

Industrial scale Hydrogen production via hydrothermal liquefaction of brown algae, *Saccharina Japonica* based bio-refinery:
An Experimental and simulation approach

Niaz Haider, 유 준[†]
부경대학교
(jayliu@pknu.ac.kr[†])

This study focuses on hydrothermal liquefaction of *Saccharina japonica* as a feedstock to produce biocrude and subsequent hydrothermal gasification of aqueous product to produce hydrogen, which will be used as a feed for biocrude upgrading and other commercial purposes. Process is operated at a temperature of 300°C with biomass to water ratio of 1:10 in sub-critical pressure condition. Experimental results were used to validate the process model designed on the Aspen plus simulator. A techno-economic model for the current process was developed to evaluate the cost-effective production of H₂ gas. Pressure swing adsorption lead to a total hydrogen production of 2,400 kg/hr with a wet feed of 70,000 kg/hr. On site steam generation with total heat integration not only reduced the dependence on the external utilities but also produced 30MW of surplus power using methane as a fuel for combustion. The total capital investment for the plant was estimated to be \$84.0MM with an operating cost of \$80MM/year.