

Energy recovery potential and characterization studies of sawdust and rice husk

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Abstract

In this study the thermal decomposition of Sawdust and Rice husk were analyzed using Thermogravimetric analysis in N₂ atmospheres at a heating rate of 40°C/min. The results showed that the weight loss occur in two stages for both the biomasses, where the devolatilization reaction occurs around 100 to 260°C and final decomposition was occur during 300 to 1000°C. The lower heating values of the sawdust and rice husk are 4400 and 3450 Kcal/kg. Further in this paper these biomasses are compared with the other biomasses in the literature for energy recovery potential as feedstock to thermochemical conversion process like gasification which is an efficient and eco-friendly process.

Keywords: Sawdust, Rice husk, Thermogravimetry

Introduction

A new renewable source of energy is all around us just waiting to be capitalized upon. Biomass plant material, vegetation, chipped wood, Sawdust and agricultural waste is a permanent natural resource in a country like india where agriculture was the primary source. In this lot of waste was produced in the agriculture which is having high energy value. From this waste we can recover energy which can meet the energy crisis, mainly in the rural areas where there was no electricity up to now. This helps in the decentralised supply of power to these areas.

Materials and Methods

Sawdust and rice husk selected for this study was heated to around 105°C to remove the moisture to and then it was grounded to less than 250 micron size for using it analysis in Thermogravimetric analyzer and also for proximate and ultimate analysis. Finally the Differential scanning calorimetry was used for knowing the heating values.

Results

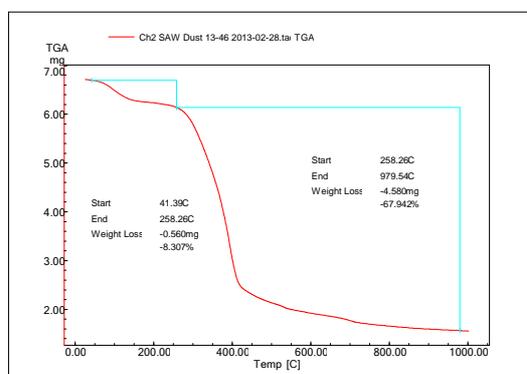


Figure.1. TGA curve for sawdust at a heating rate of 40°C/min in N₂ atmosphere.

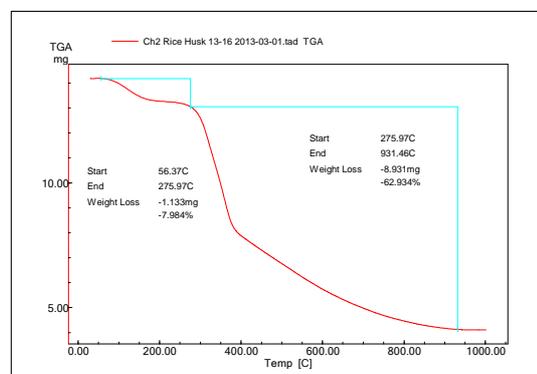


Figure.2. TGA curve for ricehusk at a heating rate of 40°C/min in N₂ atmosphere.

Table.1. Ultimate analysis of Sawdust and rice husk in Wt. %

Biomass	C	H	O	N	S
Sawdust	33.0	4.30	25.00	0.50	0.32
Rice husk	37.1	5.0	31.23	0.43	0.19

Table.2. Proximate analysis of Sawdust and rice husk in Wt. %

Biomass	Moisture content	Ash	Volatile matter	Fixed Carbon	LHV Kcal/kg
Sawdust	6.5	21.0	59.0	15.1	4400
Rice husk	5.9	3.5	75	15.9	3450

Conclusions

The thermogravimetric analysis was done with the two biomasses and it was observed that the devolatilization was occurred around 100 to 260°C f and the further decomposition was occurred at 300 to 1000°C for both the biomasses. The heating values obtained are 4400 and 3450 kcal/kg of sawdust and rice husk respectively.

References

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