ABSTRACT

Gasification of biomass in a reactor Circulating Fluidized Bed (CFB) has the potential for the development of clean technologies and the improvement of the quality of the resulting fuel gas. The process of pyrolysis or gasification is a thermal decomposition process in which the carbon chains of biomass split into gases CO, CO_2, CH_4, and H_2. Based on the advantage which is owned by the CFB reactor, to know how the gasification process is carried out in the reactor simulation process. Simulation and analysis of the characteristics of biomass gasification is done to get a visualization of the characteristics of biomass gasification using Computational Fluid Dynamic (CFD). CFD methods contained in ANSYS 14.5 is used to determine the dimensions and configuration of the system at CFB biomass gasification reactor such as the distribution of temperature, pressure distribution, fluid flow, and direction of the particles during the process of biomass gasification. In the simulation results showed that the flow velocity in the reactor is relatively common along the steeper the reactor, the pressure distribution is greater at the bottom and at the top of the reactor tends to shrink, the composition of CO and H_2 can not be detected but for a fraction of the fuel gas is already visible along the height of the reactor CFB. The entire results of CFD simulation has shown characteristics of gasification CFB namely fluidization velocity design 0.7 m / s and minimum fluidization velocity 0.07 m/s that can be seen in one simulation with input MFR 0.00709 kg / s and the air speed 2.35 m/s has the value of the flow rate or fluidization 1,638 m/s; 2,234 m/s; and 2952 m/s are seen from three points to review.

Keywords : biomass gasification, *circulating fluidized bed* (CFB), *computational fluid dynamic* (CFD), ANSYS