



RESEARCH ARTICLE

## Phytochemical and Bioactivities of *Myrtus communis*: A Review

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### ABSTRACT

*Myrtus communis* L. plant is from Myrtaceae family and it is known as True Myrtle. *M. communis* extracts and essential oil are important in drug development with some pharmacological activities in the Middle East. For a long time *M. communis* has been used in traditional medicines for the treatment of lung disorders and as an antiseptic, anti-inflammatory, mucolytic, carminative and astringent remedy. It has recently antioxidant, analgesic, antibacterial and antifungal activities and larvicide, insecticide and repellency effects. Myrtucommulone A & B and semi-myrtucommulone are oligomeric, nonprenylatedacylphloroglucinols which are reported from leaves of myrtle.  $\alpha$ -pinene, 1,8-cineol, limonene and linalool were identified as the major constituents in *M. communis* essential oil.

**Keywords:** *Myrtus communis*, Chemical compounds, Plants, Bioactivities.

## INTRODUCTION

Myrtaceae family includes 100 genera and 3000 species. *Myrtus* genus belongs to this family of evergreen shrubs or small trees, which grow up to 5-m tall spontaneously. It is native to Southern Europe, North Africa and Western Asia and also distributed in South America, North western Himalaya and Australia (Romani et al, 1999). Myrtle (*Myrtus communis* L.) is an aromatic evergreen perennial shrub or small tree belonging to the Myrtaceae growing in temperate, tropical and subtropical regions (Romani et al, 1999). The plant is 2.4–3m high and branches forming a close full head, thickly covered with leaves (Sumbul, 2011). Leaves are small and green and fruits are small and dark. The evergreen leaves are 2–5 cm long and aromatic after crushing such as in the case of myrrh or eucalyptus. The taste of it is bitter and intensive (Özkan & Güray, 2009) which is mainly due to its astringency. Flowers are star-like, white or pinkish and very fragrant. The round blue-black berry fruit contains several seeds. The pollination is done by insects, and the seeds are dispersed by birds that eat the berries (Satyavati et al, 1976). The seeds are dispersed by birds that eat the berries. It is a traditional medicinal plant for the Tuareg people. Several botanists do not consider *Myrtus nivellei* sufficiently distinct to be treated as a separate species. It is listed as an endangered species (Ebrahimabadi et al, 2016).

*Myrtus communis*, the Common Myrtle, is widely cultivated as an ornamental plant for use as a shrub in gardens and parks (Jabri et al, 2016). It is often used as a hedge plant, with its small leaves shearing cleanly. When trimmed less frequently, it has numerous flowers in late summer. It requires a long hot summer to produce its flowers (Acosta-Motos et al, 2016). It is traditionally used as an antiseptic, disinfectant drug and hypoglycaemic agent (Elfellah et al, 1984). Different parts of the plant have been used in the food industry, as flavouring meat and sauces, and the cosmetic industry (Chalchat et al, 1998). The present review attempts to give an overview on the phytochemical, pharmacological effects of this plant.

## Chemical Compounds

*M. communis* contained 1, 8-Cineole (28.62%),  $\alpha$ -Pinene (17.8%), Linalool (17.55%), and Geranylacetate (6.3%) as the major compounds and Geraniol (1.6%),  $\alpha$ -Humulene (1.5%), eugenol (1.3%), isobutyl-isobutyrate (0.8%), and methyl chavicol (0.5%) as minor components (Nabavizadeh, et al, 2014). Polyphenolic composition of the the plant was characterized by high concentrations of flavonol glycosides, flavonols and flavanols. The major fatty acids of the plant were reported as linoleic, palmitic, oleic and stearic acids (Barboni et al, 2010). The plant was also

reported to contain tannin, resins, citric, malic and caffeic acids, sugar, anthocyanin arabinosides, anthocyanin glucosides, kaempferol, quercetin, myricetin 3-o-glucoside, myricetin 3, 3-di-o-galactoside amongst others (Akin et al, 2012). Mersin myrtle fruits contained crude protein, tartaric, malic and citric acids, and they were rich in minerals including Ca, K, Mg and Na (Haciseferoğulları et al, 2012).

## BIOACTIVITIES

### Anti-bacterial effect

The therapeutic effects of *Myrtus communis* L 2% (in metronidazole base) with only metronidazole vaginal gel 0.75% on bacterial vaginosis was compared. Findings of the study showed that treatment with a combination of *Myrtus communis* L or *Berberis vulgaris* in metronidazole base improve the efficacy of bacterial vaginosis therapy (Masoudi et al, 2014).

### Anti-oxidant, and anti-tumor properties

An endophytic strain of *Neofusicoccuma australe* recovered from a myrtle branch was selected based on the bioactivity of its culture extracts, and found to produce myrtucommulones A and D. The availability of a microbial strain to be cultured in vitro may provide access to more substantial amounts of these products for further investigations in view of their possible pharmaceutical use (Nicoletti et al, 2014).

### Repellency effect

Repellency effect of this plant was examined and it was demonstrated that Essential oil of *Myrtus communis* have repellency effect, even with 10% concentration of essential oil (Kayedi et al, 2014).

### Antifungal, anti-biofilm and adhesion activity

The adhesion activity, the biofilm formation and the action of the *Myrtus communis* L was evaluated. The antimycotic activity of the EO towards the three species was also evaluated, and the results were compared with the minimum inhibitory concentration of six antimycotics. The activity of the EO against *C. albicans* and *C. parapsilosis* was better than that obtained against *C. tropicalis*; moreover, the strains used in the assay were adhesive and biofilm producer, and the effect of myrtle EO on the biofilm formation yielded encouraging results (Cannas et al, 2014).

### Antileishmanial and cytotoxic effects

The antileishmanial effects of the essential oil and methanolic extract of *Myrtus communis* against *Leishmania tropica* on an in vitro model was evaluated. Essential oil indicated a more cytotoxic effect as compared with the methanolic extract of *M. communis*. The findings of the present study demonstrated that *M. communis* might be a natural source for production of a new leishmanicidal agent

### Antifungal and Herbicidal Effects

The herbicidal effects of the oils on the seed germination and seedling growth of *Amaranthus retroflexus* L., *Chenopodium album* L., *Cirsium arvense* (L.) Scop., *Lactuca serriola* L., and *Rumex crispus* L. were also determined. The oils completely or partly inhibited the seed germinations and seedling growths of the plants. The findings of the present study suggest that the *M. communis* essential oils might have potential to be used as natural herbicides as well as fungicides.

### Anti-inflammatory effect

Several studies have indicated the anti-inflammatory properties of the essential oil of *M. communis* in animal models (Rossi et al, 2009; Amira et al, 2012). The anti-inflammatory effect of aqueous and ethanolic extracts of the aerial parts of *M. communis* L. using xylene-induced ear oedema and cotton pellet tests. The extracts showed significant activity against acute inflammation that was dose dependent for the aqueous extract. The ethanolic (0.05 g/kg) and aqueous extracts (0.005, 0.015 and 0.03 g/kg) proved anti-inflammatory effects against chronic inflammation. The extract effectively and significantly reduced cotton pellet-induced granuloma. Therefore, this activity may have occurred through the proliferative phase of the inflammation. Furthermore, topical use of the essential oil of *M. communis* is reported to cause a significant decrease in the ear oedema and cotton pellet-induced granuloma (Maxia et al, 2011).

### Cardiovascular effect

The aqueous leaf extract of *M. communis* showed a negative inotropic effect on isolated guinea pig atria; this effect was not reversed by atropine. Besides, the to-

tal extract induced concentration-dependent depressive effect in anaesthetized rabbit which was not attenuated by propranolol, cimetidine and atropine but blocked by theophylline. These effects could be due to the presence of an adenosine-like compound in this extract as studied by Al-Jeboory (Al-Jeboory et al, 1985).

### Effects on impotence

*M. communis* is used traditionally as a treatment of sexual impotence, a study was performed to evaluate the effect of the hydroalcoholic extract of the leaves on pituitary-gonad axis in adult male rats. In the study, doses of 0.75, 1.5 and 3mg leaf extract/kg body weight were administered orally. The analysis of the concentrations of FSH, LH and testosterone by radio immunoassay indicated that administration of *M. communis* at 1.5 and 3mg/kg doses led to a significant increase in the level of testosterone ( $p < 0.05$ ), whereas no significant difference was observed in the concentration of LH or FSH hormones. The mechanism of action by which *M. communis* leaf extract causes an increase in testosterone hormone level is not yet clear but it could be related to the presence of compounds such as flavonoid, ascorbic acid and myricetin (inhibition of aromatase activity), linoleic, oleic and palmitic acids (inhibition of 5- $\alpha$  reductase activity). 1,8-Cineole and delta-cadinene (the cytochrome-P450 Inducer) could also be involved in the activity described (Shariati et al., 2010).

### CONCLUSION

*M. communis* has many pharmacological functions including anti-inflammatory, analgesic, antidiabetic, antibacterial, antifungal and antioxidant activities, among others. As the current information shows, it is also possible that monoterpenoids from the essential oil and nonprenylated acyl phloroglucinols isolated from the leaves might be useful in the development of new drugs to treat various diseases.

### REFERENCES

- Acosta-Motos JR, Ortuno MF, Alvarez S, Lopez-Climent MF, Gomez-Cadenas A, Sanchez-Blanco MJ. (2016). Changes in growth, physiological parameters and the hormonal status of *Myrtus communis* L. *Plant Physiol*. 191:12-21. <https://doi.org/10.1016/j.jplph.2015.11.010>
- Akin M, Aktumsek A, Nostro A. (2012). Antibacterial activity and composition of the essential oils of *Eucalyptus camaldulensis* Dehn. and *Myrtus communis* L. growing in Northern Cyprus. *Afr J Biotechnol* 9: 531-535.
- Al-Jeboory A, Abdul L, Jawad M. (1985). Cardiovascular and antimicrobial effects of *Myrtus communis*. *Indian J Pharmacol* 17:233-235.
- Amira S, Dade M, Schinella G, Rios J-L. (2012). Anti-inflammatory, antioxidant and apoptotic activities of four plant species used in folk medicine in the Mediterranean basin. *Pak J Pharm Sci* 25:65-72.
- Barboni T, Venturini N, Paolini J, Desjobert J-M, Chiaramonti N, Costa J. (2010). Characterisation of volatiles and polyphenols for quality assessment of alcoholic beverages prepared from Corsican *Myrtus communis* berries. *Food Chem* 122: 1304-1312. <https://doi.org/10.1016/j.foodchem.2010.03.087>
- Cannas S, Mollicotti P, Usai D, Maxia A, Zanetti S. (2014). *Nat Prod Res.*;28(23):2173-7.

Chalchat J, Garry R P and Michet A, (1998). Essential oils of myrtle of the mediterranean littoral, J Essent Oil Res, 10, 613-617. <https://doi.org/10.1080/10412905.1998.9700988>

Ebrahimabadi EH, Ghoreishi SM, Masoum S, Ebrahimabadi AHJ(2016). Chromatogr B Analyt Technol Biomed Life Sci. 2016;1008:50-7.

Elfellah M S, Akhter M H and Khan M T, (1984). Antihyperglycaemic effect of an extract of *Myrtus communis* in streptozotocin-induced diabetes in mice, J Ethnopharmacol, 11, 275-281. [https://doi.org/10.1016/0378-8741\(84\)90073-4](https://doi.org/10.1016/0378-8741(84)90073-4)

Haciseferoğulları H, Özcan MM, Arslan D, Ünver A. (2012). Biochemical compositional and technological characterizations of black and white myrtle (*Myrtus communis* L.) fruits. J Food Sci Technol 49:82-88. <https://doi.org/10.1007/s13197-011-0253-z>

Jabri MA, Tounsi H, Rtibi K, Marzouki L, Sakly M, Sebai H (2016). Pharm Biol.:1-11.

Kayed MH, Haghdooost AA, Salehnia A, Khamisabadi K J (2014). Arthropod Borne Dis.,8(1):60-8.

Masoudi M, Miraj S, Rafieian-Kopaei M.J (2016). Clin Diagn Res.,10(3):Qc04-7.

Maxia A, Frau M, Falconieri D, Karchuli M, Kasture S. (2011). Essential oil of *Myrtus communis* inhibits inflammation in rats by reducing serum IL-6 and TNF-alpha. Nat Prod Commun 6:1545-1548. <https://doi.org/10.1177/1934578x1100601034>

Nabavizadeh M, Abbaszadegan A, Gholami A, Sheikhi R, Shokouhi M, Shams MS, et al. (2014). J Conserv Dent.,17(5):449-53. <https://doi.org/10.4103/0972-0707.139836>

Nicoletti R, Ferranti P, Caira S, Misso G, Castellano M, Di Lorenzo G, et al. (2014). World J Microbiol Biotechnol.,30(3):1047-52.

Özkan AMG, Güray ÇG. (2009). A Mediterranean: *Myrtus communis* L.(Myrtle). In Plants and Culture: Seeds of the Cultural Heritage of Europe, Morel J-P, Mercuri AM (eds.).Edipuglia: Bari; 159-168.

Romani A, Pinelli P, Mulinacci N, Vincieri FF, Tattini M. (1999). Identification and quantification of polyphenols in leaves of *Myrtus communis*. Chromatographia. 49(2):17-20. <https://doi.org/10.1007/bf02467181>

Rossi A, Di Paola R, Mazzone E. (2009). Myrtucommulone from *Myrtus communis* exhibits potent anti-inflammatory effectiveness in vivo. J Pharmacol Exp Ther 329:76-86. <https://doi.org/10.1124/jpet.108.143214>

Satyavati G, Raina M, Sharma M. (1976). Medicinal plants of India, Raina MK (ed.). Indian council of medical research: New Delhi, India.

Shariati M, Sharifi E, Houshmandi M, Nourafshan A, Ghavami F.(2010). Effect of hydro alcoholic leaf extract of *Myrtus communis* on pituitary-gonad hormonal axis in adult male rat. Int J Fertil Steril 4: 19.

Sumbul S, Ahmed MA, Asif M, Akhtar M. (2011). *Myrtus communis* Linn.—A review. Indian J Nat Prod Resour 2: 395-402.