
FACULTY OF ENGINEERING
DEPARTMENT OF CHEMICAL AND PROCESSING
ENGINEERING
FINAL YEAR PROJECT REPORT

**DESIGN AND CONSTRUCTION OF DOMESTIC SUGAR CANE JUICE
EXTRACTION MACHINE**

By

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ABSTRACT

This project report describes the design, construction and fabrication of domestic sugar cane juice extraction machine which is motorized. This study is to integrate the existing extraction machines which are complex and high capacity crushers which cannot be afforded by small scale farmers and to encourage people to start consuming sugar cane juice which is useful to human health with few additional features. The reason of developing the design and construction domestic sugar cane juice extraction machine able to extract clean sugarcane juice at household level which is beneficial to human health, easy to operate and affordable to both small scale farmers and people going to consume the health juice which can be operated in closed room. The motorized domestic sugar juice extractor crushes and grinds the horizontally loaded sugarcane stem and presses the macerated stem against the 3 crushing rollers to extract the juice from the wet bagasse. The machine consists of the housing, 3 small shaft, ball bearings, keys, spur gears, 3grooved rollers, hopper, chain and sprockets and electric geared motor etc. The performance tests carried out on the developed machine showed **an efficiency of 70.7% and an actual throughput of 72kg/hr at low peripheral speeds** of rotating rollers at **0.5 m/s**.

DECLARATION

I, **KIGULI COLLINS**, do hereby declare that this report compiled is my original work and to the best of my knowledge, it has never been published and submitted for the award of any academic qualification in any institution of higher learning/University before.

Signature.....

KIGULI COLLINS



APPROVAL

This proposal report has been submitted to the Department of Agro-Processing Engineering for examination with approval from the following supervisors:

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CHAPTER ONE

1.0 Introduction

This chapter presents the general information about the research design giving its background, problem statement, significance, objectives, justification and scope of the study.

1.1 Background

Sugarcane is a tall tropical grass with a stout, jointed and fibrous stalk that looks similar to bamboo. It is of the genus (*Saccharum* spp) (D'Hont *et al*,1996), thought to have evolved in the Burma – China – India and later spread to other areas of the world. Sugarcane juice is derived from the sugarcane plant, which is also the source of the majority of white table sugar and processed sugar that we find in our foods. Sugarcane juice is not widely known about, but it is particularly popular in countries that have a large production of sugarcane, such as Brazil, India, and Thailand. It is consumed as a beverage in many places, especially where sugarcane is commercially grown such as Southeast Asia, the Indian Subcontinent, Egypt, and Latin America. Sugarcane juice is obtained by crushing peeled sugar cane in a mill and is one of the main precursors of rum (David, 2001).

The top benefits of sugarcane juice include lowering blood pressure, strengthening the bones, reducing cholesterol, fighting infections, soothing stress and anxiety, boosting energy levels, supporting kidney health, strengthening the immune system, protecting the skin, optimizing digestion and managing diabetes, among others. Even though cane juice tastes very sweet and has high sugar content, it is good for diabetic patients. It contains natural sugar which has low glycemic index that prevents steep rise in blood glucose levels in diabetics, so it can act as a substitute of aerated drinks for them. However, people with Type-2 diabetes should consume it in moderation and after consultation with their doctors (Munir *et al.*, 2012). Sugarcane juice is considered an alkaline forming food because of the high concentration of calcium, magnesium, potassium, iron, and manganese in it. Diseases like cancer cannot survive in an alkaline environment and that's why studies show that it is effective in fighting against cancer, especially prostate and breast cancer. In addition, as sugar cane juice boosts protein levels in the body, it helps in maintaining the health of the kidney. Taken in a diluted form, with lime juice and coconut water, sugar cane

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