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**OVERVIEW OF THE PROCESSES FOR MEMBRANE
PROCESSING OF FRUIT JUICES
(ОГЛЯД ПРОЦЕСІВ МЕМБРАННОЇ ОБРОБКИ
ФРУКТОВИХ СОКІВ)**

Membrane methods for separating liquid systems such as dialysis, reverse osmosis, ultrafiltration are gaining more and more attention every year. The separation of mixtures by membrane methods, in contrast to the widely used methods of evaporation, rectification, extraction and others, is carried out without phase transformations and usually at ambient temperature. One of the drawbacks of using this technology is the clogging of membranes with particles, which leads to a decrease in equipment performance. Microfiltration, ultrafiltration and reverse osmosis are processes that have much in common, since they require semi-permeable membranes made of the same material, only having different pore sizes and working at different levels of overpressure. Ultrafiltration, in contrast to reverse osmosis, is used to separate systems in which the molecular weight of the dissolved components is much larger than the molecular weight of the solvent. One of the main stages of the apple juice production process is the clarification stage, which is carried out to colloid stabilization of the product during storage, to improve its product appearance and organoleptic properties. Conformity with current international standards is achieved by integrating membrane processes into the technology, providing a high yield, improving the taste, presentation and nutritional value of juices due to the rejection of preservatives and harsh heat treatment. Along with quality improvements, the use of membrane systems as part of production lines creates the opportunity to improve the economic indicators of apple processing for juice. The tasks of clarifying juices are the destruction of the colloidal system of the product, the removal of high molecular weight protein, pectin and polyphenolic substances, microorganisms while preserving biologically active and valuable components – vitamins, sugars, mineral and aromatic substances, acids. Traditional technological schemes for the production of juices provide for combined clarification by mechanical methods (decanting, centrifugation, filtration), physicochemical (gluing with gelatin and tannin, treatment with infusorized soil and bentonite) and enzymatic processing of squeezed juice. Traditional methods of clarifying and stabilizing fruit juices are based on introducing additives into the product – clarifying materials. Excessive amounts of mineral and

other ballast substances often pass from clarifying materials to juice. The duration of processing juices according to the traditional scheme is 24–30 hours. Such prolonged contact of the product with atmospheric oxygen contributes to the loss of some of the biological value of the juice components. All this negatively affects the quality of the finished product. With the advent of modern high-performance synthetic membranes, it has become possible to effectively clarify the juice while fully preserving the valuable components of the juice. For fine clarification of juices, membranes are used in the range for micro- and ultrafiltration. Membrane processes are particularly suitable for use in cases where the mixture to be separated contains labile, easily degradable substances. These are most often liquid food media, for example, juices, extracts, protein solutions, etc. The development of membrane processes for their separation makes it possible to create fundamentally new technological schemes and equipment for the integrated processing of plant materials, reduce environmental pollution through the use of waste-free technologies, and also obtain food products with new functional properties and high nutritional value. Membrane processes in the technology for the production of fruit juices are currently used mainly for their clarification and concentration. In contrast to microfiltration, ultrafiltration processing of juices, beer, wines and other food colloidal dispersed media eliminates not only insoluble, but also soluble substances, in particular, pectin, starch, proteins, condensed forms of polyphenols. Ultrafiltration clarification of juices is more complete and effective, therefore, it is widely used in industry for clarification and stabilization of the quality of apple, grape, cherry, lemon, orange and other juices. The process of clarification of fruit and berry juices and wines using membrane technology helps prevent clouding during storage and, accordingly, increase the permissible shelf life. Membrane ultrafiltration practically does not change the quantitative content of alcohol, sugar, volatile acids, minerals, as well as titratable acidity and pH. At the same time, the content of components such as phenolic and nitrogenous substances decreases, which leads to the stability of wines to protein, reversible and irreversible colloidal turbidity. Thus, the ultrafiltration process of clarification of fruit juice does not reduce its nutritional value, therefore, in its manufacture it is possible to recommend membrane technology instead of clarification by pectolytic enzymes, heat treatment and separation.