Nanochemistry and biotechnology

Cellulases and hemicellulases from microscopic fungi

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Cellulases and hemicellulases have numerous applications and biotechnological potential for various industries [1,2]. Conversion of plant lignocellulosic biomass by these enzymes is important platform of the future biorefinery [3]. Obtaining of cellulases and xylanases, meeting industrial requirements is critical for biofuel production. From the collection of mycelial fungi of the DIBB, 6 active producers of cellulases and xylanases from mesophilic and thermophilic fungi have been selected. By optimization of submerged cultivation conditions high activities of cellulases and xylanases were obtained. To obtain the enzymes technical preparations filtrates of cultural liquids were cooled to 4°C; cold ethyl alcohol, acetone, isopropanol, ammonium sulphate in different ratios were added and after 15-20 minutes or 5-6 h in case of ammonium sulphate. Pallet after centrifugation (6000 rpm for 10 minutes) lyophilized. Precipitation by ethyl alcohol (1:3.5) and ammonium sulphate were found the most efficient. In both cases, the yields according to cellulase activities were 80-85%.

Cellulase activity of enzyme preparation obtained from the strain *Trichoderma viride* X 33 is 126 U/g, from the strain *Penicillium canescence* D 85–185U/g and from the strain *Sporotrichum pulverulentum* T 5-0 110 U/g. Cellulase activity of enzyme preparation obtained from the strain *Aspergillus* sp.Av10 is 120 U/g, xylanase activity of enzyme preparation obtained from the strain *Aspergillus niger* A 7-5–1155U/g and from the strain *Aspergillus niger* Aj 38 - 1250 U/g . Optimum pH and temperature of operation and thermostability, of the enzyme preparations were established.

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