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Pretreatment of brewers´ spent grains for cellulases production by *Aspergillus niger* van Tieghem

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Successful utilization of cellulosic materials as a renewable carbon source is dependent on the development of economically feasible process technologies both for the production of biomass-degrading enzymes, and for the enzymatic hydrolysis of cellulosic materials to low molecular weight products. Significant cost reduction is required in order to enhance the commercial viability of cellulase production technology and biomass pretreatment can be an essential processing step for this purpose. Thus, the aim of this work was to evaluate the performance of pretreated brewers´ spent grains on the improvement of cellulases production by *A. niger* van Tieghem. For this, brewers´ spent grains was submitted to autohydrolysis treatment. Initially, the material was dried, milled and sieved (1.0 mm screen). Water was added to the sample in a closed and pressurized vessel (solid/liquid ratio 1:10 w/v), and the system heated to 180, 190 or 200ºC for 10, 35 or 50 min. The liquor obtained (hemicelluloses fraction) was separated from the solids (cellulose/lignin) by filtration and both fractions were used together or not as carbon source on fermentation: 1% (w/v) treated solid fraction; 1% (w/v) solids plus 10% (v/v) liquor, or only liquor. Carboxymethylcellulose, avicel and untreated brewers´ spent grains were used as control. The inocullum was done in Mandels medium and the cultivation conditions were 30ºC/100 rpm for 6 days. Carboxymethylcellulase (CMCase) and avicelase were assayed by DNS using 1% (w/v) carboxymethylcellulose in sodium acetate buffer, pH 4.0 and 1% (w/v) avicel in the same buffer, pH 5.0, respectivelly, while β-glucosidase was detected by *p*-nitrophenolate released using 5 mM pnp-β-D-glucoside in sodium citrate buffer, pH 4.5. One unit of enzymatic activity was defined as the amount that liberated 1 µmol of product per minute on assay conditions. The results showed that the liquor obtained at 190ºC/50 min autohydrolysis was quite favorable to CMCase and avicellase production, since the enzyme production was significantly higher than with other sources. However, the effect of the treatment on β-glucosidase production was not as significant as the control. These results show that by using autohydrolysis liquor as an alternative substrate, the performance of the bioprocess for cellulase production can be improved.