Air intake modification for pyrolysis optimization on rice husk fixed bed downdraft gasifier with maximum capacity of 30 kg/hour

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Abstrak

Rice husk is one of the
most abundant biomass wastes in Indonesia. One way to convert it into an alternative source of energy is biomass gasification. This is a thermochemical process which converts biomass feedstock into fuel gas or chemical feedstock gas (producer gas). The gasification type which is developed in this study is fixed bed downdraft type due to its low tar content and compatibility in microscale implementation. One major problem with the implemented biomass gasification reactor was ruggedness of the partial oxidation process due to the absence of air in the reactor?s middle section, which consequently affected the pyrolysis zone. Several experiments were conducted previously using coconut shells and rice husks as solid feedstock, where an equivalence ratio (ER) of 0.4 was obtained. Therefore, in order to optimize the pyrolysis zone, the modification conducted involves adding a circular air intake into the gasifier. Experiments were conducted in a pyrolysis temperature range of 300?700oC with ER variation of 0.19, 0.24, 0.27 and 0.31. The results show that a good quality producer gas is produced at an ER value of 0.24. This value shows a promising result because the ER value of biomass gasification standard is 0.25.