

## MODELLING OF SELECTED WASTE BIOMASS DOWNDRAFT GASIFICATION

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Gasification of waste biomass has double benefit since it presents efficient and environmentally friendly procedure to produce energy. Modelling of gasification of demolition wood and coffee waste, and their mixtures, in downdraft gasifier is investigated. Air is exclusively used as gasification agent. A model for waste biomass gasification has been developed using “Engineering Equation Solver” (EES). The downdraft gasification model, prepared within this study, is an analytical semi-empirical model that can be used as a tool to analyse the general trends of biomass downdraft gasification. The main characteristic and advantage of this model is that involves main gasification sub-processes (drying, pyrolysis, gasification). Also, model is capable of dealing with wide variety of biomasses (based on elemental and ultimate analysis) and to predict its behaviours during a gasification process (yield and composition of the products - producer gas, charcoal and tar). Different gasification process parameters (temperature, equivalence ratio, air preheating) are varied and discussed in order to define optimal (qualitative and quantitative) yield of producer gas for each of biomass and their mixture.

**Keywords:** downdraft gasification, biomass, demolition wood, coffee waste, semi-empirical model