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**FACULTY OF AGRICULTURE AND ANIMAL SCIENCES**

**DEPARTMENT OF CROP PRODUCTION AND MANAGEMENT**

**FINAL YEAR RESEARCH PROJECT REPORT**

**ASSESSING THE LEVELS OF OCCURENCE OF AFLATOXIN B<sub>1</sub> IN  
MAIZE AND GROUNDNUT IN SELECTED DISTRICTS IN EASTERN  
UGANDA**

**BY**

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**This final year research project report is submitted to the department of crop production and management in partial fulfillment of the requirement for the award of the degree of Bachelor of Science in Agriculture of Busitema University**

**May 2023**

DECLARATION

I **ILUKOL DANIEL** hereby declare that the information written in this research report is out of my hard work and has not been submitted to any institution of learning for award of any academic qualification.

**Signature**.....

**Date**.....

APPROVAL

This research was carried out under supervision and has been submitted for examination with the approval of Mr. Muyinda Robert

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## DEDICATION

I dedicate this report to my beloved father Mr. Adiaka Faustino (RIP), my beloved mother Mrs. Abura Hellen and my brothers, sisters and friends. This report is also dedicated to my sponsors straight talk foundation and my beloved guardian Mr. Zacharia Ilukol.

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May the almighty father bless you all abundantly.

## LIST OF ABBREVIATIONS

AF	Aflatoxin
ANOVA	Analysis of Variance
COVAB Biosecurity	College Of Veterinary Medicine, Animal Resources And
ELISA	Enzyme Linked Immunosorbent Assays
HPLC	High Performance Liquid Chromatography

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## ABSTRACT

Groundnut is a major crop in Uganda, ranking eleventh in production and sixth in area harvested. It's majorly used as a source of protein and lipids in many areas in Uganda. Maize is the most important cereal in Uganda providing over 40% of the calories consumed in both rural and urban centres. It is grown in every part of the country and direct source of livelihood to over 2 million households. A research was carried out in 2022 in eastern Uganda to determine the most commonly used drying methods and the aflatoxin levels of occurrence in maize and groundnuts. Three districts (Soroti, Iganga and Namutumba), two sub counties per district and four parishes per Sub County were selected, i.e. for Soroti, Gweri subcounty (Telamot, Opucet, Gweri and Omugenya parishes), Arapai subcounty (Amoru, Odudui, Arabaka and Dakabela parishes) were selected. For Iganga, Nambale sub county (Nasuti, Muyira, Ilenzi and Nabitinde parishes), Nakalama sub county (Bukaye, Bukoona, Buseyi and Nakalama parishes) were selected and for Namutumba, Bulange sub county (Bulange, Buwaga, Bubutya, Bubutya parishes), Magada subcounty (Iziragobi, Kiwany, Mulama and Kategere parishes) were selected. Farmers were interviewed and samples of both maize and groundnuts were collected. The samples were taken to College Of Veterinary Medicine Animal resources And Biosecurity, Makerere University to determine the aflatoxin B<sub>1</sub> levels of occurrence, results showed that most of the samples (88%) tested positive, 100% of the groundnut samples tested positive while 25% of the maize samples tested negative to aflatoxin B<sub>1</sub>. Namutumba district recorded more negative samples (18.75%) of both maize and groundnuts while Iganga recorded 12% and Soroti recorded 6%. The most commonly used drying field was bare ground (64.6%) compared to tarpaulin (35.4%), more groundnut farmers used bare ground (75%) compared to maize farmers (54.2%). Of all the districts, Soroti district groundnut farmers were the highest users of bare ground (88%) compared to Iganga (75%) and Namutumba (62.5%). These results can serve as the basis for pre-and postharvest approaches to reduce aflatoxin B<sub>1</sub> contamination in maize and groundnuts in eastern Uganda in order to reduce health risk, avoid reduced production in livestock, and open up export markets.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 BACKGROUND

Aflatoxins are highly carcinogenic secondary metabolites that can contaminate approximately 25% of crops (Iii & Pryor, 2017). Aflatoxin are fungal metabolites majorly produced by *Aspergillus flavus* and *A.parasiticus*. Several types of aflatoxin (14 or more) occur in nature, but four – aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> are particularly dangerous to humans and animals as they have been found in all major food crops (Safety, 2018). Aflatoxin B<sub>1</sub> is a secondary metabolite produced by *Aspergillus flavus* and *Aspergillus parasiticus* when environmental factors are favorable. Aflatoxin B<sub>1</sub> has also been characterized as a biological toxin. Biological toxins are defined as toxic substances produced by microorganisms, animals and plants that have the capability of causing harmful effects when inhaled, ingested, injected or absorbed (medical dictionary) (Owuor Lalah et al., 2020). Approximately 4.5 billion people are chronically exposed to aflatoxins.(Iii & Pryor, 2017).

The average yield of groundnuts in Uganda is about 290kg per acre as opposed to a potential yield of 1200g per acre, Every part of the peanut plant is used in some way: kernels for human consumption, vines as fodder for cattle, and nitrogen fixed from its roots as nutrients for the soil (Pazderka et al, 2010). Over the years, total maize production has gradually increased from roughly 800, 000 tons in 2000 to 2,575,000 tons in 2019, maize is the number one staple for the urban poor, in institutions such as schools, hospitals and the military (safety, 2020). Corn possesses significances nutrients, minerals and vitamins, which provides nutrition in animal diet as well as man. Maize has been revealed to have the potential to sustained human health-related cases, raise standard of living of farmers, served as a soil fertility indicator crop and generate income (Pruitt, 2016)). Due to this high consumption of maize and groundnuts in Uganda, humans and animals have a high risk of exposure to aflatoxins. (Okello et al , 2006).

Maize and groundnuts in Eastern Uganda have high risk of contamination with aflatoxins due to high us of traditional grain drying techniques which involve drying in the field and bare ground, that favor fungal growth and consequent aflatoxin contamination (Zuza et al., 2019). Moreover, these are slow, time consuming and labor intensive, involving lots of crop handling and due to

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