



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING AND TECHNOLOGY
FINAL YEAR PROJECT REPORT

**DESIGN AND CONSTRUCTION OF A BIOMASS-FUELED MEAT
ROASTER**

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By

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ABSTRACT

The meat industry in Uganda is expected to grow at an annual rate of 11.40%, presenting a significant opportunity for innovation in meat manufacturing. Roadside basters use undeveloped roasting practices that result in unevenly roasted meat and associated health problems. This project aims to develop a semi-automated biomass-fueled solar energy-controlled meat roaster to improve meat quality and address basters' challenges.

The proposed roaster aims to achieve consistent and thorough roasting through even heat distribution, offering versatility in roasting different sizes and types of meat. It will be constructed using appropriate materials that can withstand high temperatures without releasing harmful fumes. The significance of this project lies in producing quality roasted meat products, leading to increased marketability and higher revenue. It also promotes improved health and well-being for consumers and basters. The roaster will enhance meat Flavors with a rotary mechanism for handling meat, reduce Labor costs, and provide practical application opportunities for students. The scope of the project includes designing, fabricating, and testing the machine within five months.

The methodology covers various equations to determine the required size of machine components such as the roasting chamber, air circulation system, support system, thermal insulation, meat handling shafts, chains & sprockets, and energy requirements.

Material selection for the machine components will be carried out, considering durability and heat resistance. Computer-aided design (CAD) software like SolidWorks and AutoCAD was used for testing and simulation to assess the efficiency and effectiveness of the machine.

The proposed budget for the project's completion is UGX 3,017,000. By successfully developing and implementing the biomass-fueled solar energy-controlled meat roaster, the project aims to improve meat quality, increase marketability, and enhance the overall efficiency of meat roasting processes in Uganda's meat industry.

Keywords: biomass-fueled, meat roaster, solar energy, meat rotation.

DECLARATION

We, hereby certify and confirm that the information in this report is out of our efforts, and research, and it has never been submitted to any institution/university for any academic award.

Student's Name	Signature
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APPROVAL

This project report titled Design and Construction of a biomass-fueled Meat Roaster has been compiled by the above members and has never been submitted to any Institution/university.

Name of Supervisor: Prof. Eng. Kant Kanyarusoke

Signature:

Date:

DEDICATION

We dedicate this report to all the individuals who have played a significant role in its realization and success. To our families, whose unwavering support and encouragement have been the foundation of our journey. Your encouragement and faith in our abilities have constantly motivated us to strive for excellence.

ACKNOWLEDGEMENT

With great pleasure and honor, all thanks to Almighty God for enabling us to compile all the required information governing the final year project report.

We would like to acknowledge the guidance received from our Supervisor, **Prof. Eng. Kant Kanyarusoke** throughout the development of this final year project, and we are humbled in recognizing his expertise and valuable insights, discussions, and suggestions that contributed to the successful completion of this Endeavor.

More so, we are deeply thankful to the entire faculty and staff, most importantly the Department of Chemical and Process Engineering, for their exceptional guidance, unwavering support, and invaluable insights throughout the proposal. Their expertise and encouragement have been instrumental in shaping the direction and outcomes of this Endeavor.

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ACRONYMS

RTE	Ready-to-eat meat
PV	photovoltaic
F.O. S	Factor of safety
DC	Direct current
CAGR	Compound Annual Growth Rate

FAO	Food and Agriculture Organization
BCR	Benefit Cost Ratio
PV	Present Value
SMEs	Small and Medium Enterprises
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
CAGR	Compounded Annual Growth Rate
CAD	Computer-aided Design

CHAPTER 7: References and Appendices

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7.2 Appendices



WhatsApp Video
2024-05-15 at 11.51.



WhatsApp Video
2024-05-15 at 11.52.