

Twin-screw extrusion pretreatment of Miscanthus for the efficient bioethanol production

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The main purpose of cellulosic pretreatment is to enhance the accessibility of enzyme to the cellulosic substrate through decrease of lignin and reduction of the crystallinity of cellulose. In this study, Miscanthus was selected as the lignocellulosic feedstock for the bioethanol production. The Miscanthus was pretreated by the twin-screw extruder which is suitable for applying the continuous and commercial process. The optimal conditions were found to be 90°C, 0.4 M, 80 rpm and 120 mL/min for temperature, NaOH concentration, twin-screw speed and flow rate, respectively. Finally, $67.31 \pm 3.36\%$ of theoretical biomass to ethanol rate (BTER) yielded after pretreatment by twin-screw extruder with sodium hydroxide. In addition, we investigated optimal condition of SSF process regarding biomass and enzyme dosage for saving production cost. 25% of biomass dosage with 30 FPU/g glucose of enzyme was suitable to produce the ethanol with pretreated Miscanthus, due to its high stability, effective reaction and economic feasibility.