FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING

DESIGN AND FABRICATION OF A DUAL POWERED GINGER PULVERIZING MACHINE

BY

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ABSTRACT

Ginger is mainly grown in Central districts of Uganda, like Mpigi, Wakiso, Masaka, Kiboga, Mukono, Mubende, and Butambala. Ginger varieties available on the Ugandan market are; the Land race (local) with small rhizomes and Hybrid with big rhizomes. Size reduction of ginger in Uganda can be done by pulverizing. This can be manual method or modern method. The manual method being so tedious, labour intensive and time consuming is dying out with introduction of the modern electrified method which saves human energy as well as time. Electrically powered ginger pulverizing machines require a consistent reliable power supply which is not the case for most rural areas of the country, therefore in situation of power unreliability, these machines cannot be operated leading to delay in the production line.

When electrically operated, the output capacity was 79kg/hr., efficiency was 64%. When manually operated, output capacity was 20.5kg/kg., efficiency was 55%.

This report describes the design and fabrication of a dual powered ginger pulverizing machine. The machine aims at saving time taken to pulverize ginger, reduce the labour used, and solve problem of electricity unreliability.

Chapter one of this report describes, background, problem statement, justification, purpose of study, scope of study, and objectives (main objective and specific objectives).

Chapter two contains the literature that assisted in the design of this machine with emphasis on the morphology of ginger, its market in Uganda, post-harvest handling, ginger nutritional values, pulverizing technologies for ginger.

Chapter three entails the methodology in which, methods, techniques, equations, and scientific principles are applied in order to come up with component sizes, and also to help in material selection. This section also explains performance measures (Output capacity and crushing efficiency).

Chapter four digs deeper into the results and discussions; this section therefore explains the results arrived at in chapter three into details. Finally, challenges faced encountered in the course of the project, conclusion, and recommendations are all covered in this section.

DECLARATION

I CANOGURA DOULAS OKUCHA declare to the best of my knowledge that this report project is as a result of my research and effort and it has never been presented or submitted to any institution or university for an academic award.

DATE ……

SIGNATURE ……

APPROVAL

This project report was compiled and submitted to the Department of Agricultural Mechanization and Irrigation Engineering under the supervision of;

Mr. SAJJA SSALI GODFREY

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Date……..... .....

Mr. MAKUMBI THOMAS

Signature ……

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DEDICATION

I dedicate this report to my parents who in all difficulties struggled in favor of my future and May the almighty God bless them abundantly.

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First and foremost, I would like to thank the ALMIGHTY GOD for my life and good health I am living today. Thank you Father and may your name be glorified.

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CHAPTER ONE

1 INTRODUCTION

Chapter one of this report describes, background, problem statement, justification, purpose of study, scope of study, and objectives (main objective and specific objectives).

1.1 Background

Ginger (*Zingier officinale* Rosc.), a monocotyledon belonging to family Zingerberaceae, is an important spice and medicinal plant originated in South-East Asia and introduced to many parts of the globe**,** where it is used as both medicine and a spice since ancient times***(Kizhakkayil & Sasikumar 2012).*** Ginger is primarily grown for its rhizome as root, although some parts of the plant may also be consumed as a type of vegetable as a seasoning. The plant is sometimes cultivated as a garden or landscape plant due to its colorful flowers and its overall aesthetic appeal.

Ginger is worldwide grown India, china, Indonesia, Nigeria, and Thailand as the top producing countries. Uganda is ranked 26th in ginger production worldwide, with an average of output per year estimated as 170 tons. Ginger is mainly grown in Central districts of Uganda, like Mpigi, Wakiso, Masaka, Kiboga, Mukono, Mubende, and Butambala. Ginger varieties available on the Ugandan market are; the Land race (local) with small rhizomes and Hybrid with big rhizomes.

Despite the high demand for ginger on the local market, fresh ginger prices are subjected to fluctuations basing mainly on different seasons. The price could peak to 6000Ug.x per kg during the dry seasons when there was scarcity and it then drops to 3000Ug.x per kg during the bumper harvest when there was plenty. Freshly harvested, ginger is thoroughly washed, dried (sometimes left in wet) before it is delivered to the pulverizing (crushing) equipment, washed to remove any impurity introduced to it during the pulping, it is dried again to reduce the moisture content and then further processing operations done to obtain the desired final product. Value addition in terms of quality and quantity to the ginger increases with processing level(Onu onu, olughu. Kayode Joshusa 2014), consequently increasing the unit price yet most of small scale farmers in the country today are selling freshly harvested (unprocessed ginger) which has resulted into the low market prices. This is the major challenge faced by these small scale

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