## Nanochemistry and biotechnology

# Thermostable cellulase/xylanase complex from microscopic fungi

**T.A. Sadunishvili[1], L.I. Kutateladze[1], R.M. Khvedelidze[1], T.R. Urushadze[1], N.G.Zakariashvili[1], I.L.Khokhashvili[1], M.D. Jobava[1], I Kvesitadze[2]**

[1] *Agricultural University of Georgia, Durmishidze Institute of Biochemistry and Biotechnology, 240 David Aghmashenebeli Alley, 0159 Tbilis Georgia.*
*E-mail: t.sadunishvili@agruni.edu.ge*

[2] *Georgian Technical University, 77 Kostava str., 0175 Tbilisi, Georgia.*

The majority of cellulases used in biotechnology are still derived from well-characterized non-extremophilic microorganisms. The draw of these industrial enzymes is the lack of activity at even slightly elevated temperature and the tendency to denature at other critical condit Thermophillic fungi producing cellulase complex are valuable sources of heat stable cellulases. Additional stability of the enzyme complex reusability could be achieved by their immobilization on suitable solid materials. *T.reesei* cellulases chemically bound to magnetic nanoparti exhibited excellent stability and catalytic activity [1].

As a result of screening of microscopic fungi from the Institute culture collection two strains, active producers of cellulase/xyla *Penicillium canescence* E-2 (mesophile) and *Aspergillus versicolor* Z17 (thermophile) were selected. The highest cellulase/xylanase activ 220 $Uxg^{-1}$/1200 $Uxg^{-1}$of were obtained for mesophilic strain enzymes at 45-50$^0$C, while almost the same activities 125 Uxg-1/940 $Uxg^{-1}$ fixed for the enzymes from thermophile at temperature 60-65°C. Optimum pHs of action for the both enzymes were similar 4.5-5.0. cellulase/xylanase technical preparations hydrolyzed cellulose of untreated wheat straw to reducible sugars by 46-52% and to glucose by 22-2 However the enzyme preparations from the thermophilic *A.versicolor* conducted the process at 60$^0$C higher by 10$^0$C as compared to meso analogue. Rate of hydrolyses of the pretreated substrate by the same enzyme preparations to reducible sugars and glucose conducted at opti for their action 60$^0$C and 50$^0$C was 52-61% and 29-33%, correspondingly.

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1. *Abraham R.,, Verma M.,, Barrow C,, Puri M. Suitability of magnetic nanoparticles immobilized cellulases in enhancing enzymatic saccharification of pretreated hemp biomass*//Biotech Biofuels. -2014.-**7**, -P.90–99.