BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

AGRO-PROCESSING ENGINEERING PROGRAMME

FINAL YEAR PROJECT

EXAMINATION OF EFFECTS OF VARIATION IN WEATHER CONDITIONS ON THE QUALITY OF STORED MAIZE GRAINS

BY

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ABSTRACT

Maize grains play a major role in enhancing world's economic growth as well as acting as food security. However, the world is suffering from starvation due to famine and this is because of increased grain losses. These losses are attributed to variation in weather conditions (namely: relative humidity, temperature and air) which always affect grains quality during storage. Therefore, this study was aimed at examining the effects of weather variations on the quality of stored maize grains in terms of grain viability, moisture content, AmyloViscosity and rigidity.

The study was conducted on one maize variety i.e. Longe 5.Three samples were used, where two samples were subjected to varying weather conditions whereas the other sample (control sample) was subjected to constant conditions. The grains were stored in a conditioned room for 30 days. The conditions in the storage room were effected using a humidifier, heater and an air blower. The grains' quality before storage was assessed. After 30 days of storage time, the grains' quality after storage was also assessed. The grains quality in terms of viability, moisture content, AmyloViscosity and rigidity was determined using germination test, Moisturemeter, Brabender and rigidity tester respectively.

The grains moisture content increased from 13.5% before storage to 13.58%, 13.55% and 13.51% for different the two samples stored in varying weather conditions and in constant conditions respectively. The viability remained at 98% before and after storage. AmyloViscosity reduced from 254.54BU before storage to 254.47BU, 254.45BU, 254.50% for the samples stored in varying weather conditions and constant conditions respectively. The grain rigidity reduced from 14.22N before storage to 14.03N, 14.15N, 14.20 for the two samples stored in varying weather conditions and sample of grains stored in constant conditions.

The study therefore showed that the quality of maize grains is compromised by variation in weather conditions.

DECLARATION

I **GODFREY GUMISIRIZA** declare to the best of my knowledge that the piece of this project report 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.

SIGNATURE: ..... Date: 18/05/2015

APPROVAL

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

Mr. SSERUMAGA PAUL

..... Date: .....

MAIN SUPERVISOR

Mr. ERIAU EMMANUEL

..... Date: .....

CO-SUPERVISOR

DEDICATION

I dedicate this report to my mom Busiingye Moneck, Brothers Tumusiime K Johnson, Twineamatsicko K Moses, Sisters Natukunda K Grace, Katusiime K Molly and Uncle Ben K Twine for the love, guidance and financial assistance they rendered to me. May God bless the work of your hands.

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The Almighty God should bless you abundantly

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LIST OF ACRONYMS

AFN- Afternoon

ARO- Agricultural Research Organization

BU- Brabender Units

EAC – East African community

EVN- Evening

FAO – Food Agriculture Organization

GDP- Gross Domestic Product

KG - Kilo gram

MNG- Morning

NaCRRI- National Crops Resources Research Institute

NARO – National Agricultural Research Organization

S/N – Serial Number

UCA- Uganda Census of Agriculture

UNBS – Uganda National Bureau of Standards

WFP – World Food Programme

CHAPTER I

1 INTRODUCTION

This chapter describes the background information of the project, the problem statement, significance, purpose, objectives and scope of the study. The problem statement describes the research problem and identifies potential causes and a solution. The significance describes the importance of the project. The specific objectives presented will achieve the main objective.

1.1 Background to the study

Maize *(Zea mays)* is one of the most important cereal crops grown in Uganda. In the year 2007, Uganda produced over 1.262 Mega Tonnes of maize (FAO, 2009).Maize is the third most important cereal grain worldwide after wheat and rice (Golob, *et al.,* 2004). However, one of the major constraints facing maize producers in the country is drying and storage of the crop. Drying and storage are considered as one of the most critical points within the postharvest grain processing due to their effect on the quality of the final product (Wrigley, 2010). Economic losses caused by mycotoxins occur along the entire food chain. In addition to human health effects, as a result of feed contaminated with too many mycotoxins consumed by animals, there is a major risk that mycotoxins reach animal food products – eggs, milk, and meat. In this context, it is imperiously necessary to identify appropriate storage conditions so as to eliminate the causes of such deficiencies in quality of grains (Savu, 2004).

Grain is still the main basis for human consumption and animal feed, especially in developing countries. The on-going effects of the food crisis are caused in part by very high losses of grain during storage, which in turn has resulted in the starvation of 925 million people worldwide (FAO), including people who suffer from undernourishment.

Post-harvest grain and dry food losses caused by insects, mold and other bio-agents range from 10%-40%. Under sub-optimal storage conditions, harmful microorganisms and mycotoxins may develop which could cause severe damage to human and animal health. These biological factors can also cause reduction in the nutritive value of stored products. Post-harvest losses can include not only loss of the crop itself, but also damage to the environment, a lack of return on the resources and labor needed to produce the crop and a decrease in the livelihood of individuals involved in the production process.

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