UTILIZATION OF SPENT COFFEE GROUNDS (SCG) AS BIO-BRIQUETTE FUEL

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines
in Partial Fulfillment of the Requirements
for the Degree of

BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING
(AB Process Engineering)

JUNE 2023

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ABSTRACT

DUMELOD, JEZIAH ALEXIS A., FERNANDEZ, CHESKA V., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **June 2023, UTILIZATION OF SPENT COFFEE GROUNDS (SCG) AS BIO-BRIQUETTE FUEL.**

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The coffee industry produces a large amount of waste in the form of coffee grounds, which is about 45% of the processed coffee beans. This study aims to produce the spent coffee grounds (SCG) and cassava starch (CS) binder as an environmentally friendly alternative fuel in the form of biomass briquettes. It also aimed to determine the best binder mixture proportion through analysis of bio-briquette's physical and thermal properties.

There are 3 treatments in this study — T_1 (10:3:10) has a proportion of 100% spent coffee ground and 30% cassava starch as binder with 100% water, T_2 (10:3:12.5) has a proportion of 100% spent coffee ground and 30% cassava starch as binder with 125% water and T_3 (10:3:15) has a proportion of 100% spent coffee ground and 30% cassava starch as binder with 150% water.

Based on the analysis of physical and thermal properties of the bio briquettes, the best treatment is T_3. It has a density of 0.553 g/cc, an abrasive resistance value of 1.73 %, a shatter resistance value of 39.14% and a compressive strength of 548.0 N. It has the highest calorific value of 4,974.21 cal/g, energy density of 2763.19 kcal/cc. It also has a thermal efficiency of 73.50% and burning rate 10.27 g/min with no significant difference with other treatments.

Bio-briquettes from T_3 were considered as the best among other treatments. The cost of production for one (1) kg of T_3 bio briquette was Php 39.00 and a per piece price of Php 1.95.

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