# ANALYSIS OF BIOMASS BASED DOWNDRAFT GASIFIER USING EQUILIBRIUM MODEL

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## ABSTRACT

Development of non-conventional energy is an important activity all over the world. Among the non-conventional energy sources, biomass is the most promising one. During the past decade, substantial research has been performed on different biomass gasification systems, employing different gasifier configuration (e.g., fixed bed, and fluidized bed, or other), different oxidants (air, oxygen, steam), and different modes of heating (direct or indirect). Downdraft biomass gasification is of particular interest in many applications because of its low tar and oil yields and low carry-over of char and ash into the product gas. Downdraft gasifiers find wide applications in both power generation and thermal energy applications. Since the experimental approach is expensive, computer simulations are used for the investigation. A mathematical model to study the performance of a gasifier is required to improve the design of the gasifier. In this connection a survey of the existing model in the literature was carried out. In the present work Mathematical model was developed to characterize the gasification performance of a typical biomass downdraft gasifier. The composition of producer gas has been determined. The effects of Moisture content in the wood and equivalence ratio in the gasification zone have been investigated. The predicted values compare reasonably well with experimental data.

**KEY WORDS:** Biomass, Equilibrium Modeling and Gasifiers.