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Res. Agr. Eng.

Malaťák J., Bradna J.:

Use of waste material mixtures for energy purposes in small combustion devices

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The article assesses the energy use of solid biofuels (wheat and rape straw) and their blends with suitable additives (cocoa husks, brown coal and coal sludge). The elemental and stoichiometric analysis evaluates their suitability for energy recovery. Furthermore, thermal emission characteristics in automatic hot water boiler VERNER A251 are observed. The results of thermal emission measurements show that all samples meet the requirements of the Directive No. 13/2006 for carbon monoxide (2,000 mg/m3). The average nitrogen oxides emission concentrations exceed emission limits compared with the Directive No. 13/2006 (250 mg/m3) for all samples of solid biofuels. One reason is the high temperature in the combustion chamber that increases combustion temperature and results in high temperature of nitrogen oxides. Another problem is carbon monoxide that depends on the coefficient of excess air. The value of this coefficient drops under its optimum (2.5) and subsequently follows an increasing trend.

Keywords:

biomass; additives; cocoa husks; brown coal; coal sludge; net calorific value; emission

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