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Development of Strategy for Enhanced Production of Industrial Enzymes by Microscopic Fungi in Submerged Fermentation

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Abstract : Green processes are based on innovative technologies that do not negatively affect the environment. Industrial enzymes originated from biological systems can effectively contribute to sustainable development through being isolated from microorganisms which are fermented using primarily renewable resources. Many widespread microorganisms secrete a significant amount of biocatalysts into the environment, which greatly facilitates the task of their isolation and purification. The ability to control the enzyme production through the regulation of their biosynthesis and the selection of nutrient media and cultivation conditions allows not only to increase the yield of enzymes but also to obtain enzymes with certain properties. In this regard, large potentialities are embedded in immobilized cells. Enzyme production technology in a secreted active form enabling industrial application on an economically feasible scale has been developed. This method is based on the immobilization of enzyme producers on a solid career. Immobilizing has a range of advantages: decreasing the price of the final product, absence of foreign substances, controlled process of enzyme-genesis, the ability of various enzymes' simultaneous production, etc. Design of proposed equipment gives the opportunity to increase the activity of immobilized cell culture filtrate comparing to free cells, growing in periodic culture conditions. Such technology allows giving a 10-times raise in culture productivity, to prolong the process of fungi cultivation and periods of active culture liquid generation. Also, it gives the way to improve the quality of filtrates (to make them more clear) and exclude time-consuming processes of recharging fermentative vials, that require manual removing of mycelium.

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