FILTRATION IN BIOTECHNOLOGY

Britan M.V., Manoukian A.A., Kalyuzhnaya O.S., Kalyuzhniy A.B.*, Strelnikov L.S.
The National University of Pharmacy, Kharkiv, Ukraine
Kharkov P.Vasilenka National Technical University of Agriculture, Kharkiv, Ukraine
biotech_ukrfa@mail.ru

The final stage of any microbiological production is the isolation of the desired product (cell biomass or a product of cell metabolism) from the culture medium and its purification. In most cases, before extraction of the desired product, which is inside the cell, it is necessary beforehand to break this cell. However, this process is not convenient to carry out directly in the culture medium drawn from the fermenter, and with the concentrate after removal of the cell culture fluid. Therefore, regardless of the location of the desired product, the first stage of the isolation of most products of microbiological synthesis is the separation of microbial biomass producers from the culture medium. Thus, various methods can be used depending on the type of microorganisms.

For the separation of bacterial cultures filtration with using various types of filters (vacuum filters, nutsch filters, belt filters, drum filters, chamber filters) are widely used. Filtration of the bacterial suspensions is associated with great difficulties arising from the small size of cells, high viscosity suspensions and the large amount of impurities microparticles, so the development of new and improvement of existing designs filters and filter occurs constantly.

Today there are widely used filters based on fluoroplastic. Fluoroplastics – the name used in industry for any one of a series of fluorine-containing plastics, which are homopolymers of fluorine derivatives of ethylene or copolymers of ethylene fluorine derivatives and, for example, fluoroolefins, olefins, or perfluoroalkyl vinyl ethers. The most important are polytetrafluoroethylene (PTFE), which accounts for 85 percent of the world production of fluoroplastics, and polychlorotri-fluoroethylene (PCTFE). Both are white, crystalline substances that exhibit good chemical and thermal stability, good resistance to cold, weatherproofness, nonflammability, and a number of valuable physical properties. These filter elements with different porosity to liquids and gases (including aggressive) have widest range of applications (energy, oil refining, engineering, electrical, chemical, light, medical, food industries). They are used for filtering of: oils, fuels, acids, alkalis, food, drinking water, medicines, biological media. However, despite these attributes, perhaps the most desired characteristic of this group of plastics is their ability to resist abrasion. Simply stated, here is a chemist's explanation for this unique property: A tightly bonded, impenetrible shield of fluorine atoms surrounds and protects an interior chain of carbon atoms. Unlike other materials, whose molecules lock into each other then break off when sliding takes place, these molecules have very little attraction for other substances. So today at the Department of Biotechnology of NUPh and the Department of Materials Technology of NTUA it is carried out work about possibility the use of porous materials based on PTFE for use in biotechnology.