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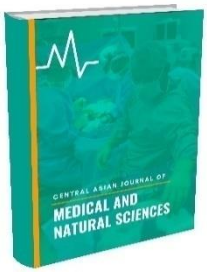

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The Biological and Medical Properties of Myrtus communis Linn - Subject Review

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Abstract: The plant called Myrtus communis that belong to family of Myrtaceae is known as a significant plant being used in System of Unani of Medicine since ancient Greece time. Typically, M. communis is planted for its attractive foliage, the flowers and also the berries. Its berries, foliage and the essential oil are often utilized to various diseases as the ulcer of stomach, diarrhea condition, and the dysentery condition with vomiting, the rheumatism disorders, haemorrhages problems and leucorrhoea. The foliage and the berries are utilized in flavoring. Ripe fruits have historically been used as food additives because of the high vitamin content of this plant. The chemical makeup of M. communis includes tannins, phenols, flavonoids, coumarins, essential oils, different types of fiber, sugars, vitamin C, malic acid, and antioxidants. This paper was showed the pharmacological qualities, chemical composition, and medical applications of the plant.

Key words: M. communis, Biological activities, Medical activities, Phenols.

Introduction

Myrtus communis, commonly known as "Murt" or "Murd" in traditional texts, is one of the most frequently cited Myrtus species [1]. M. communis, also referred to as common myrtle, is a Mediterranean shrub that is indigenous to that area. The plant has branches that form a thickly covered entire head and grows to a height of 2.4 to 3 meters [2]. Asif et al. [3] describe the fruits as tiny and black, with small green leaves. The evergreen leaves measure 2 to 5 cm in length. Because of its astringent qualities, it has a bitter flavor [4-6]. The flowers are extremely fragrant, star-shaped, and white

or pinkish [7]. The round, fruit is highly seeded. Flowers are pollinated by insects, and birds who eat berries distribute seeds. (Figure 1) [8]. Long used as an ethnobotanical remedy, myrtle is also used to cure obesity, hypercholesterolemia, and diabetes [11–12], as well as to treat skin conditions, colds and coughs, digestive issues, and diabetes [9–10]. In perfumery, Essential oils derived from shoots, leaves, and occasionally flowers and fruits are frequently used. The berries are also used to make bitters and well-known liquors. Myrtle has been extensively researched due to its widespread use in folk medicine, particularly in terms of EO content [13-19]. Contributions to the literature on biological activity include research on antioxidant and antibacterial properties [20-27], as well as putative anti-inflammatory and antitumoral actions [21-22]. The leaf EO has an antiparasitic action against Leishmania tropica strains, as Mahmoudvand et al. [28] have found. Recent studies have found that the fruit's high phospholipid, polyunsaturated fatty acid, and phenolic content accounts for its effectiveness in treating ulcerative colitis, esophagitis, diarrhea, and digestive illnesses [29]. However, the chemical makeup of plant species' extracts, which varies greatly depending on a variety of variables including growing region, season, and cultivar [30], as well as the surrounding conditions, plant phenological phases, and genotypes [31], strongly influences the biological activities of plant species. The same species, which is represented by a diversity of morphs and genotypes, is capable of producing a range of extracts with different compositions and therapeutic effects depending on these characteristics.

Kingdom Plantae – Plants

Division Magnoliophyta

Class Magnoliopsida – Dicotyledons

Subclass Rosidae

Order Myrtales

Family Myrtaceae

Genus Myrtus

Species Myrtus communis L.

Phytochemical constituents

The plant contains fibers, carbohydrates, antioxidants, and a variety of biologically active chemicals [32-33]. The main phytochemicals present in fruits include anthocyanins, flavonoids, and phenolic compounds. Fixed oil comprises about 12–15% of the fat in seeds and is composed of glycerides comprising oleic acid, the myristic acid, palmitic, and lauric acids [34]. According to fatty acid assays [35], the myrtle fruit contains 14 fatty acids, with oleic acid being the most frequent, followed by palmitic acid and stearic acid. The essential oil of M. communis, known as myrtle oil, is obtained by steam distilling the plant's leaves, the fruits, and flowers. Its color is golden or greenish yellow, and it smells distinctly reviving. The yield and quality of oil are determined by the region of production, the harvest season, and the length of distillation. variable sections of the plant have variable oil yields (w/w). The yields of the hydro-distilled oils were as follows: 0.4–0.5 for leaves, 0.4 for flowers, 0.5 for unripe fruits, and 0.02% for ripe fruits. Terpenes and terpene alcohols make for over 80% of the volatile

substances present in essential oils [36]. There are different concentrations of the five terpenoid compounds in leaf oil, fruits, and flowers [37].

Figure (1): branches and fruit of M. communis

Pharmacological activities

Anti-bacterial effect

The therapeutic benefits of Berberis vulgaris 5% (in metronidazole basis) and Myrtus communis L 2% (in metronidazole base) vaginal gels on bacterial vaginosis were evaluated and compared to metronidazole vaginal gel 0.75%. The study's findings suggest that combining Myrtus communis and metronidazole improves the efficacy of bacterial vaginosis treatment [38]. Pinene, 1, 8 cineole, and limonene are the most significant contributors to the antimicrobial properties of M. communis essential oil, according to research on the antimicrobial efficacy of the samples against three microbial strains. Our findings are supported by other research that has discovered that plant essential oils rich in these compounds have strong antibacterial action [39]. Sodium hypochlorite (NaOCl) and chlorhexidine were compared to this plant's antibacterial activity against E. faecalis, S. aureus, and C. albicans. With a minimum inhibitory concentration in the range of 0.032-32 g/mL, M. Communis essential oil was a powerful antibacterial agent against persistent endodontic germs [40].

Antifungal activity

At a dosage of 1600 ppm in vitro, essential oils from the base plant had an inhibitory action against the R. Solani fungus of up to 60%. In a study using the broth microdilution method, Investigations were made into the essential oils from the base plant's ability to suppress the Aspergillus fungus. The researchers reported an effective impact against Aspergillus fungi [41]. Amaranthus retroflexus, Cirsiumarvense, Lactucaserriola and Rumexcrispus seeds were examined for the oils' herbicidal effects on seed germination and seedling growth. The oils prevented plant seed germination and seedling growth

completely or partially. According to the findings of this study, M. communis essential oils could be employed as natural fungicides and herbicides [42].

Antioxidant Activity

Various studies on the antioxidant properties of Myrtus communis extracts have also been conducted. According to Serce et al., [43], methanolic extracts of eight Turkish myrtle fruit accessions displayed variable degrees of capacity to scavenge DPPH free radicals and inhibit linoleic acid oxidation as measured by the -carotene-bleaching test. The IC50 values found in the DPPH assay varied from 2.34 g/mL, which was not statistically different from the reference -tocopherol, to 8.24 g/mL. The inhibition percentages for inhibiting linoleic acid oxidation were consistently above 80% but less than the 96.31% registered for the reference substance (-tocopherol). Polat et al. [44] investigated how extracting solvents affected the total phenolic content, antioxidant activity, and antiradical action of myrtle extracts collected in different locations of Turkey. [45] examined the antioxidant activity of extracts from white and dark blue Tunisian berries. Tuberoso et al. [46] conducted a first-ever evaluation of the antioxidant activity of myrtle berry extracts made with different polarity solvents. The researchers evaluated the extracts' capacity to neutralize DPPH free radicals and protect biological molecules using cholesterol and LDL (low density lipoproteins) oxidation assays.

Cardiovascular activity

The aqueous leaf extract produced a bad inotropic impact on guinea pigs that wasn't stopped by atropine. The entire extract had a concentration-dependent depressive effect in anesthetized rabbits that was inhibited by theophylline but not attenuated by propranolol, cimetidine, or atropine. These results support the discovery by Al-Zohyri et al. of an adenosine-like molecule in this extract [47].

Hepatoprotective activity

It was investigated whether the aqueous extract of M. Communis leaves might shield albino rat livers from the toxicity paracetamol caused. A series of biochemical measurements, including alanine transaminase, aspartate transaminase and phosphatase, total protein, and bilirubin level in the blood (both total and direct), were used to determine the extent of liver protection provided by the aqueous extract of M. Communis leaves. The liver's protective effects were seen at doses of 200 mg/kg and 400 mg/kg of body weight because the extract significantly decreased the amount of enzymes at these concentrations [48].

The effect on the peptic ulcers

H. pylori infection plays sgnificant role in pathogenesis of gastritis, such as disease called peptic ulcer and the stomach cancer [49-50]. Different studies and researches have been done to determine the protective impact of M. communis versus gastric ulcers disease [51]. Rats were given the aqueous extract prior to exposure to ulcerogenic drugs in order to determine the protective effect of myrtle on stomach ulcer versus pyloric ligation-induced models. Aqueous extract treatment considerably lowers the ulcer index. In comparison to omeprazole, the aqueous extract's action is more pronounced at low doses. When

indomethacin, which produces ulcers, was administered to rats' stomachs, histopathological analysis revealed significant anti-ulcer effects at both dose levels [52].

Antidiabetic effects

In mice with diabetes brought on by streptozotocin, M. communis leaves were found to have an anti-diabetic effect. Recently, it was discovered that the ace plant's phenolic chemicals were in charge of this activity. M. Communis leaves were used to extract phenols, which had an anti-diabetic activity [53]. The usefulness of M. Communis in treating diabetic rats did not show any promising results. The outcomes also revealed that ace plant phenols had a considerable anti-diabetic influence when supplied 800 mg/kg body weight and a mild reaction as an anti-diabetic at a dose of 400 mg/kg in rats without diabetes. These effects were demonstrated by regeneration alterations in the cells of the pancreatic island. According to the study, the absence of tissue abnormalities in control mice without diabetes' liver and kidneys revealed that phenolic compounds alone have no adverse impact on physiological tissues [53].

Insecticidal activity

Essential oils from M. Communis leaves and flowers were found to have fatal and poisonous effects on mosquito larvae Culex pipiens when used as insecticides [54]. Essential oil were exhibit insecticide impact versus 3 stored insects, adults of Mediterranean flour moth, Indian meal moth and A. getectus Say bean [55]. Essential oils in the ace plant have been shown to be effective as an insecticide against P. humanis capitis. The efficacy as an insecticide may be due to Lineol, α-pinene and the linalool [56].

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