

CHOICE OF TECHNICAL EQUIPMENT FOR MANUFACTURE OF EXTRACTS FROM SUNFLOWER RAW MATERIAL

Guzenko V., PhD in Tech. Sc., Sen. Lect.
Kharkiv State University of Food Technology and Trade

The implementation of the extraction process for pectin containing feedstock's is difficult, as the detailed details of its passage are still unexplored. As you know, the choice of the method of extraction can both simplify and complicate the subsequent stages of production of pectin (processes of concentration, purification, drying, etc.). Such remarks, especially, should be taken into account in the continuous technology of pectin extraction.

In order to obtain high-quality pectin products with low cost, we need not only modern technological processes and formulations, but also modern machines and devices that would meet all technological requirements, in terms of economy, convenience in maintenance, reliability.

Today, there is a wide range of equipment that is used at various stages of the production of pectin concentrates. In addition, the efficiency and environmental friendliness of technologies for the production of various types of pectin products greatly depends on the technical condition and the improvement and engineering solution of a specific technological task requiring extraction equipment. In addition, modern machines and apparatus for obtaining pectin extracts should be automated using computer and microprocessor technology and provide all technological processes in optimal mode.

When choosing the necessary equipment design for the extraction of pectin substances, it is advisable to determine the main characteristics of the existing equipment.

So, to work in an aggressive environment, stainless and enamelled steel is used. Some parts of the equipment may be made of food plastic or rubber, which can withstand the temperature effect and have anti-corrosion properties.

In the process of extraction of pectin substances, auxiliary processes can be used, among them – maintaining a constant high temperature in the heat shield or additional equipment by heating the technological or working fluid.

The extraction process for pectin-containing feedstocks can take place in one or more stages. Depending on this equipment may have one unit of equipment or several apparatuses (extractors) that are interconnected. In relation to the type of reagent (water, acid, alkali, enzymes, etc.), the extractors have open, closed, semi-tight or sealed containers. Overall dimensions of the equipment are determined by functional purpose and technical solution.

Overall dimensions of the equipment are determined by functional purpose and technical solution. One of the features of each type of extractor is the passage time of the process, the presence of the working body and the type of extraction. The equipment is equipped with a variety of turbulent elements and additional processes. One of the processes that allows intensifying the process of extracting pectin substances is the mixing process. In the case of extraction of pectin substances, the mixing process is used to eliminate the phenomenon of formation near the surface of the phase distribution of a solution of high concentration, which slows the mass transfer from the raw material to the solution. Mixing of the technological solution in the process of extraction is through the use of additional working bodies of the device – mixers and rotors of arbitrary shape.

The analysis of various mixing elements, which differ in shape, size and area of application, shows that disk, blade and turbine mixers can be used to intensify the transition of pectin substances into the extractant solution. We have developed a plant for extraction of pectin substances, which has a mixing element similar to a shredder used in shaving machines for public catering establishments. Such a mixing element will simplify the design of the extraction plant by reducing the metal content. Also, in order to prevent the formation of the well for mixing viscous media, achieving greater uniformity and intensity of mixing, the structure of the stirring element is equipped with special partitions, which are additional blades.

Thus, the production of high-quality pectin extracts with low cost requires the creation of not only modern technological processes and formulations, but also the selection and creation of modern hardware equipment of the production process that would meet all the technological requirements regarding economy, convenience in service, reliability and environmental friendliness.