

EXPERIMENTAL INVESTIGATION ON TAR REMOVED FROM CLEANING SYSTEMS OF DOWNDRAFT BIOMASS GASIFIER WITH CO-GASIFICATION

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Downdraft biomass gasifier is generally used to run internal combustion engine. Gasification process is a converting of biomass fuel into combustible gases for operating engines and was purposed as green technology to convert different biomass into clean energy. Production of impurities/tar from gasification systems is one of the most challenging issues for this technology. Overall goal of this study is to evaluate tar impurities and efficiency of cleaning systems of downdraft biomass gasifier in syngas produced from co-gasification of wood chips and corn cobs as compared with the mixture of bagasse and coconut shells. Performance of different cleaning unit i.e. cyclone separator, wet scrubber, biomass filter and axillary filter were tested with the mixture of these fuels. Gasification experiments were done in a 24 KW downdraft biomass gasifier. It was founded that co-gasification of corn cobs and wood chips produced less amount of tar 8212mg/Nm³ compared to mixture of bagasse and coconut shells which produces 11937mg/Nm³ with the syngas lower heating value of 3.8 MJ/Nm³ and 4.56 MJ/Nm³ respectively. It was observed that when mixture of corn cobs and wood chips were used as a fuel tar contaminations were reduce from 7425 to 190 mg/Nm³ while in case of bagasse and coconut shells tar impurities decreased from 8500 to 270 mg/Nm³. Overall removal efficiency of cyclone separator, wet scrubber, biomass filter and axillary filter was 69 %, 59 %, 80% and 35% respectively.

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