# ON THE QUESTION OF CULTIVATION OF ALKALOID-CONTAINING PLANTS IN UKRAINE

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**Introduction.** Alkaloids, like most drugs, are both toxic. Evolution has already carried out a screening process itself whereby plants are more likely to survive if they contain alkaloids which deter animals or insects from eating them. The rate of accumulation of alkaloids during plant vegetation is different, also different organs can contain different amounts of these substances. These are evolutionary processes that are not subject to anthropogenic influences.

**Aim.** To conduct an analysis of the effect of external environmental factors on the content of alkaloids in plant medicinal raw materials, to identify relevant for Ukraine species containing alkaloids and determine the prospects for their cultivation.

**Materials and methods.** Information search and analysis of data of modern foreign and domestic literature.

**Results and discussion.** Numerous researches show that the number of alkaloids in the plant is affected by abiotic factors, which must be taken into account when cultivating them.

Increased alkaloid content is contributed by high intensity and duration of sunlight, high air temperature at low relative humidity. Usually plants growing in a tropical climate are more prone to accumulation of toxic compounds. Warm weather enhance the content of alkaloids in plants, cold weather inhibits it, and alkaloids in the plant do not accumulated at all while it's freezing. The content of alkaloids varies even during the day. Lobelia inflata (L). has their number at night by 40% more than at noon. Cuts of unripe capsule of Papaver somniferum (L.) in the evening give a greater yield of opium and the content of alkaloids is higher. Sokolov's studies showed the benefits of harvesting Salsola richteri (L.) in the early morning and at night.

Altitude above sea level and climatic zone also significantly affect the dynamics of accumulation of alkaloids. Rhaponticum repens (L.), grown in atypical dry ecotypes for it, is little toxic or completely non-toxic. It becomes poisonous if it grows on lowland bottoms, wetlands. Since alkaloids are nitrogen-containing compounds, the role of nitrogen fertilizers in their synthesis in plants is indisputable; Also favorably affects on alkaloids the content of various microelements in the soil, such as copper, manganese and cobalt. But the excess of potassium reduces their amount.

The content of alkaloids decreases with slow drying and in storage raw materials in damp premises.

More than 15 plant species are in demand in the modern pharmaceutical market of Ukraine, the main Biological Active Substances of which are alkaloids. Among them, a third of the species are weeds. These are both adventive plants Hyoscyamus niger (L.) and Datura stramonium (L.), for which the technology of cultivation has already been developed in Ukraine and species of natural flora Chelidonium majus (L.), Conium maculatum (L.), and Cynoglossum officinale (L.), which medicinal raw materials are harvested in natural phytocenoses.

Papaver somniferum (L.) is known only in culture, the technology of its cultivation is developed in many parts of the world. Now in Ukraine mostly non-alkaloid varieties of poppy are cultivated, widely used in the food industry. Attempts to grow a drought-resistant species of African and Asian flora Aerva lanata (L.) Juss. ex Schult. there are in Poltava and Odessa regions. Far-Eastern shrub species Securinega suffruticosa (Pall.) Rehd. is cultivated in many domestic botanical gardens as ornamentals, but its cultivation is also promising in Ukraine for obtaining medicinal raw materials.

The greatest number of alkaloid-containing plants belongs to the rare and protected species on the territory of Ukraine. For example, Colchicum autumnale (L.), Thalictrum foetidum (L.), Atropa belladonna (L.) and Glaucium flavum Srantz are listed in the Red Book of Ukraine, community Nuphar Lutea (L.) Sm. included in the Green Book of Ukraine, Lycopodium clavatum (L.), Veratrum lobelianum Bernh. and Echinops ritro (L.) are protected at regional levels in certain regions of Ukraine.

Technologies of cultivation in our country are developed only for Glaucium flavum, Colchicum autumnale, Atropa belladonna and Echinops ritro. The lack of such technologies for a number of protected species is often explained not only by economic aspects. Growth of aerohydatophyte Nuphar lutea is possible only in coastal water and aquatic cenoses, and Lycopodium clavatum refers to spiophytes and can be cultivated only under the canopy of the forest.

**Conclusions.** The analysis shows that only for the half of the demanded alkaloid-containing species in Ukraine is developed cultivation technology, for other species, some of which are protected, the development of such technologies is relevant.

## DETERMINATION OF THE QUANTITATIVE CONTENT OF FLAVONOIDS IN THE THALLOMS OF PARMELIA SULCATA AND PARMELIA PERLATA

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**Introduction.** According to literature, the Parmeliaceae family has about 2700 representatives. In turn, the genus Parmelia includes about 70 species, the most widespread among which are Parmelia sulcata and Parmelia perlata. These lichens are commonly found on all continents. They grow on the slopes of rocks, stony terrain, infertile soils and on trees as epiphytes.

Representatives of the genus Parmelia are used as animal feed, as a natural brown paint, in cosmetology for skin whitening, and some people use it for food. Along with this, they have long been used in folk medicine in many countries as antiviral, antitumor, antioxidant, antimicrobial, antipyretic, analgetic, antiallergic, wound healing and antispasmodic remedies. Galenic preparations from the thalloms of different species from the genus Parmelia are used in Indian folk medicine in the treatment of diarrhea, psoriasis, amenorrhea, dysentery and many other diseases. Literary data suggest that some representatives of this genus may exhibit antidiabetic, hypolipidemic and cardioprotective activity.

**Aim.** For the purpose of comprehensive phytochemical study of the thalloms of Parmelia sulcata and Parmelia perlata, the quantitative content of flavonoids in the investigated raw material was determined.

**Materials and methods.** The air-dry thalloms of Parmelia sulcata and Parmelia perlata, which were harvested in Kazakhstan in 2016-2017, were used for the research.

Quantitative determination of the sum of flavonoids in the thalloms of Parmelia sulcata and Parmelia perlata was carried out by spectrophotometric method in accordance with the method described in the second edition of the SPU, supplement 1 in the monograph "Sophora alabastrum". The maximum absorption for solutions of the investigated raw material was recorded at a wavelength of 410 nm. The calculation of the content of flavonoids was carried out on rutin and absolutely dry raw material.

**Result and discussion.** Preliminary detection of flavonoids in the studied types of raw materials was carried out by methods of paper and thin-layer chromatography.

As a result of the conducted experiments, it was found that the content of flavonoids in the thalloms of Parmelia sulcata and Parmelia perlata slightly differed. The content of the sum of flavonoids in the thalloms of Parmelia sulcata was 1,00 ± 0,03%, while in the thalloms of Parmelia pelata it comprised 1,21 ± 0,03%.

**Conclusions.** The obtained results can be used in the development of the quality control methods for thalloms of Parmelia sulcata and Parmelia perlata, as well as in the development of drugs on their basis.