

## Comparative techno-economic analysis of palm empty fruit bunch (EFB) to fuels

Do Xuan Truong, \*

(limyi@hknu.ac.kr\*)

Approximately one million metric tons of empty fruit bunch (EFB) which is a waste of the palm oil industry are discharged every year in the world, mainly in Malaysia and Indonesia. It is one of the most recent renewable energy resources. There are several pathways to convert low heat value EFB to fuels. The objective of this study is to carry out the techno-economic analysis of three conversion pathways from EFB which are bioconversion to produce bioethanol, fast pyrolysis to make biooil, and gasification to generate syngas. To achieve this objective, first three comprehensive process models of bioethanol, biooil, and gasification are developed with the aid of experimental data. For each plant, the optimal configuration was found with regard to the product yield and energy consumption. Next the total capital investment (TCI) and total production cost (TPC) of the three cases were estimated. The economic benefit was compared in terms of the payback period (PBP), return on investment (ROI) and net present value (NPV). The sensitivity of key variables to NPV was analyzed for all three cases.