



FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING.**

FINAL YEAR PROJECT REPORT.

**DEVELOPMENT OF AN AUTOMATED CHICKEN DE-FEATHERING MACHINE
FOR CHICKEN MEAT PRODUCERS**

*A final year project report submitted to the Department of Agriculture Mechanization and
Irrigation Engineering as a partial fulfilment of the requirements for the award of a Bachelor
Degree of Science in Agricultural Mechanization and Irrigation Engineering.*

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ABSTRACT

Agricultural mechanization remains a cornerstone of improving productivity, efficiency, and sustainability in modern farming. The growing population and increasing continuous demand of chicken meat not only in Uganda but also worldwide has imposed greater call for advancement in the chicken meat processing industry especially in de-feathering operations. This paper focuses on the design and fabrication of an automated chicken de-feathering machine specifically tailored for chicken meat producers. The traditional and motorized plucking process is labour-intensive, time-consuming, and susceptible to inconsistent quality, faced with challenges of unregulated scalding temperatures, and manual scalding process. To address these limitations, this project aimed at automating the water transfer and scalding mechanism, attaining the optimal scalding temperature and scalding time to reduce human injuries and poor hygiene while ensuring precision and maintaining the quality of plucked chicken.

The project adopts an interdisciplinary engineering approach, combining principles of mechanical design, material selection, torque and speed analysis, and fabrication techniques. Stainless steel was selected for critical components due to its superior corrosion resistance, durability, and hygiene—factors essential for food product applications. The machine operates using a rotary mechanism powered by a motor that drives the rotating plate attached with pluckers. Detailed calculations were carried out to determine the torque and angular speed necessary to operate the system efficiently without damaging the chicken.

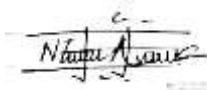
The design prioritized ergonomics, and cost-effectiveness, ensuring that chicken meat producers can adopt and operate the machine with ease. SolidWorks was used for modelling, ensuring design optimization before physical prototyping. The fabricated prototype was tested under various scalding temperature i.e. 80°C, 85°C, and 90°C at varying rotational motor speed of 100N for scalding and 240rpm for de-feathering at varying time intervals of 5 and 3 seconds respectively for both exotic and local breeds. The results demonstrated a significant reduction in plucking time while attaining optimal scalding temperature of 80°C, and 90°C for exotic and local chicken respectively at same rotational motor varying speeds and time thereby maintaining quality, consistency, and machine efficiency. Additionally, safety mechanisms and ease-of-maintenance considerations were incorporated into the final design.

This automated chicken feather plucking machine represents a viable solution to the challenges faced in chicken meat processing industry especially de-feathering operations. It offers a pathway to enhance productivity, reduce labor dependency, and improve the economic viability of poultry farming especially in chicken de-feathering operations. The successful completion of this project provides a foundation for future enhancements, including full automation and integration with smart agricultural machination technologies.

Key words; De-feathering machine, automation, scalding temperature, chicken feather pluckers

DECLARATION

This final year project report was as result of research and citation and it has never been submitted for any degree, certificate or diploma to any university or institution of higher learning.

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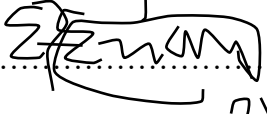
APPROVAL

This final year project has been prepared and submitted as a partial fulfilment for the award of Bachelor Degree of Science in Agricultural Mechanization and Irrigation Engineering has been under the supervision and guidance of;

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ACKNOWLEDGEMENT

We thank the Almighty Gracious Lord for the grace, wisdom, and strength through the entire project process.

We would like to convey my sincere appreciation to our dear parents, course mates, relatives and well-wishers who have supported us financially, through piece of advice and encouragement to push on.

Our sincere appreciation goes to Mr. Eriau Emmanuel, our supervisor for his continuous support, guidance during the development of our proposal project. We don't take for granted the time and care he devoted to our progress.

DEDICATION

This final year project report is dedicated to our families, supervisor Mr. Eriau Emmanuel and our friends who contributed to our success and made it possible. May the almighty continue to bless them abundantly in all your endeavours.

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