

***CLINOPODIUM VULGARE* AS A PROMISING MEDICINAL PLANT**

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Approximately 80% of the world's population relies on traditional healing modalities and herbals for primary healthcare and wellness. Some 25% of all prescription drugs are derived from plant sources and of them most were discovered because of their prior use by traditional healers [10]. Therefore, plants of folk medicine are promising sources for development of new effective medicines. Among such plants may be considered wild basil - *Clinopodium vulgare* (*Lamiaceae*), widely applied nowadays in Bulgarian traditional medicine.

Clinopodium vulgare (L.) Fritsch (*Calamintha clinopodium* Spenn., *Satureja vulgaris* L.) grows throughout Ukraine (except of the Southern steppe areas) on the edges of deciduous and mixed forests, in brushwoods, and may occur as an adulterant of *Origanum vulgare*, collected in wild.

The objectives of the research comprise summarizing of data concerning distribution, main morphological characters, constituents, pharmacological effects, current application and promising uses of *Clinopodium vulgare*.

The species grows well in dry grassy places along banks and hedgerows and open woodland, widely distributed in Europe, Western Asia and North Africa. It is also found in Canada and has been introduced to the United States [8]. The plant occurs in light forests, shrubberies, shady meadows, calcareous grounds; in all Carpathian territories [2].

Clinopodium vulgare L. is an erect up to 45 cm tall perennial herbaceous plant. The oval leaves are supported by a short stem and are toothed at the edges. The flowers with tubular lipped corollas of a pinkish colour are arranged on the stem in several crowded bristly rings [8].

The species from the genus *Clinopodium* contain a number of triterpenes and triterpenoid saponins [4]. Several saikosaponin homologues, called clinoposaponins have been isolated from *C. vulgare*. Saikosaponins are well known to have an anti-hepatotoxic activity. The species of the genus were found useful as a saikosaponin source [6].

Wild basil also contains the saturated hydrocarbon gentriacontan ($C_{31}H_{64}$) [4], flavonoids [7]. Ferulic, *cis*-cinnamic and *p*-coumaric acids are among the prevalent phenolcarboxylic acids [3].

GC–MS analysis of the oil resulted in the identification of 40 compounds, representing 99.4% of the oil; thymol (38.9%), *c*-terpinene (29.6%) and *p*-cymene (9.1%) were the main components [9]. The chemical composition of the essential oil of *Clinopodium vulgare* L. ssp. *arundanum* (Boiss.) Nyman was analysed by means of GC and GC-MS. Thirty-seven compounds were identified, representing 89.6–90.5% of the samples. The main constituents of the oils were germacrene-D, β -caryophyllene and β -caryophyllene oxide [5].

In Bulgaria *Clinopodium vulgare* L. is a well known medicinal plant mainly used for healing wounds and treating warts due to virus infection; its aqueous extract, prepared by boiling grounded blades for 5 min, is recommended for antitumour treatment [4].

The herb is widely used in Bulgarian traditional medicine for treatment of skin irritation and swelling, and relieving the symptoms associated with mastitis and prostatitis. Based on the ethnopharmacological use, a gel containing 20% ethanol extract of the plant (brand name Clinogel™) was developed by the pharmaceutical group Sopharma Ltd. for treatment of inflammatory-related skin conditions and prevention of skin aging. *Clinopodium vulgare* infusions are also used in traditional medicine to treat infirmities such as gastric ulcers, diabetes, and cancer [3].

Aqueous extract of *Clinopodium vulgare* L. showed strong antitumour activity when tested *in vitro* on A2058 (human metastatic melanoma), HEP-2 (epidermoid carcinoma, larynx, human) and L5178Y (mouse lymphoma) cell lines. The saturated hydrocarbon gentriacontan ($C_{31}H_{64}$), extracted with chloroform, has been proved to

have antitumour properties when tested on Ehrlich ascitic and Lewis pulmonary tumour cells, as well as on permanent cell lines of human lymphocytic cells MOLT-4 and K- 562 [4].

Cytotoxic activity of methanolic extract from crude *Clinopodium vulgare* in the brine shrimp lethality test against MCF-7 cell line (LC(50): 60.4 micro g/ml) was determined [1].

Two of the main components of the *Clinopodium vulgare* essential oil fraction, oxygenated monoterpene thymol and monoterpene hydrocarbon γ -terpinene, exhibit significant antioxidant activity [3, 9].

The study [3] provides evidence for the traditional use of the plant infusions as an anti-inflammatory drug. Compounds present in the aqueous extract have high potential to reduce the levels of NO and some pro-inflammatory cytokines, inhibit the activity of MMP-9 and xanthine oxidase, and act as free radical scavengers.

The investigation [7] proved its broad-spectrum antibacterial activity. The results of the work [8] indicate the potential antibacterial efficacy of *Clinopodium vulgare* ethanol, ethyl acetate and acetone extract against tested pathogenic bacteria. The significant amount of phenols and flavonoids contribute in total biological activity of this plant.

Considering the sufficient resource base in Ukraine and presented data on potent cytotoxic, anti-inflammatory and antioxidant effects, it may be concluded that *Clinopodium vulgare* deserves a significant attention for development of new promising phytopharmaceuticals, comprising the valuable medicinal plant.

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