ENZYME RECOVERY FROM REAL FERMENTATION BROTH

Balázs Lemmer, **Nikolett Szpisják-Gulyás, Zoltán Jákói, Gréta Bányai, Sándor Beszédes, Cecilia Hodúr**

Department of Process Engineering, Faculty of Engineering, University of Szeged, Szeged, Hungary
lemmer@mk.u-szeged.hu

Abstract

Ultrafiltration is a widely used technique whose main complication is membrane fouling. This phenomenon causes both reversible and irreversible flow resistances that can be minimized with special techniques e.g. ultrasonic treatment and/or stirring. The application of sonication can increase the flux by breaking the concentration polarization and cake layer on the membrane surface without impairing the structure of the membrane.

Our work focused on modelling of stirred and/or ultrasound aided ultrafiltration of cellulase and β-glucosidase enzymes from real fermentation broth of experimental tobacco plants.

Membrane filtrations were done in a laboratory-grade batch ultrafiltration cell, extended with stirrer and ultrasound processor. The effects of stirring speed and ultrasound treatment were investigated on the membrane's permeate flux efficiency and on the quality of recycled enzymes. Hermia's analysis was carried out to get detailed information about membrane fouling. Resistance values were calculated by the resistance-in-series model as well.

The enzymes could be successfully from real fermentation broth. Tests of enzyme activity revealed that enzymes can keep their activity during either stirred or sonicated processes. New hydrolysis with recovered enzymes showed that there's minimal need to add new enzymes to the system to keep the efficiency of the process.

Key words: sonication, ultrafiltration, enzyme recovery, Hermia's model