

**DESIGN, FABRICATION, AND TESTING OF A MOTORIZED SCREW-
TYPE COPRA OIL EXPELLER WITH INTEGRATED
ACTIVATED CHARCOAL FILTRATION**

AN UNDERGRADUATE THESIS

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**JONAFE M. OLHON
JE TON CRAIG L. PADOGD OG**

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Misamis University

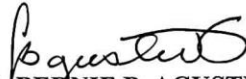
Ozamiz City, Philippines 7200
Tel. No. +63 88 521 0367 / Telefax No. +63 88 521 2917
Website : <http://www.mu.edu.ph>




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CERTIFICATE OF PANEL APPROVAL


This research paper, entitled “**DESIGN, FABRICATION, AND TESTING OF A MOTORIZED SCREW-TYPE COPRA OIL EXPELLER WITH INTEGRATED ACTIVATED CHARCOAL FILTRATION**”, prepared and submitted by, **JONAFE M. OLHON**, in fulfillment of the requirements for the degree of **Bachelor of Science in Agricultural Biosystems Engineering**, has been examined and is recommended for acceptance and approval.


ENGR. BERNIE P. AGUSTIN, MBA
Adviser
06 - 01 - 26
Date


Approved by the Committee of Oral Examination with a grade of Passed.


OLIVER S. TALIP, Ph.D.
Chairman
06 - 01 - 26
Date


YUNALYN T. VILLANTES, Ph.D.
Member
05 - 29 - 26
Date


GETHER P. ENARIO, Ph.D.
Instructor/Member
06 - 01 - 26
Date

Accepted and approved in fulfillment for the degree Bachelor of Science in Agriculture.


OLIVER S. TALIP, Ph.D.
Dean, College of Agriculture and Forestry
06 - 01 - 26
Date

DEDICATION

We dedicate this thesis to God for His constant guidance, strength, and wisdom throughout our journey. We are deeply grateful for His presence, which gave us hope and perseverance in times of difficulty.

We also dedicate this work to our beloved parents, whose unwavering support, sacrifices, and encouragement made this achievement possible. Their love and belief in us have been our greatest source of motivation in overcoming every challenge. We sincerely thank them for their patience, understanding, and continuous prayers for our success. This accomplishment reflects their efforts and God's grace in our lives.

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Jonafe M. Olhon

Je ton Craig L. Padogdog

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Je ton Craig L. Padogdog

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ABSTRACT

This study focused on the design, fabrication, and testing of a motorized screw-type copra oil expeller with integrated activated charcoal filtration intended for coconut oil extraction suitable for small-scale coconut farmers. The machine was developed to improve the extraction and filtration process through a single operating system. Performance testing was conducted using different copra sizes and batch weights to determine their effects on pressing time, oil yield, extraction efficiency, and processing capacity. A Completely Randomized Design (CRD) with a 3×3 factorial arrangement and three replications was employed in the study. Results showed that copra size and copra weight significantly influenced the performance of the machine. Medium-sized copra (0.75 inch) produced the highest oil yield, while smaller copra sizes resulted in shorter pressing time and higher processing capacity. Larger batch weights generated greater oil yield and processing capacity; however, extraction efficiency decreased as batch weight increased. Significant interaction effects between copra size and batch weight were observed for extraction efficiency, indicating that both factors influenced oil recovery performance. The combination of smaller copra size and lower batch weight produced the highest extraction efficiency. The developed machine successfully integrated oil extraction and activated charcoal filtration into a single system and achieved Technology Readiness Level (TRL) 4, indicating successful laboratory validation of the prototype. The findings suggest that the developed machine has potential for efficient coconut oil extraction and filtration under controlled operating conditions.

Keywords: *pressing time, oil yield, extraction efficiency, processing capacity.*