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ГАЛАХИМ



Analytical estimation of MSW-derived fuel calorific value

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Keywords:

MSW, RDF, calorific value

Research Objective:

The purpose of this work is to **study an analytical method for estimation energy potential of MSW-derived fuel**. The aim was to **calculate the MSW sample’s calorific value** by means of existing regressions based on waste composition.

Table 1 – Composition of the sample

Sample composition	% mass (dry basis)	% (wet basis)
Food	21,7	14,32
Paper / carbord	1,2	0,79
Wood	18,6	12,28
Textile	17,7	11,68
Leather / rubber	23,7	15,58
Plastics	4,4	2,9
Composite materials	8,4	5,54
Other	1,7	1,12
Glass / stones	2,6	1,72
Moisture (wet basis)	0	34,06
Calorific value (laboratory results)	13550 kJ / kg	

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Results

Table 2 – Results of the sample approbation

Regression	Composition	Results of calculation, kJ/kg	Percentage error, %
Asturias (Spain) [4]	morphological	8883,05	34,44
Tokyo [5]	morphological	6616,05	51,17
Ali Khan [5]	morphological	7796,96	42,46
Eq 1 [5]	morphological	7654,99	43,51
Eq 6 [5]	morphological	7693,37	43,22
Eq 3 [5]	morphological	10715,21	20,92
(Content of component) x (calorific value of the component) International data	morphological	10825,64	20,11
(Content of component) x (calorific value of the component) Russian data	morphological	19277,60	-42,27
Steuer [5]	ultimate	12750,16	5,90
Scheuerer-Kestner [5]	ultimate	18386,79	-35,70

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Conclusions

Regressions presented in articles [4, 5] based on morphological composition do not show a close convergence to the experimental value; the experimental calorific value was 13.55 MJ/kg, the values according to the presented formulas vary from 6.62 to 10.83 MJ/kg.

Regressions based on the ultimate composition show ambiguous results. One regression presents the value relatively close to the laboratory analysis while second regression does not prove to be reliable for calculations.

Further search for analytical methods has the aim to identify an equation for reliable estimations. The expanded experimental data is needed.

References

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Thank you for your attention!

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