

# Biomass saccharification: development of strategies for enzyme recycling

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## Abstract

In the present work the recycling of free enzymes after prehydrolysis and simultaneous saccharification and fermentation of pretreated wheat straw under a variety of conditions was investigated. It was found that a significant amount of active cellulase and glucosidase could be recovered by recycling the free cellulases the amount of free enzymes increase with its thermostability and hydrolytic efficiency. At 50° C normally regarded as an acceptable operational temperature for saccharification processes the enzymes significantly loses its activity and this thermal deactivation was independent of initial enzyme concentration used. The degree of cellulose conversion through a series of consecutive hydrolytic/recycling rounds dropped more substantially when low concentrations of cellulases were used. The hydrolysis yield and enzyme recycling efficiency in consecutive recycling rounds can be increased by using high enzyme loadings and moderate temperatures. Furthermore the recovery of cellulases from lignin lignocellulosic hydrolysates and cellulose by alkaline wash at pH 9 and 10 has been analysed.