

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**DESIGN AND FABRICATION A COLD PRESS
AVOCADO OIL EXTRACTOR
DEPARTMENT OF CHEMICAL AND
PROCESSING ENGINEERING**

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A final project submitted to the department of Chemical and processing Engineering in fulfillment for the award of bachelor's degree in Agro-processing Engineering of Busitema University.

ABSTRACT

The growing global demand for cold-pressed avocado oil—a premium product valued for its nutritional and cosmetic applications—offers a significant opportunity for smallholder farmers in Uganda. However, these farmers face considerable challenges, including high post-harvest losses (30–50%) and limited access to affordable and efficient processing equipment. This project addresses these issues by designing and fabricating a small-scale, energy-efficient cold-press avocado oil extraction machine tailored to rural settings. The design features a cylindrical malaxing chamber with modified paddles, a variable-speed motor for controlled mixing (15–30 RPM), and an optional heating jacket to maintain optimal processing temperatures (35–45°C). It also includes a screw press and an oil separation mechanism to enhance extraction efficiency while preserving oil quality. The methodology involves the design and fabrication of core components such as the pressing cage, gearbox, and feeding system, followed by prototype testing based on parameters like oil yield, energy consumption, and durability. This innovation aims to reduce post-harvest losses, improve value addition, and support the livelihoods of smallholder farmers. Furthermore, it contributes to Uganda’s Sustainable Development Goals by promoting poverty reduction, rural industrialization, and sustainable agribusiness development.

DECLARATION

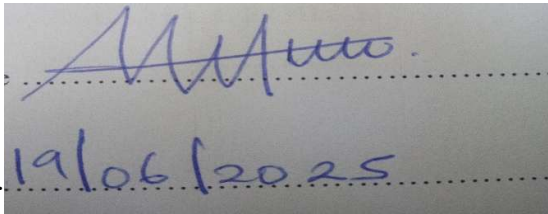
We, **MUYANJA NICHOLAS AND OTIM JOSHUA**, declare that this report is a result of my own research and has never been submitted to any institution of higher learning for any academic award.

I stand to account for all this information contained in this report.

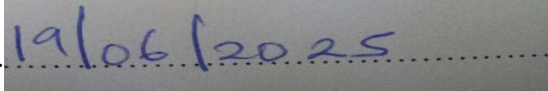
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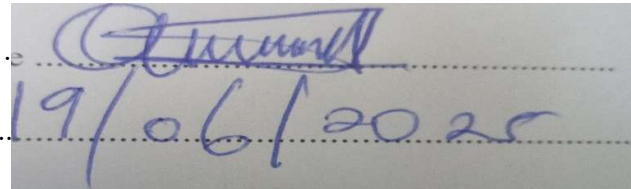
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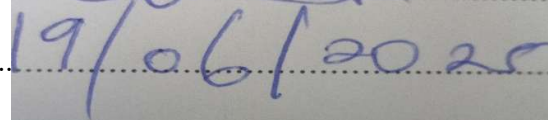
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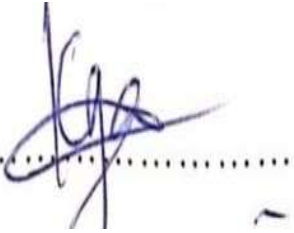
APPROVAL

This research proposal submitted as a partial fulfillment for the award of bachelor's degree in Agro Processing Engineering of Busitema University, with our approval as the academic supervisor(s).

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Acknowledgement

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Dedication

I dedicate this report to all those who have supported and guided me throughout this journey. To my beloved parents, whose unwavering love, encouragement, and sacrifices have been the foundation of my academic and personal growth. To my friends, who offered constant motivation, insightful discussions, and companionship during challenging times. And to everyone who contributed in any way to the success of this project your support, whether big or small, has been deeply appreciated. This work stands as a reflection of your belief in me.

ABSTRACT

The increasing global demand for cold-pressed avocado oil, a high-value product with significant dietary and cosmetic applications, presents a unique opportunity for smallholder farmers in Uganda. However, they face challenges such as high post-harvest losses (30–50%) and the lack of affordable, efficient processing equipment. This project focuses on designing and fabricating a small-scale, energy-efficient cold-press avocado oil extraction machine tailored to meet the needs of rural farmers. The proposed design incorporates a cylindrical malaxing chamber with modified paddles, a variable-speed motor for controlled mixing (15–30 RPM), and an optional heating jacket for precise temperature control (35–45°C). Additional features, such as a screw press and oil separation mechanism, ensure cost-effectiveness and high extraction efficiency while maintaining oil quality.

The methodology includes designing critical components (e.g., pressing cage, gearbox, feeding system), fabricating the prototype, and evaluating its performance on parameters like oil yield, energy consumption, and durability. The machine aims to reduce post-harvest losses, enhance value addition, and improve the livelihoods of smallholder farmers by addressing their technical and financial constraints. This innovation aligns with Uganda's Sustainable Development Goals by promoting poverty alleviation and sustainable agribusiness development, providing a scalable solution for rural industrialization.

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- Design a modular press chamber to enhance scalability and adaptability for varying production needs.

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