MULTI-CROP SPICE GRINDER 2.0

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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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES TABLE

LIST OF APPENCICES FIGURES

ABSTRACT

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The study was carried out to modify, test, and evaluate a proposed new version of spice grinder machine that had previously been developed by Tadeo 2020, with regards to its capacity, percent recovery, and particle size distribution under varied grinding mechanism rotational speeds.

The hopper, frame, grinding case, grinding blade, and dust collector are the major components of the new proposed spice grinder design. The spice grinder machine is constructed of commercially available materials that are food grade as per regulatory requirement.

The performance features of the multi-crop spice grinder machine were assessed in terms of grinding capacity, percent recovery, and particle size distribution. The cost of using the spice grinder machine was determined as well.

Different spices, but primarily chili pepper and black pepper, have been used to evaluate the performance of the machine affected by speeds (2000 rpm and 2500 rpm) of rotation of the grinding blade. The performance data were analyzed at 95% confidence interval using independent t-test.

The highest grinding capacity for chili pepper was observed at 2500 rpm with a mean of 4.97 kg/hr. Regarding black pepper, machine performs better at a speed rotation of 2500 rpm produce is higher grinding capacity of 6.31 kg/hr, compared to 2000 rpm

results of 6.13 kg/hr. The grinding capacity of the two sample materials demonstrates that the varied speed applied to the grinding blade mechanism has no effect on grinding capacity.

The study found that grinding recovery for chili pepper samples was higher at 2000 rpm, with a mean recovery of 98.4%, while black pepper samples showed a higher recovery of 99.3% at 2000 rpm. The blade mechanism speed did not affect grinding recovery for both samples.

The average particle sizes of the grinded samples for the chili pepper reveal that the average particle size of the grinded chili pepper with a speed of 2000 rpm gets an overall total of 938.9967 grams, compared to 2500 rpm with an overall total of 981.33 grams. For grinding black pepper, the average particle size at 2000 rpm results in an overall total of 993.33 grams and 990.9967 grams at 2500 rpm.

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