



(REVIEW ARTICLE)



## Research on medicinal uses and chemical composition of *Chenopodium botrys*

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### Abstract

Medicinal plants have been used by humans for many years in the prevention and treatment of diseases. *Chenopodium botrys* species has been used as a medicinal plant since the past in human history. The genus *Chenopodium*, which belongs to the Chenopodiaceae family, is widely grown in Western Asia, Europe and North America. It is used medically in the treatment of inflammatory disorders, diabetes, gastric and parasitic ulcers, bacterial, fungal and viral diseases. Traditionally, it is also used in the treatment of various conditions such as cough, abdominal pain and congestion among the people. In addition, according to studies conducted in recent years, it has been determined that essential oil has healing properties for wounds.

**Keywords:** *Chenopodium bortys*; Medicinal and Aromatic Plants; Chenopodiaceae; Folk Medicine; Essential oil

### 1. Introduction

Medicinal and aromatic plants have been used in the food, medicine, spice and cosmetics industries for many years [1]. According to the World Health Organization (WHO), about three-quarters of the world's population resort to herbs for public health. Therefore, besides modern medicine, herbal treatment methods need to be researched and developed [2-4]. Extracts obtained from the medicinal parts of plants by different methods are widely used in the treatment and prevention of many diseases in [1,5].

The genus *Chenopodium* is from the Chenopodiaceae family and spreads in North America, Western Asia and Europe [6]. There are 102 genera and 1400 plant species belonging to this family, including annual and perennial species. There are herbaceous, shrub-shaped or tree-shaped species [7]. There are 15 species belonging to the genus *Chenopodium* in Turkey [8]. As a result of the researches of the species belonging to the *Chenopodium* genus, their strong anticancer, antifungal and antibacterial potentials have been revealed [1].

In this research, it is aimed to review the medical use and chemical compositions of *Chenopodium botrys*.

**Traditional Uses:** *Chenopodium* species are used in folklore for the treatment of different ailments. *C. album* strain is used for its appetite suppressant, anthelmintic, laxative, diuretic and tonic properties [9]. *C. ambrosioides* species has been used against intestinal parasites since ancient times. The plant is also known as a carminative, diaphoretic and emmenagogue and can be used in the treatment of cough, lung congestion and amenorrhea. In Europe, the *Chenopodium botrys* species is generally used in the treatment of colds and humoral asthma [10]. *Chenopodium botrys* species, which spreads in various regions of the world, has different usage areas for each region [11]. The essential oil of the *Chenopodium botrys* species is used as a bactericide and fungicide in Southern Serbia and Greece [12]. In addition, in Serbia, the above-ground part of the plant is used as a spice, as well as as a diuretic, antispasmodic, carminative and anti-diarrheal. There are various studies including the use of plant-based sesquiterpenes as natural cancer inhibitors [11-12].

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<sup>13</sup>. In Iran, it is used as an expectorant, antiepileptic, tonic and in the treatment of asthma. It is used for colds and humoral asthma in France and South America <sup>[10]</sup>. In Pakistan, the young leaves and branches of the plant are used to heal wounds, while the infusion of the whole plant is used orally as a stomachache, laxative, diuretic <sup>[14]</sup>. In India, it has been reported that it is used as a diuretic, antispasmodic, antispasmodic, pectoral for asthma and colds, and is good for the stomach and liver <sup>[15]</sup>. Moth control has also been used in Germany since the 19th century <sup>[16]</sup>.

In Spain, it is used as a tea (Valladolid tea) for the treatment of cough and digestive system disorders. In addition, according to pharmacological results, it is included in the category of plants that can also be used for cancer treatment <sup>[16]</sup>. As a flavoring for meat, cheese and barley soup in some cities of India; The seeds of the plant are used as a decoction in cases of tapeworm infection in children, as well as in headaches, colds and flu, as it has an analgesic effect. It is also used as an anthelmintic, diuretic and laxative in Indian medicine <sup>[15,17,18]</sup>. The extract obtained from the leaves of the *Chenopodium botrys* species in the Uttar region of India is used for the removal of leeches from the nose of cattle. The seeds of the plant are considered poisonous <sup>[19]</sup>.

This herb is a vermifuge, for example in Alabama it is used against worms when tea from the seeds and stems is consumed as syrup three times a day. In addition, when the inner bark of the plant is boiled and mixed with molasses, it can be used as sugar and can also be used in the treatment of tuberculosis <sup>[20]</sup>.

*Chemical Composition:* *Chenopodium botrys* has glandular trichomes that produce essential oil with an intense characteristic odor reminiscent of frankincense <sup>[9]</sup>. As a result of the researches carried out in *Chenopodium botrys* species, 0.08-2% of essential oil was determined. Its essential oil is rich in monoterpenes and sesquiterpenes <sup>[21]</sup>.

According to the results of the research conducted for the determination of essential oil components; The sesquiterpenes  $\alpha$ - and  $\beta$ -eudesmol were found to be the main compounds in the essential oil from Saudi Arabia <sup>[22]</sup>. In the research conducted in North America;  $\alpha$ - and  $\beta$ -chenopodiol (36%), eudesma-3,11-dien-6 $\alpha$ -ol (9.4%), botrydiol (9.0%), elemol (6.5%), elemol acetate (5.5%),  $\gamma$ -eudesmol (5.4%), and  $\alpha$ - and  $\beta$ -eudesmol (3.7%); guaia-3,9-dien-11-ol (7.4%) was detected <sup>[23]</sup>.

According to the research conducted in Kashan region of Iran, the essential oil composition of the plant is 2,3-dehydro-4-oxo- $\beta$ lonone (22.4 %), (+)-7-epi-amiteol (11.5 %), elemol (7.4 %),  $\alpha$ -cadinol (7.0%) and tau-cadinol (7.0%) were detected. According to another study conducted in Northern Iran,  $\gamma$ -terpineol (52.8%), p-cymene (19.0%) and isoscaridole (7.0%) were detected in the essential oil of the plant <sup>[24]</sup>. In the research conducted in Israel (Negev), the main components of the essential oil were determined as  $\alpha$ -terpinene (21.4 %), p-cymene (15.2%), E-caryophyllene (6.5%) and limonene (6.1%). *C. botrys* species was found to be ascaridole (7.5%) in the study conducted in Spain and 40% in the study in Slovakia <sup>[25]</sup>.

*Chenopodium botrys* species is distributed in Europe, Western Asia and North America. The plant is traditionally used for medicinal purposes. The essential oil isolated from the aerial parts of the *Chenopodium botrys* species collected in Southern Serbia and Greece is beneficial to selected microorganisms (*Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, *Sarcina lutea*, *Klebsiella pneumoniae*) showed significant activity against <sup>[6,12]</sup>. In a study conducted in Iran, it was determined that the plant exhibited strong antimicrobial activity against *Staphylococcus saprophyticus*, *Klebsiella pneumoniae*, *Bacillus cereus*, *Staphylococcus epidermidis*, *Streptococcus mutans*, *Listeria monocytogenes* and *Salmonella typhimurium* <sup>[24]</sup>.

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## 2. Conclusion

As a result of this research, it has been seen that *Chenopodium botrys* is used in the treatment and prevention of many diseases. It has been determined that it is used in the treatment of cough, headache, cold, lung congestion, diuretic, expectorant, tonic and asthma, stomachache, digestive system diseases and as a preventive.

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