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Eureka Journal of Health Sciences & Medical Innovation (EJHSMI)

ISSN 2760-4942 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/5

BOTANICAL CHARACTERISTICS, CHEMICAL COMPOSITION AND PHARMACOLOGICAL PROPERTIES OF OCIMUM BASILICUM L.

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Abstract

Ocimum basilicum L. (common basil) is one of the most widely used plants in the Lamiaceae family, used in the food industry and in traditional and modern medicine. The plant is rich in essential oils, phenolic compounds, flavonoids, and vitamins, which contribute to its antioxidant, anti-inflammatory, antimicrobial, cardioprotective, and metabolic properties. This review article summarizes the botanical characteristics, chemical composition, and pharmacological activity of O. basilicum L. and discusses its potential use in pharmaceuticals and preventive medicine.

Keywords: Ocimum basilicum L. , basil, essential oils, flavonoids, antioxidant activity, medicinal plants.

Introduction

Medicinal plants remain an important source of biologically active substances used for the prevention and treatment of various diseases. Among them, Ocimum basilicum L. , commonly known as common basil, occupies a special place. It is widespread in Mediterranean countries, South and Central Asia, including Uzbekistan, and is cultivated as a spice, aromatic herb, and medicinal plant.

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Interest in basil stems from its rich phytochemical composition and proven pharmacological activity.

Botanical characteristics

Ocimum basilicum L. is an annual herbaceous plant of the Lamiaceae family. Key morphological characteristics:

- plant height: 30–70 cm;
- the stem is erect, tetrahedral, branched;
- leaves are opposite, ovate, with a distinct aroma;
- the flowers are small, white, pink or purple, collected in spike-shaped inflorescences;
- The fruit is a crushed nut.

The plant prefers a warm climate and grows well in sunny areas with fertile soil.

Chemical composition

The chemical composition of O. basilicum L. is highly variable and depends on the variety, growing conditions, and vegetation phase. The main groups of biologically active substances include:

Essential oils

The essential oil content is 0.3–1.5%. Main components:

- linalool,
- eugenol,
- methyl chavicol (estragole),
- methyl cinnamate,
- camphor.

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Phenolic compounds and flavonoids

- rosmarinic acid,
- caffeic acid,
- quercetin,
- apigenin,
- luteolin.

Other substances

- vitamins (A, C, K),
- mineral elements (K, Ca, Mg, Fe),
- tannins,
- saponins.

Pharmacological properties

Antioxidant activity

Basil's phenolic compounds and flavonoids effectively neutralize free radicals, reducing oxidative stress, which underlies cardiovascular, neurodegenerative, and metabolic diseases.

Anti-inflammatory action

Extracts of O. basilicum L. suppress the synthesis of proinflammatory cytokines and inflammatory mediators, which has been confirmed by experimental studies in vitro and in vivo .

Antimicrobial activity

Basil essential oil exhibits pronounced antibacterial and antifungal activity against Staphylococcus aureus , Escherichia coli , Candida albicans and other microorganisms.

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Cardioprotective effect

Several studies indicate basil's ability to improve lipid profiles, reduce total cholesterol levels, and prevent myocardial damage through its antioxidant and vasodilatory effects.

Hypoglycemic and metabolic action

Plant extracts help reduce blood glucose levels and improve tissue sensitivity to insulin, making O. basilicum L. a promising agent for the prevention of type 2 diabetes.

Application in traditional and modern medicine

In folk medicine, basil is used as:

- antispasmodic,
- sedative,
- carminative,
- antiseptic.

In modern pharmacy, the plant is considered as a source of herbal preparations, biologically active supplements and functional foods.

Conclusion

Ocimum basilicum L. is a valuable medicinal and aromatic plant with a broad spectrum of biological activity. Its rich chemical composition contributes to its antioxidant, anti-inflammatory, antimicrobial, and cardiometabolic properties. Promising areas for further research include clinical evaluation of its efficacy, standardization of extracts, and the development of new basil-based herbal remedies.