effect depends on the plant used and the nature of the extract. Presence of constituents like flavonoids and tannins in the extracts, are likely to be responsible for the antimicrobial activity. This result indicates the potential usefulness of *Murraya koenigii* in the treatment of various pathogenic diseases. The results of the analysis regarding the content of secondary metabolite compounds in curry leaf extract play an important role in the development of future medicines and need to be carried out to provide knowledge to the public. This study can be a basis for bioactive content for further research to expand the use of medicinal plants in the future, especially curry plants.

5. CONCLUSION

In this study ethanolic extract of *Murraya koenigii* (250 mg/kg, p. o.) significantly reduces oedema induced by carrageenan in all the phases. From the above discussion, extract of aerial roots of *Murraya koenigii* leaves exhibited significant anti-inflammatory activity. This study also confirms that *Murray Koenigii* curry leaves possesses in-vitro antimicrobial activity. This obviously justifies the use of *Murray Koenigii* curry leaves intraditional medicine. Further research has to be carried out to elucidate basic mechanism of antimicrobial action of above plant *Murray Koenigii*. Further detailed investigation is underway to determine the exact phytoconstituents those are responsible for these activities.

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

BIBLIOGRAPHY

1. *Adewunmi, C. O., Agbedahunsi, J.M., Adebajo, A.C., Aladesanmi, A.J., Murphy, N., Wando, J., (2001). Ethro-veterinary medicine: Screening of Nigerian medicinal plants for trypanocidal properties, Journal of Ethnopharmacology, 77(9), 19-24.*
2. *Ahmad, I., Mehamood, Z., Mohammad, F., (1998). "Screening of Some Indian Medicinal Plants for their Antimicrobial Properties", J. Ethnopharmacol., Vol. 62, pp. 183-193.*
3. *Akobundu, I.O,. Agyakwa, C.W., (1998). A handbook of West African weeds, Ibadan: International Institute of Tropical Agriculture.*
4. *Amna, U., Halimatussakdiah, Wahyuningsih, P., Saidi, N., Nasution, R., (2019). Evaluation of cytotoxic activity from Temurui (Murraya koenigii [Linn.] Spreng) leaf extracts against HeLa cell line using MTT assay. J. Adv. Pharm. Technol. Res; 10:51-55.*
5. *Arulselvan, P., kumar, G. P., Kumar. D., Subramanian, S., (2006). "Anti-Diabetic Effect of Murraya Koenigii Leaves on Streptozotocin Induced Diabetic Rats", Pharmazie; Vol. 61, No. 10, pp. 874-877.*
6. *Balakrishnan, R., Vijayraja, D., Jo, S.H., Ganesan, P., Su-Kim, I., Choi, D.K., (2020). Medicinal Profile, Phytochemistry, and Pharmacological Activities of Murraya koenigii and its Primary Bioactive Compounds. Antioxidants (Basel); 9.*
7. *Banso, A., Adeyemo, S.O., Jerimiah, P., (1999). Antimicrobial properties of Vernonia amygdalina extract, Journal of Applied Science and Management, 3, 9-11.*
8. *Davicino, R., Mattar, M.A., Casali, S., Graciela,E., Margarita, S., Micalizzi, B., (2007). Antifungal activity of plant extracts used in folk medicine in Argentina. Revista peruana de Biologia, 14,247-251.*
9. *Ghani, A., (2003). Medicinal Plants of Bangladesh: Chemical Constituents and Uses, 2nd Edition, Dhaka, Asiatic Society of Bangladesh; pp. 309-310.*
10. *Gopalan, C., Ramasastri, B.V., Balasubramaniam, S.C., (1984). Nutritive value of Indian foods, National Institute of nutrition, Hyderabad. Indian council of medical research, New Delhi; 66 -117.*
11. *Gupta, R., Chandra, K.L., (1995). Medicinal and aromatic plants research in India, Journal of Advances in Horticulture, 2(1), 429-451 Malhotra Publishers House, New Delhi.*
12. *Handa, S.S., (1996). Rasaayana Drugs, Journal of Supplement to Cultivation and Utilization of Medicinal Plants, 5(1), 509-524.*
13. *Iyer, D., Uma, D. P., (2008). "Phyto-Pharmacology of Murraya Koenigii", Pharmacognosy Reviews; Vol. 2, pp.180- 184.*
14. *Jelita, J., Wirjosentono, B., Tamrin, Marpaung, L., (2019). Phytochemical Screening and Chemical Analysis of Ethanol Extract of Kari Leaves (Murayya koeginii) Using GC-MS Method. Journal of Physics: Conference Series; 1232:012012.*
15. *Khandelwal, K.R., (2000). A text book of Practical Pharmacognosy, , Nirali publication, Sixteen edition.*
16. *Khanum, F., Anilakumar, K. R., Sudarshana Krishna, K. R., Viswanathan, K. R., Santhanam, K., (2000). Anticarcinogenic effects of curry leave indimethylhydrazine-treated rats. Plant Foods for Human Nutrition; 55,347–355.*
17. *Kigen, G.K., Ronoh, H.K., Kipkore, W.K., Rotich, J.K., (2013). Current trends of traditional herbal medicine practice in Kenya: A review. African J Pharmacol Ther 2, 32-37.*
18. *Kirtikar, K.R., Basu, B. D., (2006). In Indian Medicinal Plants, New Delhi, 5(2), 924-926.*
19. *Kumar, A. P. N., Kumar, M., Jose, A., Tomer, V., et al., (2023). Major Phytochemicals: Recent Advances in Health Benefits and Extraction Method. Molecules; 28.*
20. *Mankar, S., Bhosale, M., Shelke, M., Sonawane, P., (2021). A review on Murraya koenigii: For hair growth promoter. Research Journal of Pharmacognosy and Phytochemistry; 13:39-43.*
21. *Megersa, M., Tamrat, N., (2022). Medicinal plants used to treat human and livestock ailments in Basona Werana district, North Shewa Zone, Amhara Region, Ethiopia. Evi-Based Complement Alter Med 2022.*
22. *Mukherjee, P.K., (2003). A text book of Quality Control of Herbal Drug, Business Horizons publication, Third edition, 379-422.*
23. *Nadeeshani, H., Wimalasiri, S., Samarasinghe, G., Silva, R., Madhujith, T., (2018). Evaluation of the nutritional value of selected leafy vegetables grown in Sri Lanka. Tropical Agricultural Research; 29:255.*
24. *Ningappa, M. B., Dinesha, R., Srinivas, L., (2008). Antioxidant and free radical scavenging activities of polyphenolsenriched curry leaf (Murraya Koenigii L.) extracts. Food Chemistry; 106, 720-728.*
25. *Ochatt, S., Alan, A.R., Bhattacharya, A., Hano, C., Kiselev, K.V., Marconi, P.L., et al., (2022). Secondary metabolites: a boon from plants, the best chemist in nature: preface from the editors. Plant Cell Tissue Organ Cult.149:1-6.*
26. *OECD, (2000). Guideline, 423, acute oral toxicity: Environmental Health and Safety Monograph series on Testing and Assessment No. 24.*
27. *Pandey, M.M., Rastogi, S., Rawat, A.K., (2013). Indian traditional ayurvedic system of medicine and nutritional supplementation. Evid. Based Complement. Alternat. Med.:376327.*
28. *Rahayu, Ningsih, S., Nehru, F., Amna, U., Halimatussakdiah, H., (2019). Free radical scavenging activity of methanolic extract of temurui (Murraya koenigii L. Spreng) collected from Langsa, Aceh. IOP Conference Series: Earth and Environmental Science;364.*
29. *Rajendran, M.P., Pallaiyan, B.B., Selvaraj, N., (2014). Chemical composition, antibacterial and antioxidant profile of essential oil from Murraya koenigii (L.) leaves. Avicenna J Phytomed; 4:200-214.*
30. *Ramsewak, R. S., Nair, M. G., Strasburg, G. M., De Witt, D. L., Nitiss, J. L., (1999). Biologically active carbazole alkaloids from Murraya Koenigii. Journal of Agricultural and Food Chemistry; 47, 444-447.*
31. *Satyavathi, G.V., Raina, M.K., Sharma, M., (1999). Indian Medicinal Plants, 2(1) 289-299.*
32. *Satyavathi, G.V., Riana, M.K., Sharma, M., (1983). Indian Medicinal Plants, Vol – II, INMR, New Delhi; 289-299.*
33. *Syam, S., Abdul, A. B., Sukari, M. A,, Mohan, S., Abdelwahab, S. I., Wah, T. S., (2007). "The Growth Suppressing Effects of Girinimbine on Hepg2 Involve Induction of Apoptosis and Cell Cycle Arrest", Molecules, Vol. 16, No. 8, pp. 7155-7170.*
34. *Toma, M., Luchian, V., Hoza, D., (2020). Avant guard of Romanian research: Murraya koenigii L.-an amazing flower and medicinal plant. Scientific Papers. Series B. Horticulture;64.*

SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 3 | March 2025 - Peer Reviewed Journal

35. *Vaou, N., Stavropoulou, E., Voidarou, C., Tsigalou, C., Bezirtzoglou, E., (2021). Towards Advances in Medicinal Plant Antimicrobial Activity: A Review Study on Challenges and Future Perspectives. Microorganisms;9.*
36. *Vogel, H.G., (2002). In; Drug Discovery and Evaluation Pharmacological Assays, Springer Verlag Berlin Heidelberg, New York, 2nd Edn, 418.*
37. *Vogel, H.G., (2002). In; Drug Discovery and Evaluation Pharmacological Assays, Springer Verlag Berlin Heidelberg, New York, 2nd Edn, 418.*
38. *Wang, W., Nguyen, K.T.K., Zhao, C., Hung, H.C., (2023). Earliest curry in Southeast Asia and the global spice trade 2000 years ago. Sci Adv; 9:eadh5517.*