

# DETERMINATION OF THE PRODUCTIVITY OF UF-MEMBRANES DEPENDING ON THE PRESSURE PARAMETERS OF THE PROCESS

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The processes of the division of liquid and gaseous systems play an important role in many branches of economy and, first of all, in various areas of biotechnology. The division with the use of perm selective membranes (membrane process) is the most universal method of the division. In food technology, membrane processes are used for the concentration of fruit and vegetable juices, milk, obtaining of high quality sugar, in wine industry, etc. Membrane processes are broader used for the treatment of water and water solutions, during the exudation of biogenic substances from plant and animal raw material, during the purification of waste water and obtaining of concentrates from the secondary food raw material. The research of the properties of membranes for carrying out baromembrane process – ultrafiltration with the purpose of finding optimal conditions for their work – is a very actual task.

At the first stage, the initial performance of semipermeable membranes of the PAN type was investigated. Studies were carried out on distilled water at a temperature of 20 °C and various values of ultrafiltration pressure. The research results are summarized in table 1.

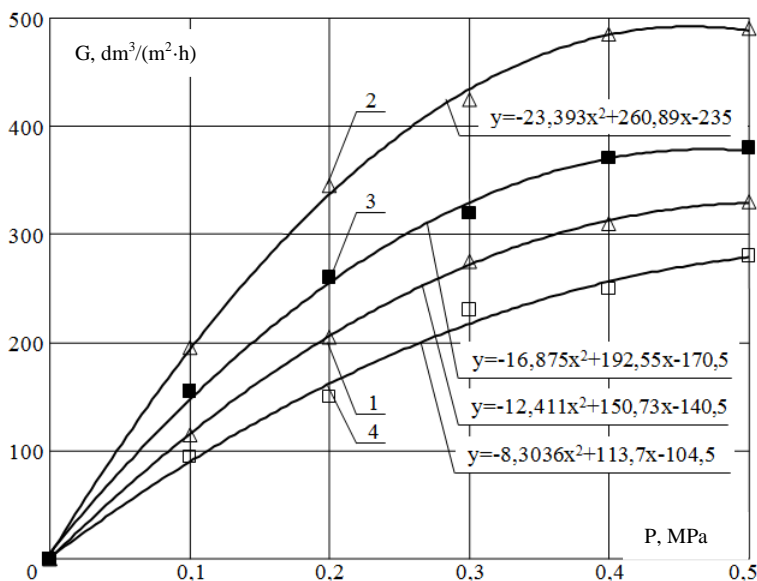
Table 1

## Initial ultrafiltration membrane performance

The amount of ultra-filtration pressure, MPa	Initial performance of UF-membranes, dm <sup>3</sup> /(m <sup>2</sup> ·h)				
	PAN-50	PAN -100	GR61PP	GR81PP	Pypor 3
0,1	120...125	160...165	Not explored		
0,25	350...355	535...540	480...500	240...250	150...155

The authors studied the influence of working pressure of the filtration on productivity of ultrafiltration membranes PAN (filtered liquid – distilled water). The results of the research are presented in fig. The data presented in the figure 1 show that both the investigated and control membranes refer to acceptable membranes, which are able to consolidate, i.e. they possess maximum of critical value of the filtration pressure. It is known that maximum acceptable pressure is that filtration pressure, the achievement of which does not raise productivity. Based on fig. it is possible to state that maximum acceptable filtration pressure for both kinds of the researched membranes is 0,45–0,50 MPa.

These are the values of the filtration pressure, when the increase of membranes productivity both slows down and then practically stops. Besides, as the investigations showed, the increase of the filtration pressure to 0,6 MPa both failed to raise membranes productivity and led to mechanical destruction of the selective layer.



**Fig. 1. Dependence of UF-membranes productivity in the filtration pressure (the filtered liquid is purified water; filtration temperature is 20 °C):**  
**1 – PAN-50; 2 – PAN-100; 3 – GR 61 PP; 4 – GR 81 PP**

So, the most rational values of pressure during the process of ultrafiltration by means of PAN membranes are 0,45–0,50 MPa, because we can observe maximum possible membranes productivity without their destruction.