

# CALORIMETRIC METHOD OF FUEL QUALITY CONTROL OF AGRICULTURAL ORIGIN

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The production of energy from biomass of agricultural origin is an industry that is developing dynamically in many countries of the world. The widespread use is of waste from the main activities of agriculture, including straw and sunflower husk. Basically, most of straw cereals are a by-product and are not used in any way. However, combustion of such fuels in the form of briquettes or pellets poses a number of problems, the main of which to control the quality of fuel, since their heat of combustion depends not only on the type of grass, but also on the place of its cultivation and the method of harvesting. In addition, the quality of briquettes and pellets largely depends on the moisture content of the original mixture.

A calorimetric system were developed and established by Institute of Engineering Thermophysics for measuring the calorific value of fuel. A new methods and technical solutions for measuring the heat of combustion of fuel with improved operational and metrological characteristics has been implemented. Also were proposed and grounded, as well as algorithms and software for controlling and measuring the caloric value of fuel, which allows automating the measurement process.

Calorimetric analysis includes determination of the higher and lower heat of combustion, ash content and humidity. It was carried out for pellets and briquettes from agricultural waste collected in the fields of Ukraine. The obtained results of measurements and calculations showed in the table.

	straw of cereals		sunflower husk	
	briquette	pellet	briquette	pellet
density, kg/m <sup>3</sup>	981	920	886	1034
humidity, %	7,0	11,0	8,3	11,1
ash content, %	2,68	3,93	2,21	1,87
higher heat of combustion, MJ/kg	17,60	16,21	18,58	18,62
lower heat of combustion, MJ/kg	16,15	14,72	17,20	17,18

Briquettes has a long burning characteristic, higher than 5 ... 10% of heat of combustion than pellets of the same raw materials, but the process of their production is labor-intensive and energy-intensive. In general, the analysis of the results of calorimetric investigation has been confirmed that the basic quality indicators of Ukrainian briquettes and pellets comply with European standards.