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## Conceptual model in aspen plus for recovery of biocrude from hydrothermal algal biomass liquefaction

Taimur Akhtar and Souman Rudra  
University of Agder, Norway

The recovery of biocrude from biomass is gaining interest because of its potential use in the sector of renewable energy systems. Hydrothermal liquefaction (HTL) is one of the perspective technologies to utilize biomass for biofuel production. In this paper a comprehensive Aspen Plus modelling study was carried out for algal biomass and hydrothermal liquefaction reactor. The primary goal was to develop simplified simulation model for hydrothermal biomass liquefaction. Predictive Soave-Redlich-Kwong (PSRK) equation of state, Unifac model and Yield reactor block were chosen based on a thorough study of a suitable modelling approach. Process simulation was performed based on data from literature and laboratory scale experiments. Simulation results show  $1\text{ kgs}^{-1}$  algal biomass generates  $0.45\text{-}0.62\text{ kgs}^{-1}$  bio-oil,  $0.22\text{-}0.07\text{ kgs}^{-1}$  gas and  $0.12\text{-}0.26\text{ kgs}^{-1}$  solids. A comparative study of simulated results and available experimental data has also been done which shows good agreement with energy conversion efficiency and heating values. This model can also be used for other potential biomass feedstocks to predict the biocrude compositions at various operating condition such as temperature, pressure, residence time and water-to-biomass feed ratio.

[taimur.akhtar@uia.no](mailto:taimur.akhtar@uia.no)

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