FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL & PROCESS ENGINEERING

BSc. AGRO-PROCESSING ENGINEERING

DESIGN AND CONSTRUCTION OF A BIOMASS TRAY DRYER FOR CASSAVA MASH

By

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A final year project proposal report submitted in partial fulfilment of the requirements for the award of the BSc. In Agro-processing engineering of Busitema University.

Declaration

I **MIREMBE ANGEL** declare that the work presented here is out of my own research except where due references are made. It has not been partially or wholly submitted for any academic award to any institution of higher learning any award whatsoever.

Signature……

Approval

This is to certify that this research proposal has been carried out under my supervision and that it is ready for submission to the department.

Supervisor Name: MR. SSERUMAGA PAUL

Signature……

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ABSTRACT

Cassava (***Manihot esculenta***) is an important carbohydrate food source for more than 800 million people around the world (FAO, 2007). Cassava is a highly perishable root crop which is attributed to its high moisture content. The loss of the high moisture content through respiration and transpiration lead to rapid deterioration which begins within the next 24 hours after harvesting. Cassava needs to be dried immediately after harvesting to increase its shelf life. The most commonly used dryer for agro produce is the tray dryer because of its simple design and capability to dry products at high volume. However, the greatest drawback of the tray dryer is uneven drying leading to non-uniform quality and shows low levels of drying efficiency. The aim of this research was to improve the batch uniformity and the drying efficiency of a tray dryer suitable for smallholder farmers. An experiment was carried out where 10 kg of pressed cassava mash were placed at the dryer's 4 trays, that were stacked atop each other. Moisture content (wet basis) was reduced from 48 to 14 % in about 2.5 hours. It was found that a low-cost modification to the dryer chamber of putting guide lines at the inlet and increasing the number of air outlets was able to improve heat distribution and increase the uniformity of the mash's moisture content.

The purpose of this study was to design and construct a biomass tray dryer for cassava mash with proper air distribution in the drying chamber so as to achieve even drying in the tray dryer.

A biomass energy system in this study was developed and achieved through data collection which involved literature surveys and reviews and internet surfing, designing

the system components, constructing the prototype which was tested and the results analyzed.

List of Anchromys

UCA -Uganda Census of Agriculture

PMA- Plan for the Modernization of Agriculture

IITA- International Institute of Tropical Agriculture

MAAIF- Ministry of Agriculture, Animal Industry and Fisheries

HQCF -High Quality Cassava Flour

FAO - Food and Agriculture organization

HA - Hectares

Mt/ha - Metric Tonnes per Hectare

UBOS - Uganda Bureau of Statistics

℃- Degrees Centigrade

m- metres

Kw- kilo watts

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