435c Effect of Microwave on Cellulase-Catalyzed Reaction

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Microwave irradiation is a novel technique with high prospects in the cellulose pretreatment because of its merits such as the shorter time for pretreatment, less contaminant used and produced and lower energy consumption. The effects of microwave on cellulose and its enzymatic hydrolysis were investigated.

It was found that microwaves had distinct impacts on the cellulase-catalyzed reaction. The crude cellulase contained most of its catalytic activity when expanded under the radiation of 150W microwave for 4h, while the sensitivity of cellulose to cellulase was increased by the pretreatment of microwave. In addition, the moisture content of cellulose before microwave pretreatment had an unfavorable influence on the enzymolysis rate.

The sugar yield was improved with about 4 % when the hydrolysic reaction was processed under certain power of microwave, while the following enzymolysis rate adding fresh cellulase was enhanced with nearly 10 %, which revealled that microwave had a synergetic effect on cellulase. It may also suggest that microwave can destroy the structure of cellulose, and the microenvironment of cellulase-catalyzed reaction was meliorated under the microwave irradiation.

It was also found that the cooperation of Dimethyl Sulphoxide (DMSO) with microwave could boost the enzymolysis rate of microcrystal cellulose with up to 20%. While microwave couldn't enhance the enzymatic hydrolysis of filter paper in the same condition. The promotion of microwave to the cellulase-catalyzed reation had a selectivity to the cellulosic materials.