

ABSTRACT

The use of alternative energy in Indonesia that is being developed is biomass energy. In Indonesia, the source of biomass is very abundant, one of which is corncob waste. And if used more, it can produce energy that can be utilized by the people of Indonesia. As a type of renewable energy, biomass can be used as gas fuel for gasification. In addition to corn cobs, coconut shells can also have the potential as a source of renewable energy. In the gasification research, the updraft type will be used. This research was conducted by simulation using the Computational Fluid Dynamics (CFD) method using the ANSYS Academic Student version 2021 R1. The simulation was carried out by looking at the comparison of corncob and coconut shell fuel as raw materials at combustion temperatures of 1073 K (800°C) and 1273 K (1000°C). In addition, this simulation is carried out by observing the effect of the equivalence ratio at 0,21, 0,24, and 0,32. The simulation results using updraft gasification produce various syn gas. The only observed syn gas is CO, H₂, CO₂, and CH₄ gases. CO₂ gas decreased as the combustion temperature increased, in contrast to other gases which increased. The use of corncobs as fuel is considered better than coconut shells because it produces more CO and H₂ gases. By using the ratio of ER, determine the amount of airflow rate that will be entered into the reactor tube.

Keywords : ANSYS academic student version 2021 R1, CFD, equivalence ratio, syngas, updraft gasification.