УДК:614.3:632.95:543.6

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ПЕКТИН ЯК ДІЄТИЧНА ДОБАВКА ТА АДАПТОГЕН ДЛЯ ЗМЕНШЕННЯ РИЗИКУ НЕГАТИВНОГО ВПЛИВУ НА ОРГАНІЗМ ЗАБРУДНЕННЯ ДОВКІЛЛЯ ВАЖКИМИ МЕТАЛАМИ

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PECTIN AS FOOD ADDITIVE AND ADAPTOGEN TO REDUCE THE RISK OF ADVERSE EFFECTS ON THE BODY OF HEAVY METALS ENVIRONMENTAL POLLUTION

In Ukraine both ecosystems and human activities are negatively impacted by pollutants and other environmental stresses. This created demand for a complex prevention program related to environmental pollution.

Recent studies have elucidated many interesting features of pectin that are complex polysaccharides and components of the primary plant cell walls. These studies indicate the possibility of elimination heavy metals and other toxic substances from the body, and at the same time improve health indices.

Technologica Ltd. has patented a novel technology for pectin extraction from sugar beet and apple. Pectin is extracted by adding acid at pH-values 1.5 – 2.2 for 60-80 min.; then followed by saponification by alkali at pH-values 10 – 11 for de-esterification purposes. Afterwards acid is added again at pH-values 1.4 – 1.8 to form gel structures, then neutralized by adding alkali to reach pH-values 6.5 – 7.5. Pectin is then washed and dried. This technology made it possible to obtain pectin with high binding capacity to heavy metals. At the moment Pectin Complex containing 12% of pectin and about 1% of vitamins is produced. It is widely used not only in Ukraine but also in Belarus and Vietnam.

At the same time, the mechanisms of binding heavy metals are not well described. Despite the importance and urgency of the examination of the complexes formed by carbohydrates and the great number of experimental and theoretical works in this field, there is no uniform concept on the interrelation between the structure of the complexes and their properties. The cause of that is an extreme complication of the objects under study stipulated by features of carbohydrates as complexones. Nevertheless, the needs of practice, in particular searching for new types of mild detoxicants, demand a quite definite information on the structure and properties of the complexes of metals with carbohydrates.

At the moment this work is being performed within NANOMED project **"***Nanoporous and nanostructured materials for medical applications"* (Horizon 2020 research and innovation programme under a grant agreement No 734641, http://www.nanomed-project.eu/) in collaboration with University of Alicante (coordinator of the NanoMed project), R.E.Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology, National Academy of Sciences of Ukraine (Kyiv) and Budapest University of Technology and Economics. This project also involves several academic institutions and small enterprises from 9 countries (France, United Kingdom, Portugal, Greece, Hungary, Slovakia, Moldova, Ukraine, Kazakhstan). Currently several new compositions of carbon and pectin in different ratios were synthesized and already proved a higher binding capacity towards mercury in vitro experiments.