The synergy of recombinant xylanolytic enzyme on xylan hydrolysis

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Abstrak

Microbial xylanases or xylanolytic enzyme have received considerable attention over the last years owing to a multitude of possible applications. These enzymes have potential in the biodegradation of lignocellulosic biomass to fuels, chemicals, fruit juice, animal feed and in improving rumen digestion. More recently, the use of xylanases as bleaching agent in the pulp and paper industry has been suggested to replace of some of the chemicals presently used for this purpose. Such applications could have an important positive impact on the environment. The purpose of this research was determining the synergy of 3 recombinant xylanolytic enzymes (β-xylosidase, exo-xylanase and α-Larabinofuranosidase) from recombinant Eschericia coli BL21 (DE-star) in xylan hydrolysis by analysis the reduction sugar product. Purified of recombinant xylanolytic enzyme β-xylosidase (Xyl), exo-xylanase (Exo-Xyl) and α-Larabinofuranosidase
(Abfa) with Ni-NTA resin. Seven samples of enzyme (each and enzyme mixture) used to hydrolyze xylan substrate (oat-spelt xylan). Analysis of hydrolysis product was done by HPLC. The xylanolytic
activities of this enzyme before and after purification were 0,91 and 9,94 U/mL (Exo-Xyl); 1,65 and 14,2 U/mL (Xyl);
0,65 and 5,6 U/mL (Abfa). The xylosidase activity were 2,37 and 14,3 U/mL (Xyl); 1,49 and 10,5 U/mL (Exo-Xyl);
2,54 and 18,6 U/mL (Abfa). The highest hydrolysis product of xylan (xylose) shown in enzyme mixture of exoxylanase
and β-xylosidase was 1,084 mg/mL