BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL AND PROCESSING ENGINEERING

FINAL REPORT

FOR

STORAGE AND PRESERVATION OF FRESH CASSAVA ROOTS USING AN EVERPORATIVE COOLING FACILITY.

BY

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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. This limits commercial production of cassava due to storage constrains (Pérez, 2012). The methods currently in use for storage and preservation of fresh cassava have a number of hindrances which limit their use at the marketing level. This therefore led to the design and construction of an evaporative cooler for the storage and preservation of fresh cassava.

The purpose of this study was to design and construct an evaporative cooler for the storage and preservation of fresh cassava roots which the working fluids are water and air, no special refrigerants such as ammonia or CFCs are used that could be toxic, expensive to replace, contribute to ozone depletion or be subject to stringent licensing and environmental regulations.

This was achieved through the following method; design of the various components, construction of the prototype, evaluation of the shelf stability of cassava roots, and carrying out an economic evaluation for the project.

At the end of this study, the evaporative facility was constructed and the cooler was in position to ensure; extended shelf stability of fresh cassava roots due to temperature control and also ensure high relative humidity desirable for cassava storage.

Declaration

I, EBIDAU RICHARD, do hereby declare that this final report compiled is my original work and to the best of my knowledge, it has never been published or submitted for the award of any academic qualification in any higher institution of learning.

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Approval

This is to certify that EBIDAU RICHARD is the original author of this report to be submitted for examination for partial fulfilment for the award of a Bachelor of Science in Agro- Processing engineering, Busitema University under the approval of my supervisors.

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Dedication

I dedicate this report to my dear family, my parents Mr. & Mrs. EBIDAU AKIROR, and finally to my friends for the unsparing support that made this report writing a success. Love, God bless u all.

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Acronyms

FAO – Food and Agricultural Organization

FAOSTAT - Food and Agricultural Organization Statistics

PPD – Postharvest Physiological Deterioration

CFCs – Chloro Florio Carbons

CHARPTER ONE

1 INTRODUCTION

1.1 Background

Cassava (***Manihot esculenta***) is an important carbohydrate food source for more than 800 million people around the world (FAO, 2007). The flesh can be chalk-white or yellowish. Cassava is a potential biofuel crop, owing to its high starch production. Production worldwide is estimated to be approximately 230 million tonnes per annum according to recent (FAOSTAT, 2010). Uganda is the sixth largest producer of the crop in Africa, with an estimated 5.2 million tons in 2013 (FAOSTAT; 2014) and it is the second most important staple and food security crop after banana (Kleih *et al.*, 2012). According to research done by M. A. AMENY of Department of Food Science, Agricultural Center, Louisiaxa State University (USA) (Traditional cassava processing in Uganda) the most common Cassava cultivar in Uganda includes; Bukalasa8 and 11, Bintiminsi, Serere,and Empologoma, Kiwoko, Sukan and Kulanabwana.

Cassava is a highly perishable root crop whose perishability has been attributed to its high moisture content of the crop and also some environmental factors (relative humidity and temperature). The loss of the high moisture content through respiration and transpiration lead to rapid deterioration. Rapid deterioration is a major challenge limiting commercial production of cassava. PPD process begins within the next 24 hours after harvest of the cassava roots (Pérez, 2012).

Cassava storage has gone through many of contemplation and challenges both at farmer level and marketing. This has affected consumption trends of fresh cassava roots at the commercial level. The methods currently in use for storage and preservation of fresh cassava have a number of hindrances which limit their use at the marketing level such as refrigeration which requires reliable power supply and is too expensive for storage of a low value crop like cassava. Also to add on dipping in water container which leads to development of characteristic smell on the root if stored for more than two days thus affects market value.

Although it is sometimes assumed that consumption of cassava will drop with increased income levels, recent observations by operators of restaurants suggest that there was increased demand for agricultural fresh foods e.g. cassava for breakfast among the more affluent Ugandans (Scoping study, 2014). Thus necessitating the development of an evaporative cooler for preservation and

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