

**UDC: 633.8:615**

Lysiuk R., Mykhaylovska V.

Danylo Halytsky Lviv National Medical University, Lviv, Ukraine

## **EXPERIENCE IN CULTIVATION OF SAGE IN THE MOUNTAINOUS PART OF LVIV REGION**

**Key words:** *Salvia officinalis*; sage; cultivation; Alzheimer's disease; anti-herpetic

*Salvia* is one of the most numerous genera within the family *Lamiaceae* (around 900 species) which grows in many parts of the world. About 250 species are distributed in Central Asia and Mediterranean regions. At least 22 species of the genus are found in Ukraine.

The plant is indigenous to the Mediterranean region and has naturalized in all of Europe. It is cultivated in North America. Its volatile oil (1.5-3.5%) contains as chief constituents  $\alpha$ -thujone and  $\beta$ -thujone (20-60%), 1,8-cineole (6-16%), camphor (14-37%) [1].

Volatile oil containing plants deserve the particular attention and are currently widely investigated worldwide by scientists, due to their numerous promising pharmacological effects.

The objectives of the research comprise summarization of data concerning standardization characteristics, promising pharmacological effects and own experience in cultivation of *Salvia officinalis* in mountainous part of Lviv region, Western part of Ukraine.

The anticholinesterase activity of several *Salvia* species and their constituents have been investigated in the search for new drugs for the treatment of Alzheimer's disease. The inhibition of anticholinesterase *in vitro* by an ethanolic extract of *S. officinalis* (2.5 mg/mL) was 68%, and by oils of *S. officinalis* (0.1 mg/mL) was 52% [2].

Extracts and essential oils of medicinal plants are increasingly of interest as novel drugs for anti-herpetic agents, since the herpes simplex virus might develop resistance to commonly used antiviral drugs.

Aqueous and ethanolic extracts of *Salvia officinalis* were examined *in vitro* on RC-37 cells for their antiviral activity against *herpes simplex* virus type 1 (HSV-1) and type 2 (HSV-2) using a plaque reduction assay. All extracts tested revealed a high virucidal activity against free HSV-1 and HSV-2 [3].

Approved by Commission E sage uses are loss of appetite, inflammation of the mouth and pharynx, excessive perspiration. Sage is used externally for inflammation of the mucous membranes of the nose and throat, for mouth wash in inflammations (gingivitis and stomatitis) and internally as a carminative for dyspeptic symptoms and as a diaphoretic [1].

Standardized *Salviae folium* consists of the whole or cut dried leaves of *Salvia officinalis* L., and minimum 15 ml/kg of essential oil for the whole drug and minimum 10 ml/kg of essential oil for the cut drug (anhydrous drug) [4].

From an underground fibrous root system there arise a grayish, much branched, pubescent stem with branches opposite. The stem is erect and woody at the base with leafy, quadrangular, white-gray tomentose branches [1].

The lamina of whole sage leaf is about 2 cm to 10 cm long and 1 cm to 2 cm wide, oblong-ovate, elliptical. The margin is finely crenate to smooth. The apex is rounded or subacute and the base is shrunken at the petiole and rounded or cordate. The upper surface is greenish-grey and finely granular; the lower surface is white and pubescent and shows a dense network of raised veinlets. Odour strongly aromatic on crushing, taste aromatic and bitter [4].

It is doubtless that, for any plant material used as a crude drug material, it is rational to cultivate the plant in the optimized agricultural conditions instead of collecting them from the wild [5].

Accordingly to current trends in the area of standardization of herbal products, for cultivation are selected the medicinal plants, specified in the pharmacopoeias or recommended by other authoritative documents, or documented as the source material used or described in

traditional medicine [6]. Therefore, official medicinal plants, for which are developed standardization criteria and occurs the multi-year experience of cultivation, present the significant interest for the search of promising sources of new active phytopharmaceuticals, exhibiting specific biological effects.

The plant plot was introduced from seeds in April 2013 under outdoor conditions. The primary seed material for introduction was collected from cultivated samples in the Crimea.

No growth stimulants and additional irrigation were used within the first year of the cultivation experiment. Fertilizers N<sub>32</sub>-P<sub>32</sub>-K<sub>32</sub> were applied.

The blossoming and frost injuries were not observed during the first year of vegetation of the investigated species.

The plant height reaches 20 cm during the first year and the beginning of the second year of introduction.

Under outdoor introduction conditions, vegetation of the second-year species begins in April.

The plant volatile oil was obtained and assayed by the steam distillation method [7] from the investigated material, collected in the end of the first-year vegetation. The analyzed material yielded 17,5 ml/kg of essential oil for the cut drug (anhydrous drug), that complies requirements [4] of the European Pharmacopoeia.

Considering the complex estimation for successfulness of the plant introduction and the volatile oil content, *Salvia officinalis* is a promising species for cultivation in conditions of Lviv region, Western part of Ukraine, for further application with medicinal purposes.

#### References:

1. Gruenwald J., Th. Brendler, Ch. Jaenicke (sc. eds.). PDR for Herbal Medicines. - Montvale, NJ: Medical Economics Company, 2000. – 858 p.
2. Barnes J., L. A. Anderson, J. D. Phillipson. Herbal Medicines. 3<sup>rd</sup> edn. - London, Chicago: Pharmaceutical Press, 2007. – 710 p.
3. Schnitzler P. Comparative *in vitro* study on the anti-herpetic effect of phytochemically characterized aqueous and ethanolic extracts of *Salvia officinalis* grown at two different locations / P. Schnitzler, S. Nolkemper, F.C. Stintzing *et al.* // Phytomedicine. - 2008 - No. 15 (1-2) - pp. 62-70.
4. European Pharmacopoeia. VII. - Strasbourg: Council of Europe, European Directorate for the Quality of Medicines, 2008.
5. Orhan I. HPLC Quantification of Vitexine-2''- O-rhamnoside and Hyperoside in Three Crataegus Species and Their Antimicrobial and Antiviral Activities / I. Orhan, B. Ozcelik, M. Kartal *et al.* // Chromatographia Supplement. – 2007. - Vol. 66. - pp. 153-157.
6. WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. – Geneva : World Health Organization, 2003. – 72 p.
7. Государственная фармакопея СССР. 11 – е изд. Вып.1 – М.: Медицина, 1987. – 335 с.