Wormwood jelly: SibFU scientists propose enriching northerners' diet with unusual ingredients

Scientists of the School of Economics and Commerce (SibFU) proposed new options for using plant materials remaining after squeezing essential oils. The experts believe that substances extracted from Artemisia absinthium L. (wormwood), Ledum palustre L. (ledum) and Tanacetum vulgare L. (tansy) can enrich foodstuffs and increase their nutritional value.

It was proved that these non-traditional plants contain biologically active components that can significantly diversify the modern diet. This will be especially useful for Arctic residents experiencing a seasonal lack of vitamins and plant foods in their diet. It is noted that the technology for extracting these substances from oil cakes does not cost much. The study results were published in IOP Conference Series: Earth and Environmental Science journal.

Harvesting wild plants, as well as building enterprises for processing of local medicinal plant materials and producing food additives from them are considered an important task contributing to the development of the regional economy, the growth of import substitution and the development of the northern territories of the Russian Federation. The study conducted by the Krasnoyarsk scientists showed the unique capacities of using the local plants which are widespread and resistant to negative natural factors, such as low temperatures or poor soils. These plants can enrich foodstuffs with special substances contained in them extracted from the residues of the production of medicinal essential oils.

'It is not by chance that we chose wormwood, ledum and tansy, which have long been used for pharmaceutical purposes. The high biological activity of the components contained in them, wide geographical distribution and availability of these plants, as well as their unpretentiousness and rapid renewability make them extremely profitable. These materials are inexpensive and can be used on an industrial scale. The main thing is collecting them in unpolluted places. There are good reasons why these plants are considered medicinal — they contain potent components, an overdose of which can be dangerous to humans. We solved this problem by isolating the necessary substances from oil cakes which remain after extraction of medicinal sources. That is, all potentially dangerous potent contents have already been previously extracted from plant materials,' said **Olga Veretnova**, assistant professor of the Chair of Commodities Research and Examination of Goods, SibFU.

The scientist said that during the research they studied the chemical composition of essential oils, dry herbal substances and oil cakes. Moreover, they proposed a simple and effective way to turn plants known for their bitterness into tasty and healthy gelled desserts.

'Essential oils from wormwood, ledum and tansy can be used in the perfumery and cosmetics industry, as well as for aromatization of alcoholic and confectionery products. Everyone knows vermouth and absinthe which are traditional wormwood drinks. The oil cake remaining after extracting the medicinal substance and essential oils, however, is a source of a large number

of extractive substances, but for food purposes only some of them can be used. To obtain these non-toxic extracts, we used a specific extraction mode. With its help, it was possible to isolate proteins, carbohydrates, vitamins, minerals and tannins.

We decided to add the obtained extracts to the gelled desserts. These desserts are the most useful among all confectionery products as they contain little sugar and add useful pectin substances to the diet, which improve the microflora and intestinal motility and are capable of adsorbing harmful substances. The extracts of wormwood, ledum and tansy increase this healthiness dramatically,' explained **Galina Gulenkova**, assistant professor of the Chair of Commodities Research and Examination of Goods.

The experts clarify that during the analysis it turned out that tannins, simple phenols and flavonoids are common to all three plant species. Wormwood and tansy are related by the presence of oxybenzoic acids (the well-known salicylic acid belongs to this family). Tansy and ledum are related by the plant pigments Auron and Anthocyanins. In addition, wormwood contains the maximum amount of xanthones, powerful antioxidants, while ledum contains anti-inflammatory coumarins, leukoanthocyanins and antioxidaing catechins and chlorophyll. Due to such a wide range of extractives, these plants can be used not only in the pharmaceutical industry, but also for perfumery and cosmetic purposes.

'Our extracts contained tannins (having not only astringent properties, but also vitamin and antibacterial activity) ascorbic acid and vitamin PP. They can definitely make up for the lack of these substances both in the diet of modern citizens and in the traditional menu of the northerners. You will not feel the bitterness in these desserts, because the extracts are completely devoid of this taste. We offer the food industry a fresh look at pharmaceutical production and make it at least partially waste-free. Take a look at how much benefit the oil cake of wormwood, tansy and ledum, previously seemed useless, can bring,' summed up **Galina Rybakova**, assistant professor of this Chair.

The researchers of the School of Economics and Commerce developed relevant regulatory documents for the products offered. At the time of the research, a check for the safety and preservation of the products met the relevant standards and requirements.

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