

Investigation of mass balance on electron beam irradiation with chemical combined treatments of Korean *Miscanthus*

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In this study, Korean *Miscanthus* was pretreated by electron beam irradiation (EBI) and then enzymatically hydrolyzed for sugar production. Based on fundamental experiments, 30 FPU/g-biomass of cellulase with 60 CBU/g-biomass of cellobiase were determined as optimal enzyme loading. Total irradiation dose of electron beam was considered as significant factor for pretreatment and 500 kGy of irradiation dose at 7.4 mA and 1 MeV was determined by glucose conversion (enzymatic digestibility) which is enhanced about 1.26-fold compared with control (none treatment). In synergetic effect of pretreatment, the thermo-chemical treatments combined with EBI was performed by sulfuric acid and aqueous ammonia. The result indicates that aqueous ammonia with EBI treatment shows the highest glucose conversion (87.97%) and 32.3% of biomass to glucose recovery which is 2.4-fold enhanced than control. It indicates that about 323 g of glucose should be recovered, if 1,000 g of *Miscanthus* is loading in the process.