

A Systematic Review on Therapeutic & Cosmetic Uses of Rosemary

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Abstract: This work is a compilation review of rosemary (*Rosmarinus officinalis*). Rosemary is a plant of Mediterranean origin that has been distributed throughout different areas of the world. It has many medicinal properties, and its extracts have been used (mainly orally) in folk medicine. It belongs to the Labiatae family. Rosemary has played an important role from past to present and has antimicrobial, antifungal and antioxidant properties. With these features, it is used in many sectors, especially food and pharmacy. Furthermore, it shows important clinical effects on mood, learning, memory, pain, anxiety, and sleep. With this review, it is aimed to provide comprehensive information on the biological activities of rosemary and its extracts to shed light on future research.

Key Words: Rosemary, Therapeutic efficacy, antioxidant property, biological property.

1. INTRODUCTION:

Herbal medicines and natural products were used in ancient therapies. During the last decades, researchers focused more on herbs in drug discovery because of their limited side effects and fewer complications. According to the improving demand, the medicinal and pharmacological studies have been increasing worldwide. Demand for plants rich in valuable secondary metabolites is increasing day by day. One of these herbs is rosemary. Rosemary (*Rosmarinus officinalis* L.) is a valuable essential oil and spice plant from the Lamiaceae family. According to the evidence found by anthropologists and archaeologists, rosemary, which was used in medicine, food, and cosmetics. Today, rosemary is grown worldwide but it is an evergreen perennial shrub native to southern Europe and Asia especially Mediterranean region. Recently, noticeable scientific interest is focused on the beneficial therapeutic properties of different kinds of rosemary extracts and its main constituents. Rosemary is an evergreen plant with a developed root and stem system and a lot of branching. These branches frequently have needle-shaped and bright green leaves with very short stems, each about 3 cm long. There are glandular hairs that carry plenty of essential oil on the lower surface of the leaves. This plant, which has blue flowers towards the ends of the stem, has round, slippery and dark coloured fruits. The economically utilized parts of the rosemary plant are its leaves and flowers, and its leaves contain 0.3-2.5% essential oil. The most important essential oil components in rosemary plant are 1.8-cineol (15-30%), camphor (5- 25%), and borneol (10-20%). These essential oils obtained from rosemary are especially valuable in perfumes, cosmetics and aromatherapy. Rosemary juice also has an antiseptic effect and accelerates blood circulation in the skin. For this reason, fresh or dried leaves of rosemary are also added to dishes to give flavour and taste. A large number of studies either on animal models or cultured cells indicate the wide range medicinal properties of rosemary and its compounds such as anti-inflammatory (8, 9), antioxidant, antinociceptive, neuroprotective, antidepressant, anti-hysterical, ameliorative of memory and mental fatigue. Moreover, the safety of rosemary has been displayed in various studies. Taking this background into account, we present a review of *Rosmarinus officinalis* from a therapeutic & cosmetic perspective, comprising the following sections: The history of the plant from an ethnomedicinal and cosmetic point of view, its botanical aspects, its ecological aspects, including comments on Mediterranean aromatic plants, its phytochemistry or secondary metabolites as well as their biological activity, and the applications of the plant in cosmetics.

2. PLANT PROFILE

Rosmarinus officinalis



Figure 1: *Rosmarinus officinalis*

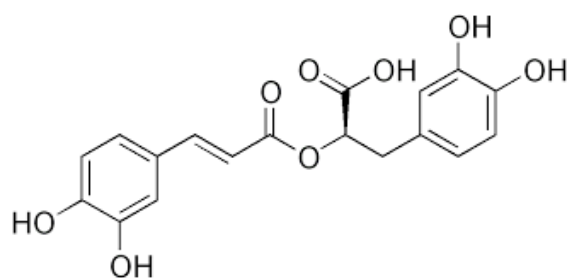
- **Common Name:** Rosemary
- **Hindi Name:** Gulmehandi
- **Taxonomical Classification:**
 1. Kingdom: Plantae
 2. Order: Lamiales
 3. Family: Lamiaceae
 4. Genus: *Salvia*
 5. Species: *S. rosmarinus*

3. METHODOLOGY

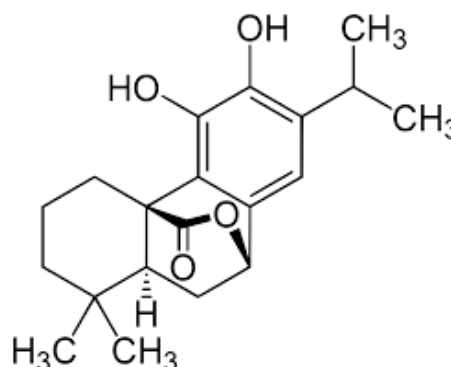
The data were gathered by searching the English articles in PubMed, Scopus, Google Scholar, and Web of Science. The keywords used as search terms were 'Rosmarinus officinalis,' 'rosemary,' All kinds of related articles, abstracts and books were included. No time limitation was considered in this review. Both in vitro and in vivo studies were subjected to this investigation.

4. THERAPEUTIC PARAMETERS

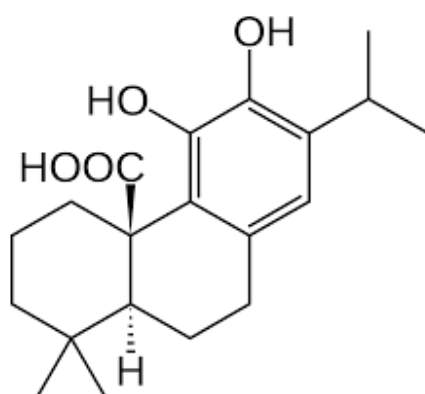
- **Antioxidant Activity:** Medicinal plants contain valuable essential oils with antibacterial, antimicrobial, and antioxidant effects. Antioxidants are important to our daily life to reduce detrimental effects to reactive oxygen species, which can appear to results of exercise or rhythm of the life. Antioxidant refers to a substance that inhibits oxidation, especially one used to counteract the deterioration of stored products. Thus, it is important to understand emerge antioxidant activity as a result of some beneficial plants. Rosemary is type of plant that has antioxidant activity to protect cells from detrimental free radicals. As previously reported, the antioxidant effect of rosemary is due to the polyphenols present in the leaves (mainly rosmarinic acid, carnosol and carnosic acid), which accumulate in the fatty membranes of cells where the antioxidant effect is required.



ROSMARINIC ACID



CARNOSOL



CARNOSIC ACID

Figure 2: Chemical Structure

In research group study it was expressed that when dry rosemary leaf exposed to radiation, antioxidant activity generally enhanced according to unapplied samples. Gamma radiated dry leaf antioxidant activities were changed to depend on extracts, methanol extracts did not show any important change while ethanol and water extracts improve activity substantially. However, methanol-based extracts demonstrated a superior antioxidant activity and higher phenolic content whether subject to gamma radiation or not. It was also clearly expressed that extraction solvent play main role to total phenolic content and antioxidant activity.

• **Antibacterial-Antimicrobial-Antifungal Activity :** In recent years, the use of medicinal aromatic plants has increased significantly in the food, pharmaceutical, and agricultural industries as medicinal-Aromatic plants have acquired antifungal, antibacterial and antioxidant properties because of their secondary metabolites. Rosemary extracts have been reported to exhibit strong antibacterial properties due to their chemical composition. Many studies have been conducted with extracts extracted from various plants to determine antimicrobial activity. In one of the types of research study it was founded that 3.125 and 1.5 mg/mL dose of rosemary extract was effective on *B. subtilis* and *S. aureus* gram positive bacteria. In a study conducted, it was shown that the oil-based formulations of rosemary have highly effective antimicrobial properties Increasing health problems due to various pathologies such as various cancers, liver diseases, and hormonal disorders caused by chemical residues in agricultural products brought the use of essential oils to the agenda for the development of natural and environmentally-friendly alternative fungicides. *Candida albicans* is a polymorphic type of fungus that, under certain conditions, can cause infections ranging from skin infections to systemic infections that lead to death. There are studies showing that the essential oil of rosemary inhibits this type of fungus that causes many diseases in humans. It is reported that essential oil of rosemary has fungus inhibiting properties against *Aspergillus niger* which is an important disease factor in humans, plants, and animals

- **Therapeutic effects of rosemary constituents on nervous system disorders:** Depression is a serious chronic psychiatric disease. Clinical and experimental studies have suggested several alterations occurred in neuronal noradrenergic and serotonergic function in the central nervous system. The antidepressant-like effect of hydro-alcoholic extract of the leaves and stems of rosemary (100 mg/kg, PO) for 14 days was revealed in behavioural tests in mice and it was also shown that its antidepressant-like effect is dependent on its interaction with the noradrenergic (α 1-receptor), dopaminergic (D1 and D2 receptors) and serotonergic (5-HT1A, 5-HT2A and 5-HT3 receptors) systems. By these documents, it may be suggested that antidepressant-like effect of rosemary could be, at least in part, because of carnosol, ursolic acid, betulinic acid and 1,8-cineole, the main compound in the essential oil of rosemary.

5. COSMETIC PARAMETERS :

- **Fight Acne:** With its potent antibacterial qualities, rosemary essential oil helps fight the acne bacteria from getting into your pores. This quality, combined with rosemary oil's non-comedogenic properties, means that acne has no foothold as the oil both clears out pores and forms a protective barrier against future breakouts.
- **Tighten Skin Tone:** Rosemary oil is here to help shrink the appearance of large pores because it is a natural astringent, which means it helps shrink pores to tighten the appearance of your complexion. This is great for people with naturally oily skin, as incorporating ingredients like rosemary oil into as many of your skincare products as possible means you multiply these benefits every day for blemish-free skin that looks great.
- **Deodorize Naturally:** Another reason rosemary is a popular ingredient in cleansers is that it naturally fights odour. Body odour is caused by benign bacteria living on your skin consuming the nutrients you sweat out and that are found in sebum. As an antibacterial essential oil, rosemary oil prevents these bacteria from thriving and releasing odorous compounds.
- **Smooth Out Fine Lines:** Like many other essential oils, rosemary oil is a natural antioxidant, meaning it protects skin against harmful elements in the environment called free radicals that hurt skin cells' DNA, leading to conditions like fine lines and skin laxity. Whether used topically or ingested in something like tea, rosemary helps prevent many types of premature signs of aging.
- **Remove Under Eye Bags:** Rosemary oil has diuretic properties, meaning it helps drive fluid out of tissues where it is applied. This can help with the appearance of under-eye bags that look swollen and puffy by getting rid of fluid retention and easing congestion.
- **Get Rid of Cellulite:** Cellulite, which can be caused by the accumulation of toxins in the tissues beneath the skin, can be helped with rosemary oil products. Rosemary oil helps stimulate the flow of the lymphatic system's responsibility of clearing away toxins and waste that harm skin's ability to regenerate and stay healthy.

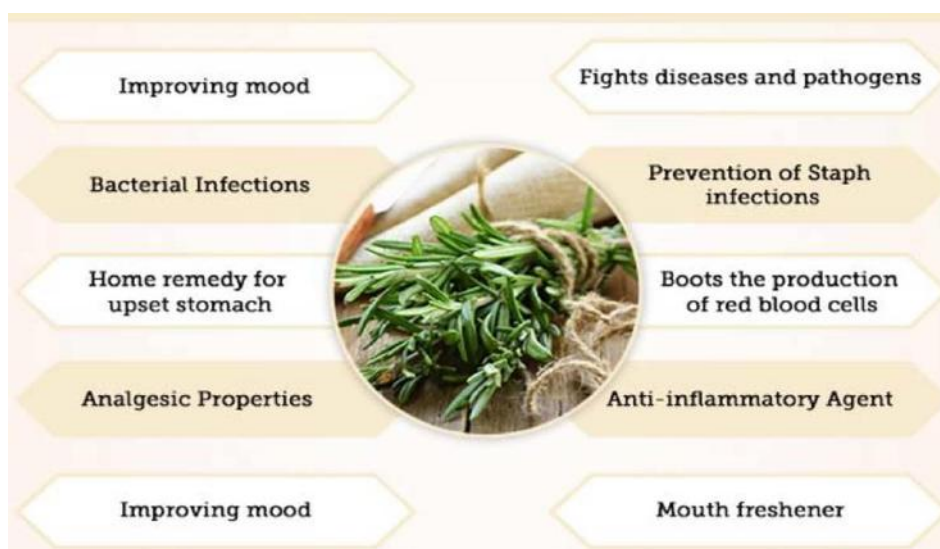


Figure 3. Health Benefits of Rosemary



Figure 4: Rosemary Oil

6. SAFETY AND EFFICACY

- **Use:** Limited clinical studies support traditional uses of rosemary as an antibacterial, anti-inflammatory, and spasmolytic. In addition to the well-established culinary uses of rosemary, potential dermatologic, CNS, and antioxidant applications have also been studied. However, limited clinical data exist to recommend rosemary for any indication.
- **Dosing:** Various rosemary preparations have been used for various indications; however, clinical evidence is lacking to provide dosing recommendations for any indication. Traditional uses include 2 g of chopped leaf infused in water, or 2 to 4 g of the shoot. Other decoctions have been described. Low oral doses (750 mg) of dried rosemary leaf powder were used in a clinical study for improvement of memory speed in elderly patients, while higher doses (6 g) impaired memory speed. Studies evaluating rosemary aromatherapy used 3 to 4 drops for inhalation.
- **Pregnancy / Lactation:** Rosemary has generally recognized as safe (GRAS) status when used as food. Dosages above those found in food should be avoided because safety and efficacy are unproven. Rosemary may have emmenagogic and abortifacient effects.
- **Adverse Reactions:** Dermatitis, allergy, and photosensitivity to rosemary extracts or oil have been reported. Although case reports of seizures due to rosemary are lacking, the potential for toxicity exists, possibly due to the high camphor content found in rosemary oil.

7. CONCLUSION:

The present review focuses on the main uses of rosemary. *Rosmarinus officinalis* (Labiatae) is an ancient plant considered to be medicinal in the European Pharmacopoeia. Through the centuries, it has been used empirically for multiple diseases. In the last few decades, *in vitro*, *in vivo*, and human trials have been carried out to establish scientific evidence for the medicinal properties attributed to this plant. Many of its molecules have also been identified thanks to new chemical tools. Some of the chemical components contained in the rosemary plant have many beneficial properties such as anticancer, anti-depressive and anti-inflammatory effects. Soon the harmless applications of rosemary will increase its widespread use in food, agriculture, cosmetics, dentistry, medicine and many more field.

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