BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRO-PROCESSING ENGINEERING

DESIGN AND CONSTRUCTION OF A PEDAL POWERED DOUGH MIXER.

BY

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ABSTRACT.

An efficient dough mixing helps to; increase bread quality, production performance of bread, minimize time wastage, prevent labor drudgery. The objectives of this research were to design and assemble different components, test the performance and to carry out cost benefit analysis of the prototype. The dough mixed was ready enough for use and the prototype is designed ready for production with the provision for repair and maintenance by the small and medium scale producers of bread. In this research, a motorized dough mixer was designed and fabricated. The machine essentially consists of a single phase electric motor with a design capacity of 70kg/hr for 6kg per batch 70kg/hr. The machine works on the principle that the gearbox reduces the motor speed to suit relatively high torque required during agitation. The dough is then manually removed from the mixing bowl. A pedal powered dough mixer prototype operated manually by peddling using human labor. The porotype had an efficiency and design capacity of 75% 40kg/hr respectively. During testing I discovered that the porotype works best for 3kg per batch. There was no any loss obtained during the mixing operation. The principle of operation of the prototype is based on the energy transmission from the pinion of the convectional bicycle unit to processing unit through the rotary shafts. From the economic evaluation using the net present value method with a huddle rate of 10% , with the Net present Value of 31,890,517 *uganda shillings*.The machine efficiency was influenced by the feed quantity of wheat flour mixing proportions. The operation requires technical skills for its smooth operation especially in aligning the mixing bowl base from the bottom level of the agitator.

Key words: wheat flour, mixing bowl, dough mixer and dough.

DECLARATION

I Okalany Gilbert, hereby declare, to the best of my knowledge, that this research project report is an outcome of my original work and that it has not been presented to any institution of learning for an academic award.

Signature: .....

Date: 15/05/2019

APPROVAL

This piece of work has been approved by;

Supervisor: Mr. SERUMAGA PAUL

Signature.....

Date.....

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TABLE OF CONTENTS

CHAPTER FOUR 36

LIST OF FIQURES

LIST OF TABLES

CHAPTER ONE

1.0 INTRODUCTION

This chapter briefly gives the background to the study topic, the problem statement, the objectives of the project, the reasons as to why the project should be carried on (justification), giving its purpose and finally the scope or limits of the project.

1.1 BACKGROUND OF THE STUDY

Bread is a dietary staple in human nutrition and one of the oldest foods. Bread as a food is highly consumed domestically during breakfast and dinner meals. Bread is rich in diverse nutrients such as: carbohydrates, proteins, fats, mineral substances, B-complex vitamins, vitamin E and other valuable diet components (Arent, 2008).

Bread making is surprisingly simple and good results are certain if one understands well all the stages of making bread (lorna walker and Joyce Hughes) Many ingredients may be included in bread in addition to the basic ingredients of flour, water, leavening and salt, to increase its nutritional value (Khurmi, 2003). Many vitamins are sensitive to light; temperature, and moisture, so milling, processing, and storage conditions affect their stability. B vitamins are susceptible to destruction by heat (Leroy, 2004).The high proportional contribution of bread to the human diet satisfying over 50% of energy requirements necessitates that particular attention should be given to bread quality. Therefore, the technology used in making this bakery product is receiving increasing attention. Bread-making technology has been changing for years (kerr,2009).Bread is prepared from composite flours and 100% wheat control flours were prepared using straight dough method(Aerican Association of cereal chemists,2000)the m process stages followed in bread preparation include ;Dough mixing,fermentation,scalling and dividing, intermediate proofing,Baking,Cooling,slicing and packaging. The very first step is the preparation of dough. The various ingredients are correctly measured per the formulation and then the dough is prepared(Bakery technology and manufacture)there are two methods of preparing dough viz;the straight dough method and the sponge dough method. However, in method dough undergoes the following mixing stages include the pickup, initial development, cleanup, final development and letdown and and breakdown stages

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