Effect of physical pretreatment on dilute acid hydrolysis of water hyacinth (Eichhornia crassipes).

ABSTRACT

Effects of different physical pretreatments on water hyacinth for dilute acid hydrolysis process (121 ± 3 °C, 5% H2SO4, 60 min) were comparatively investigated. Untreated sample had produced 24.69 mg sugar/g dry matter. Steaming (121 ± 3 °C) and boiling (100 ± 3 °C) for 30 min had provided 35.9% and 52.4% higher sugar yield than untreated sample, respectively. The highest sugar yield (132.96 mg sugar/g dry matter) in ultrasonication was obtained at 20 min irradiation using 100% power. The highest sugar production (155.13 mg sugar/g dry matter) was obtained from pulverized samples. Hydrolysis time was reduced when using samples pretreated by drying, mechanical comminution and ultrasonication. In most methods, prolonging the pretreatment period was ineffective and led to sugar degradations. Morphology inspection and thermal analysis had provided evidences of structure disruption that led to higher sugar recovery in hydrolysis process.

Keyword: Physical pretreatment; Water hyacinth; Dilute acid hydrolysis; Morphology.