IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, April 2023
Impact Factor: 7.301

A Review Article on "Rosmarinus officinalis L. (Rosemary)"

Latambale Komal, Dalvi Apeksha, Tattu Anuja, Shelke Suchitra
Samarth Institute of Pharmacy, Belhe, Maharashtra, India

Abstract: *Rosmarinus officinalis L. (rosemary) is a medicinal plant native to the Mediterranean region and cultivated around the world. Besides the therapeutic purpose, it is commonly used as a condiment and food preservative. R. officinalis L. is constituted by bioactive molecules, the phytocompounds, responsible for implement several pharmacological activities, such as anti-inflammatory, antioxidant, antimicrobial, antiproliferative, antitumor and protective, inhibitory and attenuating activities. Thus, in vivo and in vitro studies were presented in this Review, approaching the therapeutic and prophylactic effects of R. officinalis L. on some physiological disorders caused by biochemical, chemical or biological agents. In this way, methodology, mechanisms, results, and conclusions were described. The main objective of this study was showing that plant products could be equivalent to the available medicines.*

Keywords: Rosemary, Antioxidant, Anti-Inflammatory, Flavonoids, Polyphenols, Terpenes

I. INTRODUCTION

The use of herbal drugs to treat a broad spectrum of diseases and/or to modify non-pathological states [1,2,3,4] has increased worldwide. It is known that the secondary metabolites of plants have therapeutic effects; many have been used in the treatment of different diseases, such as obesity [5] and brain [6] and skin diseases [7] as well as in the treatment of non-pathological states, such as aging [8].

Rosmarinusofficinalis L., commonly known as rosemary, belongs to the *Lamiaceae* family. The genus Rosmarinus has been merged into the genus Salvia in a recent phylogenetic analysis. This means that the *Rosmarinusofficinalis* is no longer the correct name of the species studied. Since the name *Salvia officinalis* was already occupied when the merger was done, this species needed a new specific epithet in Salvia, so it is now known under the name *Salvia Rosmarinus* [9,10,11]. It is an aromatic plant with needle-like leaves that is cultivated worldwide. Rosemary has therapeutic properties and has been used in folk medicine as an oral preparation to relieve renal colic, dysmenorrhea, and muscle spasms [12,13,14]. Rosemary has antifungal, antiviral, antibacterial, anti-inflammatory, antitumor, antithrombotic, antinociceptive, antidepressant, antiulcerogenic, and antioxidant activities [13,14,15]. Several medicinal applications for *R. officinalis* have been identified, such as treatment of disorders associated with the nervous, cardiovascular, gastrointestinal, genitourinary, menstrual, hepatic, and reproductive systems and with respiratory and skin conditions [13]. Owing to its diverse properties, rosemary has also been used widely in the food and cosmetics industries [16].

Many biomolecules have been identified to be responsible for the biological effects of rosemary essential oil and crude extract. However, specific compounds causing these effects have rarely been identified; this is due to the synergistic actions of several metabolites present in rosemary [17]. Therefore, it is difficult to associate a therapeutic or cosmetic activity with an isolated biomolecule. del Baño et al. characterized the distribution of rosemary flavonoids (eriocitrin, luteolin 3'-O-β-D-glucuronide, hesperidin, diosmin, isoscutellarein 7-O-glucoside, hispidulin 7-O-glucoside, and genkwanin) in the leaves, flowers, roots, and stems during different stages of the plant's growth [18]. It was also reported a high concentration of flavonoids, polyphenols, and terpenes in *R. officinalis* leaves [19]. Rosemary contains an abundance of secondary metabolites, and their identification by ultra- and high-performance liquid chromatography and gas chromatography has revealed high contents of profile phenolic compounds (diterpenoids and flavonoids) and volatile compounds [20,21].

The aim of this review was to survey the publications related to the topical applications of rosemary and to discuss the formulations available for the delivery of the secondary metabolites of *R. officinalis*.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, April 2023
Impact Factor: 7.301

Plant profile

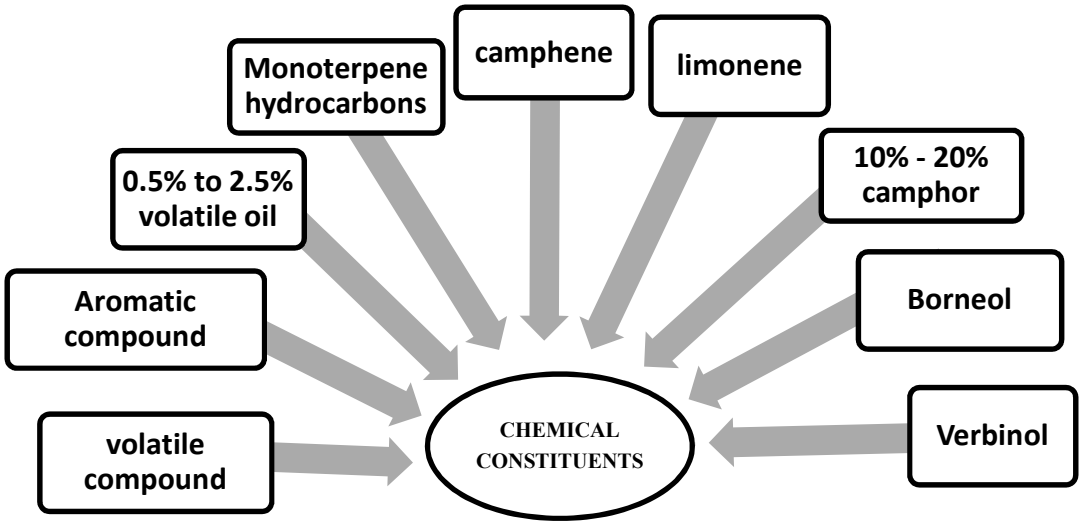
Kingdom	Plantae
Clade	Eudicots
Clade	Asterids
Order	Lamiales
Family	Lamiaceae
Genus	Salvia
Species	S. rosmarinus

II. MORPHOLOGY

- **Leaves:** Its leaves are evergreen, linear, and have smooth edges that generally tend to curl slightly under the leaf blade. Because of the similarity in appearance to other evergreens, the leaves are often referred to as "needles."
- **Flowers:** The flowers are basically bilabiate, with a much larger lower lip. The lower lip is often marked with distinctive spots and lines and makes a great landing pad for bees – the flower's pollinators. Two stamens curl up and under the upper lip (two conjoined petals) and then outward from the flower with the pistil similarly placed and between the stamens. The other two of the flower's five petals stick out and down from the sides of the flower. The flowers tend to form in clusters at the leaf axils. Flower color is generally a shade of soft to medium blue or lavender-blue, but there are some varieties with white or pinkish flower coloration. In growth habit the plant can either be prostrate and sprawling or upright and shrubby, or somewhere in between. Generally the prostrate varieties tend to bloom much more than the upright varieties. Seeds are small nutlets and each flower can produce up to four seeds.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, April 2023
Impact Factor: 7.301

Chemical Constituents



Pharmacological Activity

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, April 2023
Impact Factor: 7.301

III. CONCLUSION

3.1 Rosemary for Skin Benefits

When it comes to specific skin conditions, "rosmarinic acid is the biggest component of rosemary leaf extract and it has a powerfully calming effect on the skin that can be useful in treating many conditions, including severe eczema [as well as psoriasis and dermatitis] and skin allergies.""rosemary's antioxidant and antibacterial properties make it especially well-suited for acne. The whole-plant extract has been shown not only to reduce the inflammation associated with acne but to directly fight a bacterium that causes acne outbreaks.""Rosemary extract's anti-inflammatory properties could help to reduce swelling and puffiness of the skin. It also helps to heal burns and soothe the skin,"

It is also a bit of a youth-preserving powerhouse. "It's antioxidant properties reinforce blood capillaries, helping to reduce the signs of aging on the skin," says Langdon. "It tightens loose or sagging skin to help it look firmer and more youthful. Furthermore, rosemary stimulates biological activity and cell growth to reduce fine lines and wrinkles.

REFERENCES

[1]. Abu-Al-Basal M.A. Healing potential of Rosmarinusofficinalis L. on full-thickness excision cutaneous wounds in alloxan-induced-diabetic BALB/c mice. J. Ethnopharmacol. 2010;131:443–450. doi: 10.1016/j.jep.2010.07.007. [PubMed] [CrossRef] [Google Scholar]

[2]. Palombo E.A. Traditional Medicinal Plant Extracts and Natural Products with Activity against Oral Bacteria: Potential Application in the Prevention and Treatment of Oral Diseases. Evid. Based Complementary Altern. Med. 2011;2011:680354. doi: 10.1093/ecam/nep067. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[3]. Pazyar N., Yaghoobi R., Rafiee E., Mehrabian A., Feily A. Skin wound healing and phytomedicine: A review. Ski. Pharmacol. Physiol. 2014;27:303–310. doi: 10.1159/000357477. [PubMed] [CrossRef] [Google Scholar]

[4]. Pérez-Sánchez A., Barrajón-Catalán E., Caturla N., Castillo J., Benavente-García O., Alcaraz M., Micol V. Protective effects of citrus and rosemary extracts on UV-induced damage in skin cell model and human volunteers. J. Photochem. Photobiol. B Biol. 2014;136:12–18. doi: 10.1016/j.jphotobiol.2014.04.007. [PubMed] [CrossRef] [Google Scholar]

[5]. De Freitas Junior L.M., de Almeida E.B., Jr. Medicinal plants for the treatment of obesity: Ethnopharmacological approach and chemical and biological studies. Am. J. Transl. Res. 2017;9:2050–2064. [PMC free article] [PubMed] [Google Scholar]

[6]. Seo E.J., Fischer N., Efferth T. Phytochemicals as inhibitors of NF-kappaB for treatment of Alzheimer's disease. Pharmacol. Res. 2018;129:262–273. doi: 10.1016/j.phrs.2017.11.030. [PubMed] [CrossRef] [Google Scholar]

[7]. Ariffin N.H.M., Hasham R. Potential dermatological application on Asian plants. Biotechnol. Bioprocess Eng. 2016;21:337–354. doi: 10.1007/s12257-015-0750-4. [CrossRef] [Google Scholar]

[8]. Calabrese V., Scapagnini G., Catalano C., Dinotta F., Geraci D., Morganti P. Biochemical studies of a natural antioxidant isolated from Rosemary and its application in cosmetic dermatology. Int. J. Tissue React. 2000;22:5–13. [PubMed] [Google Scholar]

[9]. UniProt Taxonomy—RosmarinusOfficinalis (Rosemary) (Salvia Rosmarinus) [(accessed on 6 March 2020)]; Available online: https://www.uniprot.org/taxonomy/39367

[10]. Garden M.B. Salvia Rosmarinus. [(accessed on 6 March 2020)]; Available online: http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=b968

[11]. Science R.B.G.K. Salvia RosmarinusSpenn. [(accessed on 6 March 2020)]; Available online: http://plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:457138-1

[12]. AI-Sereiti M.R., Abu-Amerb K.M., Sena P. Pharmacology of rosemary (Rosmarinusoificinalis Linn.) and its therapeutic potentials. Indian J. Exp. Biol. 1999;37:124–130. [PubMed] [Google Scholar]

[13]. Begum A., Sandhya S., Vinod K.R., Reddy S., Banji D. An in-depth review on the medicinal flora Rosmarinusofficinalis (Lamiaceae) Acta Sci. Pol. Technol. Aliment. 2013;12:61–74. [PubMed] [Google Scholar]

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, April 2023
Impact Factor: 7.301

[14]. Ribeiro-Santos R., Carvalho-Costa D., Cavaleiro C., Costa H.S., Albuquerque T.G., Castilho M.C., Ramos F., Melo N.R., Sanches-Silva A. A novel insight on an ancient aromatic plant: The rosemary (Rosmarinusofficinalis L.) Trends Food Sci. Technol. 2015;45:355–368. doi: 10.1016/j.tifs.2015.07.015. [CrossRef] [Google Scholar]

[15]. Ojeda-Sana A.M., van Baren C.M., Elechosa M.A., Juárez M.A., Moreno S. New insights into antibacterial and antioxidant activities of rosemary essential oils and their main components. Food Control. 2013;31:189–195. doi: 10.1016/j.foodcont.2012.09.022. [CrossRef] [Google Scholar]

[16]. Stefanovits-Bányai É., Tulok M., Hegedus A., Renner C., SzollosiVarga I. Antioxidant effect of various rosemary (Rosmarinusofficinalis L.) clones. Acta Biol. Szeged. 2003;47:111–113. [Google Scholar]

[17]. Hyun H.B., Shrestha S., Boo K.H., Cho S.K. Evaluation of antioxidant potential of ethyl acetate fraction of Rosmarinusofficinalis L. and its major components. J. Korean Soc. Appl. Biol. Chem. 2015;58:715–722. doi: 10.1007/s13765-015-0097-8. [CrossRef] [Google Scholar]

[18]. Del Baño M.J., Lorente J., Castillo J., Benavente-García O., Marín M.P., Del Río J.A., Ortuño A., Ibarra I. Flavonoid Distribution during the Development of Leaves, Flowers, Stems, and Roots of Rosmarinusofficinalis. Postulation of a Biosynthetic Pathway. J. Agric. Food Chem. 2004;52:4987–4992. doi: 10.1021/jf040078p. [PubMed] [CrossRef] [Google Scholar]

[19]. Borrás-Linares I., Stojanovic Z., Quirantes-Piné R., Arráez-Román D., Švarc-Gajić J., Fernández-Gutiérrez A., Segura Carretero A. RosmarinusOfficinalis Leaves as a Natural Source of Bioactive Compounds. Int. J. Mol. Sci. 2014;15:20585–20606. doi: 10.3390/ijms151120585. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[20]. Fernández-Ochoa Á., Borrás-Linares I., Pérez-Sánchez A., Barrajón-Catalán E., González-Álvarez I., Arráez-Román D., Micol V., Segura-Carretero A. Phenolic compounds in rosemary as potential source of bioactive compounds against colorectal cancer: In situ absorption and metabolism study. J. Funct. Foods. 2017;33:202–210. doi: 10.1016/j.jff.2017.03.046. [CrossRef] [Google Scholar]

[21]. Mena P., Cirlini M., Tassotti M., Herrlinger K., Dall'Asta C., Del Rio D. Phytochemical Profiling of Flavonoids, Phenolic Acids, Terpenoids, and Volatile Fraction of a Rosemary (Rosmarinusofficinalis L.) extract. Molecules. 2016;21:1576. doi: 10.3390/molecules21111576. [PMC free article] [PubMed] [CrossRef] [Google Scholar]