

Combustion behaviour of agro-industrial and livestock wastes blends

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Keywords: agro-industrial wastes, livestock wastes, blends, combustion, TG//DTA/FTIR analysis.

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Agricultural and also agro-industrial sectors produce large quantities of solid organic wastes which often cause environmental problems like dispersing foul odors, occupying vast areas, ground and surface water pollution etc. By-products from agricultural production, vegetable and fruit processing by-products as well as animal manure can be used as a direct or indirect source of energy for heat and power generation. Some of them, especially wastes in liquid state are major feedstock in biogas production.

Fresh livestock wastes usually have high moisture content which decreases the heating value acceptable for combustion process. Instead of drying process livestock wastes can be mixed with another solid agro-industrial wastes to prepare fuels, which have acceptable energy and physical parameters for application in energy processes.

In this paper combustion behaviour of agro-industrial and livestock wastes blends was investigated using thermal analysis techniques. Wastes were mixed with the special proportions according to the assumptions relating to energy parameters of fuels.

Thermogravimetry (TG-DTA) and differential scanning calorimeter (DSC) techniques were used. The TG-DTA tests were performed to analyse the reaction regions, ignition and burnout temperatures, heat flow rate values of the samples are determined. Additional gaseous emissions by using the coupled Fourier transform infrared spectroscopy (FTIR) and Gram Schmidt profiles were determined.

Results showed the range of raw materials moisture, which is necessary to obtain good quality fuels and combustion behaviour, especially level of pollutants such as CO₂, CO, SO₂ and others trace gases.