
AN OVERVIEW OF PHARMACOLOGICAL ACTIVITY OF INDIAN BORAGE (COLEUS AROMATICUS)

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ABSTRACT

The herb *Coleus aromaticus* belonging to Lamiaceae family and *Coleus* genus is known by numerous names in different parts of the world and several language specific vernacular names. The herb has been extensively studied as well as reported in several fields of science. The multiple potential of the herb includes allelopathic potential, antibacterial property, antimicrobial activity, insecticidal property; free radical scavenging and radio-protective components from herb extracts and most recently the appetizing potential of the herb have been reported. The herb has carvacrol and thymol as the major components responsible for the flavour; while chlorogenic acid, rosmarinic acid etc. as the phenolic components. The herb has been used in therapeutic and medicinal applications as well as in culinary preparations.

KEYWORDS: Plant Profile, Anti-Bacterial Activity, Anti-Fungal Activity And Anti-Inflammatory Activity.

INTRODUCTION

Coleus aromaticus Benth (Lamiaceae) is known as a must-have plant in medicinal herb garden. The plant is well known for its antimicrobial and pharmacological activities. It is also reported to possess antioxidant and food additive properties. Antioxidant activity is reported to be mainly due to rosmarinic acid, chlorogenic acid and caffeic acid. The essential oil of *Coleus aromaticus* has great anti-microbial activity on Gram negative as well as Gram positive bacteria, drug resistant microorganisms, phytopathogenic microorganisms and fungi. Promising fungi-toxic activity against *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus oryzae*, *Candida versatilis*, *Penicillium* species and *Sacharomyces cerevisiae* are reported in literature. Carvacrol and/or thymol and β -caryophyllene are the major active constituents of

essential oil of the plant. The compositions of oil vary considerably depending upon the locality, season of collection and maturation of plant. *Coleus aromaticus* is useful in natural antibiotic formulation as an active gradient. The plant is also used as a food supplement and a flavouring for drinks. *Coleus aromaticus* leaves are reported to possess remarkable diuretic property. The result shows therapeutic potential of *Coleus aromaticus* which can be used as potential source of bioactive compounds.



Figure 1: Indian borage.

Domain	Eukaryote
Kingdom	Plantae
Phylum	Magnoliophyta (Angiosperms)
Class	Magnoliopsida (Dicotyledons)
Order	Lamiales
Family	Lamiaceae
Genus	Coleus
Species	Coleus Aromaticus

PHARMACOLOGICAL ACTIVITY OF INDIAN BORAGE

Coleus aromaticus (Indian borage) is a medicinal plant with many pharmacological activities due to the presence of bioactive compounds such as carvacrol, rosmarinic acid, caffeic acid, gallic acid, quercetin, and rutin. It possesses antimicrobial, antifungal, antibacterial, anti-inflammatory, antioxidant, analgesic, antitumor, anticancer, antidiabetic, anti-epileptic, wound-healing, anti-rheumatic, and diuretic properties. Traditionally, it has been used to treat cough, cold, asthma, fever, headache, diarrhoea, constipation, skin diseases, ulcers, kidney stones, urinary disorders, digestive problems, and respiratory illnesses.

Studies have also shown that its extracts can reduce inflammation, scavenge free radicals, lower blood glucose levels, inhibit the growth of cancer cells, and promote wound healing, making it a promising medicinal plant for pharmaceutical and therapeutic applications.

1. ANTIBACTERIAL ACTIVITY

Coleus aromaticus leaf extract shows strong antibacterial activity against both Gram-positive and Gram-negative bacteria, including *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Bacillus cereus*, *Salmonella typhimurium*, and methicillin-resistant *Staphylococcus aureus* (MRSA). Its antibacterial effect is mainly due to bioactive compounds such as carvacrol, thymol, limonene, linalool, myrcene, and cubebene. The plant helps prevent bacterial infections, promotes wound healing, reduces inflammation, and has also been used in the development of mouthwash formulations and zinc oxide nanoparticles to control bacterial biofilms.

2. ANTIFUNGAL ACTIVITY

Coleus aromaticus (Indian borage) essential oil has significant antifungal activity and can help protect stored food from fungal contamination. It is effective against fungi such as *Aspergillus niger*, *Aspergillus flavus*, and *Penicillium* species, mainly due to bioactive compounds like carvacrol and camphor. The essential oil also shows antimicrobial activity against bacteria including *Escherichia coli*, *Staphylococcus aureus*, *Proteus vulgaris*, and MRSA. However, some studies have reported that it has limited or no activity against the fungal yeast *Candida albicans*.

3. ANTI-INFLAMMATORY ACTIVITY

Coleus aromaticus leaf extracts have shown good anti-inflammatory activity in experimental studies. The plant helps reduce inflammation, relieve pain, and protect the body from inflammation caused by toxins and harmful chemicals. Studies have also reported that its extracts improve immune function by increasing immunoglobulin and lysozyme levels, making it a promising natural agent for treating inflammatory conditions.

4. ANTIPROTOZOAL ACTIVITY

Coleus aromaticus has shown promising antiprotozoal activity in several studies. In mice infected with *Plasmodium berghei*, the plant extract significantly reduced the number of parasites, indicating good antimalarial activity. Similar results were observed with the aqueous leaf extract. The essential oil of *C. aromaticus* was also effective against *Leishmania*

braziliensis, while the methanolic extract showed strong activity against *Leishmania chagasi* and *Leishmania amazonensis*.

5. ANTIVIRAL ACTIVITY

Coleus aromaticus leaves have shown antiviral activity against several viruses. Leaf extracts prepared using hexane, ethanol, and chloroform were effective against *Bombyx mori* Nuclear Polyhedrosis Virus (BmNPV), Herpes Simplex Virus-1 (HSV-1), Herpes Simplex Virus-2 (HSV-2), and Vesicular Stomatitis Virus (VSV). The leaf juice also showed anti-HIV activity. These findings suggest that *C. aromaticus* has promising antiviral properties.

CONCLUSION

Coleus aromaticus (Indian borage) is a valuable medicinal plant with a wide range of pharmacological activities attributed to its rich phytochemical composition, including carvacrol, thymol, rosmarinic acid, and other phenolic compounds. Scientific studies have demonstrated its antibacterial, antifungal, anti-inflammatory, antiproteolytic, antiviral, antioxidant, and wound-healing properties, supporting its extensive traditional use in the management of various infectious and inflammatory disorders. These findings highlight the plant's significant therapeutic potential and its promise as a natural source for the development of novel pharmaceutical and herbal formulations. However, further preclinical, clinical, and toxicological studies are required to establish its safety, efficacy, and standardized dosage for wider therapeutic applications.

REFERENCE

1. Annapurni S, Bhagavathy S. Assessment of enzymic and non-enzymic antioxidants in mice treated with protein fractions of arugampul, karpuravalli and thulasi against CCl₄-induced toxicity. **Indian J Nutr Diet.** 2001;38:249-255.
2. Annapurni S, Priya R (1999) Antimutagenic, anti-tumorigenic and antigenotoxic effects of polyphenol extracts of selected medicinal plants. *Indian J Nutr Diet* 36(10):431–43
3. Baslas RK, Kumar P (1981) Chemical examination of essential oil of *Coleus aromaticus* Benth. *J Indian Chem Soc* 58:103–104
4. Bos R, Hendriks H, Van Os FHL (1983) The composition of the essential oil in the leaves of *Coleus aromaticus* Benth and their importance as a component of the species *antiaphthosae*. *Pharma Weekly Sci* 5:129–130
5. Botelho MA, Nogueira NA, Bastos GM (2007) Antimicrobial activity of the essential oil from *Lippia sidoides*, carvacrol and thymol against oral pathogens. *Braz J Med Biol Res*

40:349–356

6. Ali AM, Mackeen MM, Sharkawy ESH, Hamid JA, Ismail NH, Ahmad FBH, Lajis NH. 1996. Antiviral and cytotoxic activities Of some plants used in Malaysian indigenous medicine. *Pertanika J Trop Agric Sci.* 19(2/3):129–136.
7. Arumugam G, Swamy MK, Sinniah UR. 2016. *Plectranthus amboinicus* (Lour.) Spreng: botanical, phytochemical, pharmacological and nutritional significance. *Molecules.* 21(4):369. DOI:10.3390/molecules21040369.
8. Asiimwe S, Borg-Karlsson AK, Azeem M, Mugisha KM, Namutebi A, Gakunga NJ. 2014. Chemical composition and toxicological evaluation of the aqueous leaf extracts of *Plectranthus amboinicus* (Lour.) Spreng. *Int J Pharm Sci Invent.* 3(2):19–27.
9. Baslas RK, Kumar P. 1981. Chemical examination of essential oil of *Coleus aromaticus* Benth. *J Indian Chem Soc.* 58:103–104.
10. Begum M, Lokesh S, Raghavendra VB. 2009. Role of leaf extracts of some medicinal plants in the management of seed-borne fungal diseases of Okra (*Abelmoschus esculentus* L.) Moench. *Arch Phytopathol Pflanzenschutz* 42(10):950–955.
11. Bhatt P, Joseph GS, Negi PS, Varadaraj MC. 2013. Chemical composition and nutraceutical potential of Indian borage (*Plectranthus amboinicus*) stem extract. *J Chem.* 2013:1–7. DOI:10.1155/2013/320329
12. Da Costa JG, Pereira CK, Rodrigues FF, De Lima SG. 2010. Chemical composition, antibacterial and fungicidal activities of leaf oil of *Plectranthus amboinicus* (Lour.) Spreng. *J Essent Oil Res.* 22(2):183–185. DOI:10.1080/10412905.2010. 9700298.
13. Dash SK, Sachidananda P. 2006. Review on ethnomedicines for diarrhea diseases from Orissa: prevalence versus culture. *J Human Ecol.* 20(1):59–64. DOI:10.1080/09709274.2006. 11905903.
14. Dass K, Mariappan P. 2014. Larvicidal activity of *Aegle marmelos*, *Coleus aromaticus* and *Vitex negundo* leaf extract against filarial vector *Culex quinquefasciatus*. *TURKJANS.* 1(Special Issue):858–862.
15. Deena MJ, Sreeranjini K, Thoppil JE. 2002. Antimicrobial screening of essential oils of *Coleus aromaticus* and *Coleus zeylanicus*. *Int J Aromather.* 12(2):105–107.
16. De Lima SCG, Teixeira MJ, Lopes JEG Jr, De Moraes SM, Torres AF, Braga MA, Rodrigues RO, Santiago GMP, Martins AC, Nagao-Dias AT. 2014. In vitro and in vivo leishmanicidal activity of *Astronium fraxinifolium* (Schott) and *Plectranthus amboinicus* (Lour.) Spreng against *Leishmania (Viannia) braziliensis*. *BioMed Res Int* 2014:848293. DOI:10.1155/2014/848293.