COMBINED EFFECT OF COLD SHOCK AND AOLE VERA GEL COATING ON EXTENDING SHELF LIFE AND POST-HARVEST QUALITY OF FRESH LADY FINGER BANANA (*Musa acuminata*) FRUITS

BY

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DECLARATION

I, **Wafula Julius**, declare that tis research is entirely my own effort and knowledge resulting from the implementation of an experimental study with an aim to offer solution to the farmers and banana business dealers in reducing postharvest losses of ladyfinger banana fruits during storage and transportation. This work has never been submitted for any award of academic document in whatsoever.

Sign ..... Date ..06.../...07.../...2023

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APPROVAL

All the work regarding this research; right from proposal writing, implementation and report writing has been completed by Wafula Julius under my supervision and has made all the requirement of Busitema university guidelines for academic research. I therefore approve it for submission to the department of crop production and management of Busitema university.

Sign ..... Date ..06.../..07.../..2023

Dr. OPIO PETER

ACADEMIC SUPERVISOR

DEDICATION

I hereby dedicate this research report to my beloved parents; Wafula Ben and Chemutai Ann for your unending support and encouragement during the time of my studies, I ask almighty God to bless you abundantly.

To my brothers and sisters; Wafula Denis, Wafula Daniel, Wafula Timothy, Wafula Erastus, Juma Tom and my sisters; Nekesa Jackline, Nafula Mercy and not forgetting my cousin sister Conje, for their lovely support during my studies in one way or the other.

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To all farmers and banana business dealers as they embrace this technology to reduce on the postharvest losses of banana fruits.

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ABBREVIATIONS

FAO	Food and Agricultural Organization
ANOVA	Analysis Of Variance
LSD	Least Significant Difference
C	Control
CS	Cold Shock
AG	Aloe Vera
CRD	Completely Randomized Design
E.g.	For Example
MT	Metric Tons
I.e	That is to say
%	Percentage
^{0} C	Degrees Centigrade
N	North

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ABSTRACT

Banana of (*Musa sp)* is a major food in most tropical countries of the world and its rich in easily digestible carbohydrates with calorific value of 72-135. Bananas are grown in more than 130 countries by both small and large-scale. In Uganda, banana food production area is estimated to be about 668,000 Ha. Even though the production of bananas is high worldwide, its value chain is constrained by a number of factors leading to global food insecurity. Despite of its nutritive value, farmers continue to incur losses due to poor postharvest handling techniques. In Uganda a loss of 14.9% has been reported for all cooked type bananas along the value chain out of which 7.2% get spoiled completely and have no residual value, while 7.7% get spoiled partially but can still be sold at a reduced market price. Therefore, this study aimed at exploring low-cost effective postharvest techniques for the reduction of qualitative and quantitative postharvest losses in lady finger banana fruits. In regard to postharvest losses facing banana farmers, an experiment was set up at Busitema university to test the effectiveness of combined treatment of cold shock and aloe vera in extending shelf life and quality of fresh lady finger banan fruits using completely randomized design. Aloe vera and ice block was obtained within Soroti city and prepared for use. Ladyfinger banana fruits was obtained from Serere district, Bugondo sub county. 180 ladyfinger banana fruit fingers were prepared and divided into 4 groups where each group received a different treatment i.e 1^{st} group(control), 2^{nd} group (AG20%), 3^{rd} group (CS 40min) and 4^{th} group (CS40+AG20%). And the experiment was replicated 3 times. The experiment was set in the laboratory at room temperature. Data was collected for 15 days at an interval of 5 days on the following parameters; peel color, %weight loss, PH, TA, TSS, ripening index, Vitamin c. Data was put on spreadsheet and analysis was done by GenStat 13^{th} edition and the graph was drawn using touchpad prism. The analysis of variance showed all chlorophylls, carotenoid and shelf life. The result showed high significant at ($P<0.001$) for all the treatment, time and their interaction. Combination was more effective than all the treatment in retention of; color, weight, TA, vitamin c, chlorophyll a & b, and slowing down the accumulation of carotenoid, TSS, and extended shelf life up to 15 days as it still had a mean scale of 6.000 while control was only able to maintain its shelf life up to 10 days. on other hand, CS and AG when used separately had slightly lower effect than control when used separately.

CHAPTER ONE:
INTRODUCTION

Background of the study

Banana is a well-known fresh fruit in the whole world and its name comes from the Arabic word "banan" meaning finger(Singh *et al*., 2018). Banana comprises of a range of species in the genus *Musa* and family *Musaceae* with two common cultivated varieties gotten from two *Musa* species: Musa accuminata (A genome) and Musa balbisiana (B genome) (Simmonds, 1948). Banana is a major food in most tropical countries of the world and its rich in easily digestible carbohydrates with calorific value of 72-135 (Kothawade, 2019). Beside its economic importance, banana fruit have gained considerable attention because of its abundance in nutrients including several antioxidants that have been found to help in reduction of weight and prevention of several diseases in humans such as, diabetes, cancer incidence, regulation of blood pressure, reduces stress and curing of intestinal disorders(Higgins, 2014; Ranjha *et al*., 2022). Banana is also a rich source of delightful flavors, total dietary fibers, vitamins, minerals, and phytochemicals which have health benefits (Oyeyinka & Afolayan, 2020).

Bananas are grown in more than 130 countries by both small and large-scale farmers where India stands higher position, accounting for (26.8%) of the total world production followed by China with (10.8%) while European countries and the USA are the major importers of banana. This fruit plays a very important role in contributing to food security and as a source of export revenue in some economies (Evans *et al.*, 2020). In Sub-Saharan Africa, Bananas are important sources of income for many smallholder farmers (Woldu, 2015). In Ethiopia, dessert banana is the major fruit crop that is most widely grown and consumed. It grows in several parts where the growing conditions are conducive and contributes about 47.83% for producers own consumption,49.19% for income generation, 0.47 for animal feed and 2.52% for other purposes (Woldu *et al*., 2015). In Uganda, banana food production area is estimated to be about 668,000 Ha and in 2019, the production of plantains specifically matooke (cooking type) increased from 6.2 Million Metric Tons (MT) to 8.3 Million MT in 2019 hence registering a 28.2 percent increase (UBOS, 2020). Even though the production of bananas is high worldwide, its value chain is constrained by a number of factors leading to global food insecurity.

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