Alkali and glycerol pretreatment of West African biomass for production of sugars and ethanol

KOH (1%) and glycerol (20–40%) pretreatment of bamboo, rubber, elephant grass and nSiam weed were investigated with respect to biomass composition, enzymatic hydrolysis and ethanol fermentation. Delignification was higher under alkaline environment and increased considerably with temperature (25-121°C). Lignin removal had a positive effect on biomass digestibility, sugars production and ethanol yield. The highest sugar and ethanol yields were observed for KOH pretreatment (121°C, 1h) on elephant grass which also recorded the highest delignification (67.5%) and consequently the lowest solids recovery (59.5%). The grass gave the highest yield on glucose (19g/100g raw material), xylose (8.2g/100g raw material) and ethanol (9.8g/100g raw material) under KOH pretreatment (121°C, 1h). The elephant grass has great potential to be used as a major energy crop in Africa in a biorefinery where production of sugars, ethanol and other valuable biochemicals are optimised.

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