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**MECHANISMS, KINETICS AND ENERGETICS OF PLANT RAW MATERIAL
EXTRACTION PROCESSES IN ELECTRODYNAMIC-TYPE SCREW DEVICES**

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In modern conditions of development of mechanical engineering and food technologies, improvement of plant raw material processing processes is of particular relevance in order to increase energy efficiency and quality of the final product. One of the promising directions is the use of electrodynamic-type screw devices to intensify extraction processes.

The extraction process in such devices is characterized by a complex interaction of mechanical, hydrodynamic and electrophysical factors. The main mechanism is the mass transfer of target components from the solid phase to the liquid under the action of concentration gradients, which is significantly enhanced due to the electrodynamic effect. The presence of an electric field contributes to the destruction of cellular structures of plant raw materials, which increases the availability of extractive substances.

The kinetics of the process is determined by the rate of diffusion, convective transport and the intensity of mechanical mixing, which is provided by the screw working body. It has been established that the combination of mechanical compression and electrodynamic processing allows to significantly reduce the duration of extraction and increase the degree of extraction of target components.

Energy analysis shows that the use of electrodynamic screw devices allows to reduce specific energy consumption by reducing the processing time and increasing the efficiency of mass transfer. Optimization of design and operating parameters (screw rotation speed, electric field strength, process temperature) is a key factor in ensuring energy savings.

Thus, the use of electrodynamic screw devices is a promising direction in the development of plant raw material extraction technologies, which combines process intensification, increased product yield and reduced energy costs.

References:

1. Zabarny G.M., Kudrya S.O., Kondratyuk T.G., Chetveryk G.O. Thermodynamic efficiency and resources of liquid biofuels of Ukraine. – Institute of Renewable Energy of the National Academy of Sciences of Ukraine, Kyiv, 2006. – 226 p.
2. Burlaka V. V., Energy conservation and energy management in the food industry. – Kyiv: Center for Educational Literature, 2020. – 312 p.
3. Chemat F., Vian M. A., Cravotto G., Green extraction of natural products: Concept and principles // International Journal of Molecular Sciences. – 2012.

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SOLID MATERIALS FOR HYDROGEN STORAGE USING Ti

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The transition to environmentally friendly hydrogen energy is one of the main tasks of modern science and industry. However, the widespread introduction of hydrogen as the main energy carrier remains lacking in safe, compact and cost-effective methods of its storage. Traditional methods, such as gas compression under high pressure or liquefaction, have low efficiency and high risks when used. The best alternative is solid-phase storage of hydrogen in a bound medium in metal matrices. The effectiveness of such systems directly depends on the development of new materials with high sorption capacity and optimal operating temperature conditions. This study focuses on the modification of titanium alloys, as well as on the development of innovative high-entropy alloys (HEA) with improved thermodynamic and kinetic characteristics.