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FACULTY OF SCIENCE AND EDUCATION

**EFFICIENCY TEST OF DIFFERENT CHARCOAL COOKING STOVES COMMONLY  
USED IN UGANDA**

BY

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## DECLARATION

I KOOKO RYAN do declare that the research has been out of my own reading besides the quotes put in some references and has not been submitted before to any institution for any award.

Sign ..... *K Ryan* .....

Date ..... *24/02/2023* .....

## APPROVAL

### APPROVAL

I do approve that this project report entitled Efficiency test of different charcoal stoves has been presented and submitted by KOOKO RYAN for examination with my approval.

Sign  .....

Date 27/2/2023

DR ANDIMA GEOFFREY

## DEDICATION

I dedicate this work to my beloved mum NALYAKA AIDAH NORAH, my siblings KOOKO RONALD, KOOKO RODGERS, KOOKO RAYMOND, MUKISA SARAH, NAMBUYA MILLY and MUTONYI JOAN GIFT for the great contribution towards paying my tuition and taking care of me upto this level.

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## ABSTRACT

Charcoal cooking accounts for a large portion of Uganda's energy usage and leads to severe economic, health and environmental hardships. Several organizations are looking to fuel efficient charcoal cook stoves to help solve the problem however, reliable performance data is needed for cookstove distributors to select stoves. In this study, three charcoal cookstoves intended for dissemination in Nagongera, Eastern Uganda were rigorously assessed and compared using Boiling test method and constant heat method.

Each cookstove was tested for specific fuel consumption, thermal efficiency and combustion efficiency. It was found that although traditional stove had a comparable, if not better combustion than the improved stoves, its poor thermal efficiency meant that all improved stoves save fuel on average over the traditional with the majority also reducing the total emissions released. Through the testing, the number of trials conducted was found to be an important consideration for error analysis. Also, noticeable differences in stove performance were seen between boiling test method and constant heat method indicating the potential necessity to use both types of protocols for scientific comparisons.

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## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the study

Energy is the heart of all human development and to this end, sustainable development goal 7(SDG 7) as it states “to ensure access to reliable, sustainable and modern energy services at an affordable cost as defined by the united nations. However, millions of people around the world live in energy poverty marked by lack of access to modern energy sources and lack of access to clean cooking energy (**DR SUBI MARGRET**).

Energy is the critical input in development activities. Without efficient supply and use of energy, there cannot be sustainable development. Development and promotion of energy technologies improves living standard by contributing to poverty reduction. Developing countries are in energy crisis as the majority in rural areas have no access to energy sources apart from biomass and human energy. Women spend most of their time collecting firewood instead of undertaking productive activities. In urban areas charcoal is the major source of fuel for cooking purposes in households, small and medium enterprises and institution. Based on statistics, a biggest percentage of the Ugandans have no access to electricity and the ones having access to it experiences a problem of big bills which are hard to be paid.

### 1.2 Problem statement

Most people in different parts of the country have been asking themselves why some charcoal stoves take much time when preparing a given meal than others. Some of them have given different reasons which are not genuine and have no practical evidence in the physics world. Others have been so lucky that whenever they go to the market, they end up picking the right charcoal stoves by chance and finds them working very well without knowing the physics behind the charcoal stoves chosen. For this case, different communities are still lagging behind and they really do not know the right procedures being taken before choosing the right charcoal cooking stove in order to save time and resources in the rightful way.

For those reasons, there is need for efficiency test for different charcoal cooking stoves found in the markets using the same amount of charcoal to boil the same amount of water in order to give a clear solution to the problem being faced by the community.

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