

Therapeutic Uses, Pharmacognostic and Pharmacological Review on Memecylon Umbellatum

Rajaahmad Nadaf^{1*}, U Rajashekhar²

Department of Pharmacology, Karnataka College of Pharmacy, Karnataka, Bangalore, India-560064

M. Pharm Department of Pharmacology Karnataka College of pharmacy, Bangalore, India

#33/2, Thirumenahalli, Hegdenagar main road, Jakkur post Yelahanka Hobli, Bangalore-560064

Submitted: 01-05-2022

Accepted: 09-05-2022

ABSTRACT

MEMECYLON UMBELLATUM (family;melastomataceae) has traditionally been used to treat a wide range of diseases including cardiovascular, pulmonary, and urinary tract infections. It contains bioactive substances such as flavonoids, gum, oil, and resins, as well as protein phenols. Its leaf has anti-inflammatory, anti-viral, anticancer, and anti-diabetes effects. Additionally, pharmacological properties such as antioxidant radical scavenging, antibacterial, myocardial ischemia, fibromyalgia, HIV, psoriasis, rheumatoid arthritis, anti-mutagen, and anti-carcinogen have recently been recognized.

Materials and methods:All accessible memecylon umbellatum material was gathered from scholarly publications, Google Scholar, PubMed, Science Direct, Library, and Wikipedia.

Results: More than 300 species of melastomataceae have been reported worldwide. Fresh plant material, crude extracts, and isolated chemicals of memecylon umbellatum have exhibited extensive pharmacological activity.

Conclusion:MEMECYLON UMBELLATUM is an excellent source of traditional medicine for the treatment of a variety of diseases including viral, scavenging, bacterial, cancer, diabetes, rheumatoid arthritis, psoriasis, and allergies. Its pharmaceutical research of novel medications and potential therapeutic applications.

Keywords:melastomataceae, Pharmacognostic, Pharmacological and Bioactive Compounds

illnesses. It is mostly grown in Tamil Nadu and requires a temperature range of 21.0°C to 37°C. It is a member of 35 families and has therapeutic properties. Euphorbiaceae, Lamiaceae, and Mimosaceae are the most often represented families.^[1]

According to WHO (2001), medicinal plants are used by 80 percent of the world's population for basic health care. Only approximately 0.5 percent of the 3,50,000 plant species discovered so far are utilized for medicinal reasons, and only about 35,000 (some estimate up to 70,000) have been studied for their phytochemical and pharmacological potential (Hostettmann and Marston, 2002). As a result, this green inheritance provides a vast pool of potential lead chemicals for many illnesses. Plants are key sources of medications, with bioactive chemicals generated from or modelled after plant natural products accounting for at least 25% of prescriptions in the United States and Canada (Farnsworth, 1984).

Medicinal plants would be a perfect source for a variety of medications, thus further research into their properties, safety, and efficacy is needed (Nascimento et al 2000). Medicinal plants provide the majority of antimicrobial drugs (Sofowora, 1986). The genus Memecylon L. (family: Melastomataceae) has over 300 species, including 30 species from India (Santapau and Henry, 1974; Henry et al., 1989) and 16 species from Tamil Nadu state (Nair and Henry, 1983).^[2]

I. INTRODUCTION

The genus Memecylon umbellatum (melastomataceae) is one of the largest angiosperm genera, having over 300 species worldwide and 30 species documented in India. It is also known as a wood tree. This plant's leaves and bushes are commonly used to treat fever, eye infections, bruising, inflammation, gonorrhoea, leucorrhoea, liver damage, cancer, arthritis, ulcer, and other viral



Figure 01: Memecylon umbellatum

Table 01: Taxonomical classification

Plant name	Memecylon
Division	Tracheophytes
Class	Magnoliopsida
Subclass	Rosids
Order	myrtales
Family	melastomataceae
Genus	memecylon
Species	M.umbellatum

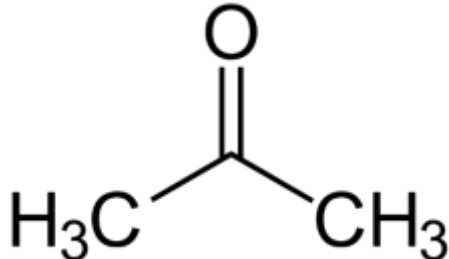
Table 02: Vernacular Name

Language	Vernacular Name
English	Iron wood
kannada	Ollayakudi
Hindi	anjan
Tamil	kaya

GENERAL DESCRIPTION

M umbellatum, often known as "Anjani," is a shrub that may grow to be 8-14m tall and is

Table 03: The structures of some of the important bioactive constituents

NAME	STRUCTURE
ketone	

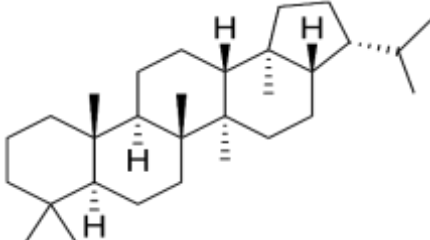
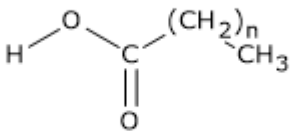
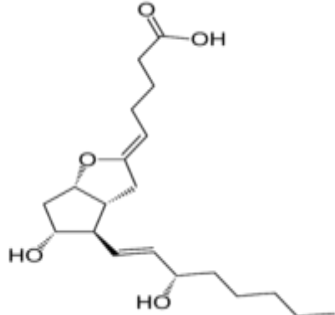
widely dispersed in the Western Ghats and the Andaman Islands. Between the Western Ghats and the Andaman and Nicobar Islands. Orissa, Assam, Sylhet, Tenasserim, Ceylon, Malay, and Archipelago have also recorded sightings of the tree. The plant is particularly prized for its edible fruit, and it is increasingly being planted for this reason. Its fruits, which contain umbellactone, amyryne, oleanolic acid, ursolic acid, sitosterol, and organic acid compounds, were used to cure leucorrhea, gonorrhoea, and eye problems. The trees' beautiful blue blossoms enchant once or twice a year. It supplies durable wood for the construction of buildings and watercraft. For bruising, a yellow dye derived from the leaves and bark is employed.^[4]

Leaves 2.5-51.5-3cm, ovate-oblong, cuneate base, obtuse to rounded apex, drying pale green; petiole 5mm long umbels compact 1.5-3cm broad, 2-3mm wide calyx, blue petals, blue filament, 1.5mm long anthers, blue style Berry 7mm wide, globose, bright green at first; mature fruit blue black.^[5]

BIOACTIVE CONSTITUENTS

The leaves include umbellatone (4-hydroxy methyl-3-methyl but-2-ene-4,1-oxide) β - amyryn, sitosterol, glucoside, oleanolic and ursolic acid, tartaric acid, and malic acid (1.38 percent), resin (6 percent), and calcium oxalate (1.44 percent).^[7]

The M. umbellatum extract was subjected to qualitative phytochemical analysis to determine the presence of alkaloids (Mayer's, Wagner's, and Dragendorff's reagents), flavonoids (Shinoda alkaline reagent), phenolic compounds (lead acetate, alkaline reagent test), triterpenes (Lieberman Burchard test), saponins (foam test), and tannins (gelatin). The outcomes of these tests were qualitatively reported as positive (+) or negative (-).^[8]

triterpenes	
Fatty acid	
lipid	

BIOACTIVITIES OF Memecylon umbellatum And Potential Use In Pharmacology

The leaves of *M.umbellatum* have a variety of pharmacological properties, including anti-amphetamine, anti-viral, spasmolytic, antidiabetic, analgesic, anti-microbial, wound healing, and anticancer action. Anjani, or memecylon umbellatum, has been claimed to have numerous qualities for the treatment of a variety of ailments.^[8]

Statistical analysis and DPPH tests were performed to investigate the hypoglycaemic activity of Memecylon umbellatum leaves in normal and alloxan diabetic mice.^[9]

Phenol and flavonoid content of memecylon umbellatum, in vitro antioxidant properties, in vitro antioxidant properties DPPH assays were performed to investigate the antioxidant property of Memecylon umbellatum leaves, and bioactive components were discovered using the Folin – Ciocalteu technique.^[10]

Endophytic Fungi Diversity and Antibacterial activity in Memecylon umbellatum Burm The antibacterial activity of memecylon umbellatum leaves was determined utilizing phylogenetic studies and statistical analyses.^[11]

Table 04: Scientific Work and Pharmacognostic Approaches of *M. umbellatum*

PHARMACOLOGICAL ACTIVITY	PART OF PLANT USED	PROCESS OF EXTRACTION	IMPRESSION
--------------------------	--------------------	-----------------------	------------

<p>Anti-inflammatory properties</p>	<p>leaves</p>	<p>methanolic Extraction</p>	<p>The MTT test revealed that it had very little cytotoxicity in C2C12 cells. In addition, as reported in the literature, TNF- produced a substantial increase in IL-6 gene expression levels in the positive control group compared to the control (p0.01). In contrast to the positive control group, the reference standard Indomethacin (p0.001) and methanolic leaf extract of M.umbellatum (p.0.01 for 250 g/ml, p.0.001) demonstrated substantial suppression of TNF-induced elevation of IL-6 gene expressions.^[12]</p>
<p>Antioxidant Properties</p>	<p>Root</p>	<p>methanolic Extraction</p>	<p>The effect of various extracts of Memecylonumbellatum root on antioxidant activity is revealed in this study. In this experiment, it was shown that acetone extract had significantly higher antioxidant activity(p0.05) than conventional ascorbic acid, with an IC50 value of 10.440.0846 g/ml. This plant may become the primary source of antioxidant dietary supplements in the future, thus further research is needed to identify the active ingredients responsible for antioxidant action^[13]</p>

Anti-Genotoxic Action	leaves	ethanolic Extraction	Mutagenicity testing is now widely accepted as an important aspect of determining a drug's genetic toxicity. This fascinating concept of using nuclear abnormalities in bone marrow smears as a quick way to assess the carcinogenic potential of medications or chemicals has given others in the field of mutagenesis a boost. ^[14]
Anti-diabetic and anti-obesity studies	Leaves	Methanolic Extraction	The current investigation is absolutely safe and harmless because all of the mice survived. Furthermore, the extract's mechanism of action must be examined by refining the extract and studying the active component that plays a vital role as an oral medicine for the treatment of the pandemic of type 2 diabetes. ^[15]

Antimicrobial medications (Sofowora, 1986) Eye problems, gonorrhoea, leucorrhoea, and wounds (Anonymous, 1998; Dhar et al., 1968; Puratchikodi and Nagalakshmi, 2007), treatment of bone fractures, herpes (Rajkumar and Shivanna, 2009), diabetes (Grover et al., 2002; Ayyanar et al., 2008; Akanksha and Maurya, 2009).^[16]

For quality control, macroscopic and microscopic evaluation, as well as chemical profiling of herbal materials, have been used. The total ash value, acid soluble, and water soluble ash values are used to determine the purity of crude medicines. The determination of moisture content aids in the prevention of product deterioration. Chemical ingredients found in crude medications are approximated using extractive values.

II. DISCUSSION

Some kinds of extremely reactive activated oxygen, also known as reactive oxygen species, include free radicals such as superoxide anion, hydroxyl radicals, and non-free radicals such as hydrogen peroxide (ROS). These free radicals

are responsible for a number of harmful metabolic events, including protein oxidation, lipid peroxidation, oxidative DNA damage, and so on, all of which lead to cellular damage and death. Secondary metabolites such as phenols, flavonoids, terpenoids, steroids, tannins, saponins, and cardiac glycosides are natural antioxidants that protect people and plants. Thus, plants and herbs are now taken into consideration for the use of phytochemicals in the treatment of infectious illnesses and other maladies.^[17]

When the leaf part is employed, it contains a chemical group called ketone (umbellactone), which has pharmacological properties such as antioxidant, radical scavenging, antibacterial, antimutagen, and anticarcinogen action, Triterpenes (Amyrin, ursolic acid) Inflammation, viral infections, cancer, and diabetes can all be treated with pharmaceutical activities. The lipid (Sitosterol) heart disease, cancer, HIV, rheumatoid arthritis, psoriasis, allergies, fatty acids are all treated with pharmaceutical activities (octacosanoic acid, cerotic acid, ethyl palmitate, palmitic acid and butyric acid) Multiple sclerosis, diabetes,

fibromyalgia, and myocardial ischemia are all examples of pharmaceutical action.^[18]

III. CONCLUSION

The current aim was to condemn and collect updated information on a top cited factor of Memecylon umbellatum, including the plant's mechanism-based pharmaceutical venture. These compositions enhance the key potential of Memecylon umbellatum while also focusing on the viable current therapeutic utilization for the advancement of pharmaceutical entities for superior health outcomes in the future.

Conflict Of Interest Statement

We declare that we have no conflict of interest.

IV. ACKNOWLEDGEMENTS

The author is grateful to Department of Pharmacology, Karnataka college of Pharmacy, Bangalore, India for their support.

REFERENCES

- [1]. MV Tamilvannan, S Ravikumar, A Rajalakshmi and T Murugan. Estimation of phenolic and flavonoid content and in vitro antioxidant and antibacterial activity of Memecylon umbellatum Burm. *Journal of Pharmacognosy and Phytochemistry*. 2019;8(2):1434-1439.
- [2]. Subban Murugesan, Annamalai Pannarselvam and Arumugame Chanemougama Tangavelou. Phytochemical screening and antimicrobial activity of the leaves of Memecylon umbellatum burm. *F. Journal of Applied Pharmaceutical Science*. 2011;01(01):42-45.
- [3]. Wikipedia; Memecylonumbellatum. https://en.wikipedia.org/wiki/Memecylon_umbellatum.
- [4]. Suresh G. Killedar, Harinath N. More and Sameer J. Nadaf. *Microscopic Evaluation of Leaves of Memecylon umbellatum Burm.* Hindawi Publishing Corporation. 2014;03(2):1-7.
- [5]. B.R. Ramesh, N. Ayyappan, Pierre Grard, Juliana Prospero, S. Aravajy, Jean Pierre Pascal. Memecylonumbellatum Burmf. India biodiversity portal. <https://indiabiodiversity.org/species/show/15559>.
- [6]. S. Satya1, K. Reeta Vijayarani1, R. Srividhya1, N. Gangatharan, Antimicrobial screening of leaves of Memecylon umbellatum. *Ancient Science of Life*; 2003;23(2):120-122.
- [7]. Kantha D Arunachalam, Sathish Kumar Annamalai and Shanmugasundaram Hari. One-step green synthesis and characterization of leaf extract-mediated biocompatible silver and gold nanoparticles from Memecylon umbellatum. *International Journal of Nanomedicine*. 2013;3(8):1307-1315.
- [8]. Bharathi tr, Sampath kumara kk, Prakash hs. Memecylon species: a review of traditional information and taxonomic description. *International journal of pharmacy and pharmaceutical sciences*. 2016;8(6):0975-1491.
- [9]. T. Amalraj, s. Ignacimuthu. Evaluation of the hypoglycaemic effect of Memecylon umbellatum in normal and alloxan diabetic mice. *Journal of ethnopharmacology*. 1998;62(1998):247-250.
- [10]. Anbukkarasi M, Dhamotharan R. And Janarthanam B. In vitro antioxidant properties, phenol and flavonoid content of memecylon umbellatum. *World Journal of Pharmaceutical Research*. 2017;6(3)815-824.
- [11]. Gagana Suryavamshi L. and M.B. Shivanna. Diversity and antibacterial activity of Endophytic Fungi In Memecylon umbellatum Burm. F.- A Medicinal Plant in the Western Ghats of Karnataka, India. *Indian Journal of Ecology* 2020;47(1): 171-180.
- [12]. Sunil Venkategowda, Nitya Shree, M.V. Venkataranganna, Ramesh R bhonde & Mala Majumdar. Anti-inflammatory activity of Methanolic Extract of Memecylon umbellatum: In vitro and In vivo Experimental Evidences. *Journal of Biologically Active Products from Nature*. 2020;10(3):204-210.
- [13]. Suresh Killedar, Harinath More, Gourav Shah and Suryakant Gaikwad. Phytochemical screening and in-vitro antioxidant activity of memecylon umbellatum root extracts. *World journal of pharmacy and pharmaceutical sciences*. 2013;2(6):5988-5996.
- [14]. Prashanth Shetty, Ullas Prakash D'Souza and Prasanna Shama K. Genotoxic studies of Memecylon umbellatum leaves. *Int. J. Pharm. & Health Sci*. 2010; 1(2):45-49.
- [15]. V. Sunila, Nitya Shreeb, M.V. Venkataranganna, Ramesh R. Bhondeb and



- Mala Majumdar. The anti-diabetic and anti-obesity effect of Memecylon umbellatum extract in high fat diet induced obese mice. *science direct*. 2017;89(2017):880-886.
- [16]. Subban Murugesan, Annamalai Pannerselvam and Arumugame Chanemougame Tangavelou. Phytochemical screening and antimicrobial activity of the leaves of Memecylon umbellatum burm. F. *Journal of Applied Pharmaceutical Science*. 2011;01(01):42-45.
- [17]. MV Tamilvannan, S Ravikumar, A Rajalakshmi and T Murugan. Estimation of phenolic and flavonoid content and in vitro antioxidant and antibacterial activity of Memecylon umbellatum Burm. *Journal of Pharmacognosy and Phytochemistry*. 2019;8(2):1434-1439.
- [18]. Bharathi tr, Sampath kumara kk, Prakash hs. Memecylon species: a review of traditional information and taxonomic description. *International journal of pharmacy and pharmaceutical sciences*. 2016;8(6):0975-1491.