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COMPARISON OF TWO TYPES OF COMBINATION OF WASTE FOR THE PRODUCTION OF BIOENERGY FROM LIGNOCELLULOSIC WASTES

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INTRODUCTION: Due to the depletion of raw materials and pollution from industrial processes are of fundamental importance to studies on alternative energy sources. Agribusiness and pre-processing of grain produce a large amount of biomass whose use constitutes an economically viable alternative energy through the compression portion of lignocellulose as raw material to replace wood. In Brazil there are significant quantities of lignocellulosic residues likely to use such as forestry waste and crops, agricultural (eg, sawdust, bagasse, rice hulls, straw, bark, ground beans and leftover corn, soybeans, beans, cotton seed hulls, etc.). For this, the briquetting is a very efficient way to concentrate the available energy in biomass. Increasing by at least 5 times the energy efficiency of waste, taking into account the bulk density and the average calorific value of these materials. In Brazil, the interest in the application of briquette has always been focused on the use of fine particles of coal in the steel industry. However, the region, depending on the volume of agricultural production generates a large volume of biomass that is not utilized as an energy source, whereby the lignocellulosic briquettes a viable option. In this sense, our study aimed to fabricate and test compounds lignocellulosic briquettes from waste sawdust and soybean and corn stover and sawdust for comparison about the performance quality of briquettes for heat generation.

RESULTS AND DISCUSSION: Tables 01 and 02 show the average results of 08 repetitions performed for each test. With regard to moisture content, it can be seen that the values obtained were in the range suggested by the ideal humidity Austrian standard ÖNORM M 7135:2000, which is between 8 and 12% for the two combinations of waste, but , the briquette made from soybean residue has a relatively lower moisture content than the briquette made from corn. The moisture content is one of the most important properties of biomass fuels, and the higher this feature, the lower the net amount of heat released in its combustion, as part of its energy is used to heat and vaporize the water. The expressive content of ash from agricultural residues is expected, and partly due to the high silica content present in these substrates. While the briquettes have been produced from sawdust and waste pre-processing of corn and soybeans, resulting in high values over the ash content in the light of the significant amount of silica residue of corn and soybeans. As a result, you can see the residue of pre-processing of soybeans, was much larger than the corn briquette. The two combinations of ash exceeded the provisions of the standard ÖNORM M 7135:2000, which is 0.5%. The briquettes of soybean residue and corn are in the range between 76 and 86% (dry basis) established to plant biomass, as Obernberg; Thek (2004), resulting in increased emission of gases during combustion. Due to the volatile matter content, there is elimination of gases in the form of flame, causing the heat will spread into a wide space in the region of burning and allow it to obtain higher temperatures at specific points.

TABLE 01 - Average results of tests of TU, TC, TMV, TCF, P and PCS for briquettes made with soy

Characterization of waste	
Medium moisture content [%]	8,56
Average content of ash [%]	2,39
Average content of volatile materials [%]	82,92
Average content of fixed carbon [%]	19,76
Porosity [%]	26,32
Gross calorific value [kcal / kg]	5,75

TABELA 02 – Resultados médios dos ensaios de TU, TC, TMV, TCF, P e PCS para briquetes confeccionados com milho

Characterization of waste	
Medium moisture content [%]	11,18
Average content of ash [%]	1,23
Average content of volatile materials [%]	79,29
Average content of fixed carbon [%]	14,34
Porosity [%]	39,83
Gross calorific value [kcal / kg]	4,87

Therefore, fuels with high contents of volatiles are burned more quickly. (Vale 2000). However, the content displayed on briquettes made from soybean was relatively higher than the level shown in briquette made from corn. We can observe that the fixed carbon content presented with a relatively low value fuels with high fixed carbon content has burned more slowly and therefore more burn time in its combustion in this sense, the briquette made from soybeans again presents with a better performance.

For the two combinations of making briquettes, low porosity indicates that despite the making of briquettes were handmade, compression of the residue was satisfactory, showing a good correlation between the volume of waste and the mass of the sample, in which case the best performance of the briquette made from corn residue. The high calorific value presented in the repetitions of the test can be assessed in terms of making the briquettes, with a combination of lignocellulosic wastes and wood sawdust and indicates an excellent performance quality of the briquette for heat generation for the two combinations, but with the making soybean residue demonstrated greater efficiency in heat generation.

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