

Modeling and simulation of empty fruit bunches (EFB) bio-oil production process

Do Xuan Truong, 임영일*
한경대학교
(limyi@hknu.ac.kr*)

The empty fruit bunch (EFB), a waste of the palm oil industry, is one of the most renewable energy resources, and promises high yield of bio-oil, low gas and char. This study aims to develop a comprehensive process model of EFB fast pyrolysis for bio-oil production using process simulator, Aspen Plus. The process includes four main areas i) EFB size reduction and drying, ii) a pyrolysis reactor, iii) gas-solid separating and iv) quenching. The pyrolysis reactor, fluidized bed, is modeled by using a combination of two zones: pyrolysis and combustion which are heat-connected by the sand flow. Sand and char are separated from the gas flow in the high efficiency cyclone and electrostatic precipitator (ESP). The Peng-Robinson thermodynamic model is applied for calculating the mass and energy balances in the quenching process. The simulation results have good agreement with experiment data. This modeling study will be used for economic analysis of the EFB bio-oil production process.