

## HYDROLYSIS OF SUNFLOWER SEED MEAL LIGNOCELLULOSIC FRACTION BY FREE AND IMMOBILIZED CELLULASES

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### Abstract

Lignocellulosic biomass is widely abundant in nature and recognized as potential renewable energy source. Its efficient transformation into bio-based fuels is enabled only after adequate pre-treatment, followed by enzymatic saccharification and microbial fermentation. Hereby we present application of two cellulase preparations – from *Aspergillus niger* and *Trichoderma reesei* (Celluclast<sup>®</sup>) in treating sunflower seed meal lignocellulosic fraction (SSMLF). Temperature and pH optimums of two enzymes were determined - 52°C and pH4.8 for *A. niger* cellulase and 55°C and pH4.5 for Celluclast<sup>®</sup>. At optimized conditions, milled LFSSM was hydrolyzed by both biocatalysts. With *A. niger* cellulase higher initial reaction rates were accomplished and yield of 70 mM glucose equivalent was obtained with 0.6 % (w/v) of enzyme after 6 hours. On the other hand, application of Celluclast<sup>®</sup> led to lower initial reaction rates and yielded 25 mM of glucose equivalent with 1 % (v/v) of enzyme. To ensure cost-effective application of *A. niger* cellulase, possibility for its immobilization on different supports was investigated. By using porous methacrylate-based carrier with C6 spacer arm and primary amino groups – Lifetech<sup>™</sup> ECR8409, preparation with highest activity was produced. Obtained results are promising and could serve as a starting point for examinations on larger scales and with different lignocellulosic substrates.

**Keywords:** sunflower seed meal, lignocellulose, cellulose, immobilization