IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

EVALUATION, COMPARATIVE STUDIES AND DETERMINATION OF ANTIMICROBIAL ACTIVITY IN FRESH AND DRY LEAVES OF *Murraya koenigii* L.

Belide Pavani[a]*, Nagapuri Aishwarya[b], Sunkari Tanusri[c], Merlin T Babu[d], Rama Rao T[e]

[a,b,c,d] CMR College of Pharmacy, Affiliated to JNTUH, Medchal, Kandlakoya, Hyderabad-500090, India

[e]Professor and Principal, CMR College of Pharmacy, Affiliated to JNTUH, Medchal, Kandlakoya, Hyderabad-500090, India

ABSTRACT: This review explores the functional and nutraceutical properties of *Murraya koenigii* L., a spicy plant rich in minerals and vitamins. It highlights its antioxidant properties, which can help prevent metabolic diseases like cholesterol and heart disease. Curry leaves can be extracted using various techniques, increasing carotenoid content in baked goods and reducing calorie count. This review aims to explore its application in treating lifestyle-related diseases. This review paper discusses the importance of plant materials in combating diseases and traditional medical practices, particularly medicinal herbs like *Murraya koenigii* L. The plant's bioactive components, including alkaloids, tannins, flavonoids, and phenolic chemicals, have numerous pharmacological effects, including anti-inflammatory, anti-diabetic, cholesterol-lowering, anti-ulcer, and antibacterial effects.

KEY WORDS: Disease, Extraction, Evaluation, Anti-microbial activity, Culture medium.

INTRODUCTION:

Curry leaves, *Murraya koenigii* L., a Rutaceae family member, are used in Indonesian food processing and Ayurvedic medicine to treat various ailments like headaches, flu, and diarrhea [1] [2]. The plant, primarily growing in tropical zones, emits a powerful scent primarily composed of O-phellandrene, P-gurjunene, P-caryophyllene, and P-elemene [3]

Fig-1: *Murraya koenigii* L.

Scientific investigations have confirmed the effectiveness of some of these traditional uses, such as their hypolipidemic benefits [4]. counter-tumor [5], shielding agent etc [6]. It has been reported that the essential oil derived from *Murraya koenigii* L. leaves has nephroprotective [7], anti-inflammatory, anthelmintic [8], antibacterial, antifungal, and hepatoprotective properties [9].

It is known that different sections of *Murraya koenigii* L., including its fruit, bark, roots, and leaves, encourage different biological activity. Even after drying, the aromatic bioactive components of *Murraya koenigii* L. leaves maintain their flavour and other characteristics [10]. Murraya koenigii L., rich in active constituents like Bismahanine, Girinimbine, Mahanimbine, Murrayanine, and Quinone, has natural medicinal properties, making it a useful plant for folk medicine [11].

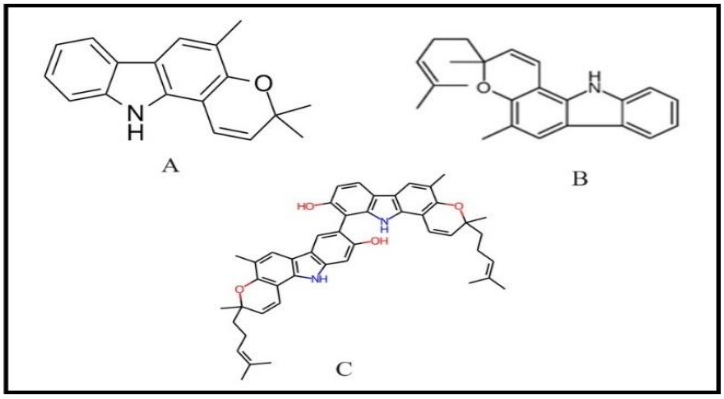

Fig-2: Structures of A- Girinimbine B- Mahanimbine C- Bismahanine

- **RESEARCH AND METHODOLOGY:**

Murraya koenigii L. is collected, powdered and kept for extraction in Soxhlet apparatus.

Extraction procedure:

The *Murraya koenigii* L. sample is put in a thimble and gradually filled with condensed fresh extractant (ethanol) from a distillation flask in the traditional SE implementation. The extracted analytes are transferred into the bulk liquid by a siphon that aspirates the liquid from the thimble and unloads it back into the distillation flask when it reaches the overflow level. Until full extraction is accomplished, the process is repeated. Soxhlet becomes a hybrid continuous-discontinuous approach because of this performance. The assembly can be thought of as a batch system because the extractant acts in steps, but it also has a continuous feature because the extractant is recirculated through the sample [12].

This procedure is performed for both dry and fresh leaves of *Murraya koenigii* L.

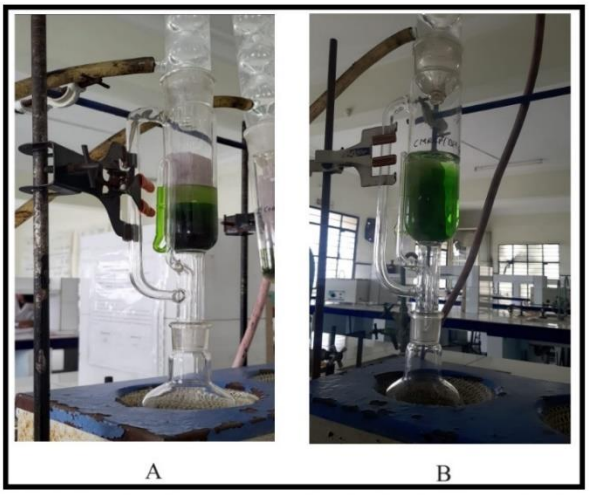

Fig-3: A- Extraction of phytoconstituents from dry leaves of *Murraya koenigii* L.
B- Extraction of phytoconstituents from fresh leaves of *Murraya koenigii* L.

PHYTO-CHEMICAL SCREENING:

1. **Test for Glycosides:**

A 25ml of dilute H_2SO_4 was added to 5ml of plant extract in a 100 ml flask. It was boiled (15 min), cooled and neutralized with 10% NaOH. The Fehling solution A and B (5 ml) was added to the neutralized solution and a brick red precipitate of reducing sugars indicates the presence of glycosides [13].

2. **Test for Steroids:**

One gram of the plant extract was dissolved in a few drops of acetic acid. It was gently warmed and cooled under the tap water and a drop of concentrated sulphuric acid was added along the sides of the test tube. Appearance of green colour indicates the presence of Steroids.

3. **Test for Tannins:**

To the plant extract mixed with basic lead acetate solution. Formation of white precipitate indicates the presence of Tannins.

4. **Test for Alkaloids:**

The plant extract was shaken with few drops of 2N HCL. An aqueous layer formed which was decanted and one or two drops of Mayer's reagent added. Formation of white turbidity or precipitate indicates the presence of alkaloids.

5. **Test for Saponins:**

The plant extract is shaken with water; foamy lather formation indicates the presence of saponins.

6. **Test for Quinones:**

To the test substance, sodium hydroxide was added. Blue green or red colour indicates the presence of Quinone.

7. **Test for Proteins:**

To the test solution the Biuret Reagent is added. The blue reagent turns violet in the presence of proteins.

8. **Test for Terpenoids: (Salkowski Test)**

To the plant extract add Chloroform + few drops of Conc. H2SO4. Shake well and allowed to Stand. Observation: Reddish brown coloration (at bottom) [14].

9. **Test for Phenols:**

Plant extract is dissolved in 5 ml of distilled water add 3 ml of 10% lead acetate solution. Observation: A White precipitate is formed

❖ **PREPARATION OF NUTRIENT AGAR MEDIUM:**

Table no-1: Formulation of agar medium.

S.No	Ingredients	Quantity
1	Beef extract	1gm
2	NaCl	0.5gm
3	Peptone	1gm
4	Water	100ml
5	Agar	0.5gm

❖ **EXPERIMENTAL PROCEDURE BY CUP PLATE METHOD:**

- Prepare nutrient media and transfer 20 ml into boiling tube, plug and sterile them
- After cooling inoculate each boiling rube with 0.1ml of test organism (Bacillus subtilis and E,Coli).
- The inoculated agar media is poured into Petri plate and solidified.

- Make holes in the solidified media at the center by using sterile borer. Add 0.1ml of prepared solution into the holes.

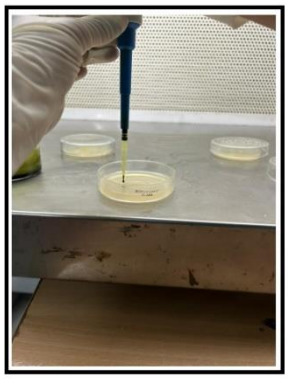

Fig-4: Introducing plant extract into the well

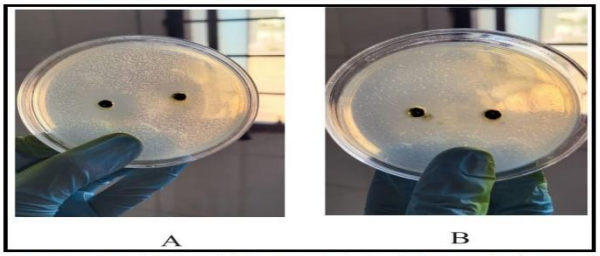

Fig-5: A-Anti-Microbial growth in bacillus petri plate and B- Anti-Microbial growth in E.Coli petri plate

- Incubate the Petri plate at 37°C for 48hrs

RESULTS:

➢ **Phyto-Chemical Screening Results:**

Table no-2: Results of phytochemical tests

S.NO	EVALUATION TEST	DRY LEAVES EXTRACT	FRESH LEAVES EXTRACT
1	Test for Glycosides	-	-
2	Test for Steroids	-	-
3	Test for Tannins	-	+
4	Test for Alkaloids	-	+
5	Test for Saponins	+	+
6	Test for Quinones	-	+
7	Test for Protein	-	-
8	Test for Terpenoids	-	+
9	Test for Phenols	-	+

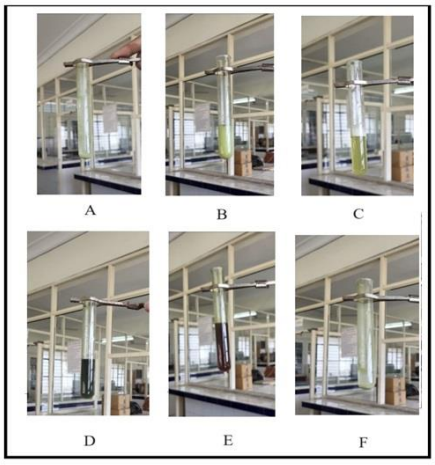

Fig-6: A-Tannins, B-Alkaloids, C-Saponins, D-Quinones, E-Terpenoids and F-Phenols

Fig-7: Saponins

Table no-3: Zone of inhibition of Fresh Leaves extract of *Murraya koenigii* L Against *E. Coli* and *Bacillus subtilis*

CONCENTRATIONS(µg/ml)	ZONE OF INHIBITION IN *E. coli*		ZONE OF INHIBITION IN *Bacillus subtilis*	
	cm	mm	cm	mm
10	1.0	10	1.1	11
20	1.1	11	1.2	12
30	1.2	12	1.3	13
40	1.3	13	1.4	14
50	1.4	14	1..5	15

Table no-4: Zone of inhibition of Dry leaves extract of *Murraya koenigii L* against *E.coli* and *Bacillus subtilis*

CONCENTRATIONS(µg/ml)	ZONE OF INHIBITION IN *E. coli*		ZONE OF INHIBITION IN *Bacillus subtilis*	
	cm	mm	cm	mm
10	0.5	5	0.9	9
20	0.8	8	11	11
30	1.0	10	1.5	15
40	1.1	11	1.8	18
50	1.6	16	2	20

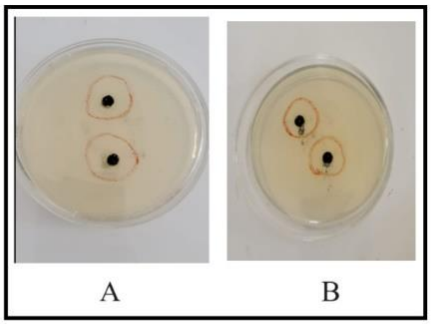

Fig no-8: A: Zone of inhibition in Bacillus subtilis in fresh leaves of *Murraya koenigii* L

B: Zone of inhibition in E. coli in fresh leaves of *Murraya koenigii* L

CONCLUSION:

Ethnobotanical and traditional applications of natural substances, particularly those derived from plants, have drawn a lot of interest lately as they have undergone extensive testing to determine their efficiency and are usually regarded as safe for human usage. A thorough examination of *Murraya koenigii* L. revealed that it is a widely used medication.

The outcome leads to the conclusion that a large number of active phytochemicals are present in the ethanolic extract of the leaves of particular plants. As a result, these plants' extract can be utilised to make medication. *Murraya koenigii* L. leaf organic extracts have been tested for pharmacological activity and shown to have antimicrobial and antibacterial capabilities in addition to many other beneficial medicinal qualities. These extracts demonstrate the highest zone of inhibition against Bacillus subtilis and E. coli. Discovering the result of *Murraya koenigii* L. high antibacterial properties on both fresh and dried leaves is remarkable.

REFERENCES:

1. Chakraborty DP, Barman BK, Bose PK. On the constitution of murrayanine, a carbazole derivative isolated from Murraya koenigii Spreng. Tetrahedron 1965; 21: 681–685

2. Kaloni, D., Chakraborty, D., Tiwari, A., & Biswas, S. (2020). In silico studies on the phytochemical components of Murraya koenigii targeting TNF-α in rheumatoid arthritis. Journal of Herbal Medicine, 100396.

3. Baş, D., & Boyacı, İ. H. (2007). Modeling and optimization I: Usability of response surface methodology. Journal of Food Engineering, 78(3), 836–845.

4. Birari R, Javia V, Bhutani KK. Antiobesity and lipid lowering effects of Murraya koenigii (L.) Spreng leaves extracts and mahanimbine on high fat diet induced obese rats. Fitoterapia 2010; 81: 1129–1133

5. Khan BA, Abraham A, Leelamma S. Role of Murraya koenigii (curry leaf) and Brassica juncea (Mustard) in lipid peroxidation. Indian J Physiol Pharmacol. 1996; 40: 155–158

6. Ningappa MB, Dinesha R, Srinivas L. Antioxidant and free radical scavenging activities of polyphenol-enriched curry leaf (Murraya koenigii L.) extracts. Food Chem. 2008; 106: 720–728

7. Mahipal, P., & Pawar, R. S. (2017). Nephroprotective effect of Murraya koenigii on cyclophosphamide induced nephrotoxicity in rats. Asian Pacific Journal of Tropical Medicine, 10(8), 808–812.

8. Molla, S. H., & Bandyopadhyay, P. K. (2014). In vitro and in vivo anthelmintic activity of Murraya koenigii against gastro-intestinal nematodes of sheep. Journal of Parasitic Diseases, 40(2), 362–368.

9. Desai, S. N., Patel, D. K., Devkar, R. V., Patel, P. V., & Ramachandran, A. V. (2012). Hepatoprotective potential of polyphenol rich extract of Murraya koenigii L.: An in vivo study. Food and Chemical Toxicology, 50(2), 310–314.

10. Sharma, P., Vidyasagar, G., Bhandari, A., Singh, S., Bhadoriya, U., Ghule, S., & Dubey, N. (2012). A pharmacological evaluation of antidiarrhoeal activity of leaves extract of Murraya koenigii in experimentally induced diarrhoea in rats. Asian Pacific Journal of Tropical Disease, 2(3), 230–233.

11. Jain, Manshu, et al. "Curry leaf (Murraya koenigii): A spice with medicinal property." MOJ Biol Med 2.3 (2017): 236-256.

12. López-Bascón, M. A., & Luque de Castro, M. D. (2020). Soxhlet Extraction. Liquid-Phase Extraction, 327–354.

13. Argal, Mohar Singh, et al. "The efficacy of Murraya koenigii leaf extract on some bacterial and a fungal strain by disc diffusion method." Journal of Chemical and Pharmaceutical Research 3.5 (2011): 697-704.

14. Bhagat, Swapnil D., et al. "PRELIMINARY PHYTOCHEMICAL ANALYSIS OF LEAVES OF THE PLANT MURRAYA KOENIGII FOUND IN LOCAL AREA OF KARANJA (LAD)." Sustainable Development (2022): 28.