

FORMULATION AND CHARACTERIZATION OF THE  
NUTRITIONAL, PHYSICOCHEMICAL, SENSORY AND  
STABLE LIFE PROPERTIES OF CHIA (*Salvia hispanica* L.)  
ENRICHED YOGHURT

ANN NYAWIRA KIBOI

A thesis submitted to the School of Graduate Studies and  
Research in partial fulfillment of the requirements for the  
award of Master of Science in Food Science and  
Technology Degree in the Institute of Food  
Bioresources Technology of Dedan Kimathi  
University of Technology

October, 2017

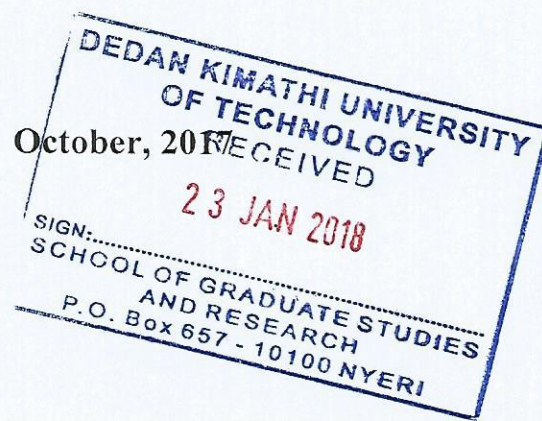
**FORMULATION AND CHARACTERIZATION OF THE NUTRITIONAL,  
PHYSICOCHEMICAL, SENSORY AND SHELF LIFE PROPERTIES OF  
CHIA (*Salvia hispanica* L.) ENRICHED YOGHURT**

**ANN NYAWIRA KIBUI**

**REG. NO: F251-01-1699/2015**

**DEDAN KIMATHI UNIVERSITY LIBRARY**

**A thesis submitted to the School of Graduate Studies and Research in partial  
fulfillment of the requirements for the award of Master of Science in Food  
Science and Technology Degree in the Institute of Food Bioresources  
Technology of Dedan Kimathi University of Technology.**



## DECLARATION

This research thesis is my original work and has not been submitted for the award of a degree in any other University.



Signature

18.01.2018

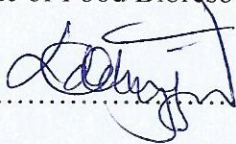
Date

## Supervisors

This research thesis has been submitted for examination with our approval as University supervisors

1. Dr. Eddy Owaga, PhD

Institute of Food Bioresources Technology, DeKUT.



Signature

18/1/2018

Date

2. Dr. Monica Mburu, PhD

Institute of Food Bioresources Technology, DeKUT.

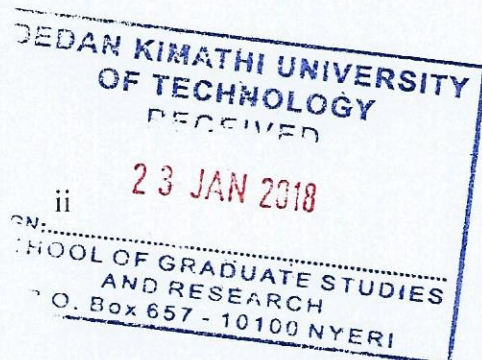


Signature

16/01/2018

Date

DEDAN KIMATHI UNIVERSITY LIBRARY



## ABSTRACT

Yoghurt is a fermented dairy product associated with several beneficial nutritional and health effects. Due to increased demand of yoghurt in Kenya, some processors seek to incorporate artificial and highly processed ingredients such as stabilizers and emulsifiers as additives in order to improve nutritional value, thickening and stabilizing properties. Besides having good gelling properties, chia seeds (*Salvia hispanica* L.) are a good source of proteins, omega-3/omega-6 fatty acids, minerals, soluble dietary fiber and phytochemicals. This study sought to develop chia enriched yoghurt and determine the nutritional (amino acids, fatty acids, mineral and vitamin C contents), physicochemical (pH, total titratable acidity and syneresis), sensory and shelf life characteristics of chia enriched yoghurt (CEY). The treatment involved enriching yoghurt with varied amounts of chia seeds as follows; 1.5% m/v (CEY1.5), 2.5% m/v (CEY2.5), 3.5% m/v (CEY3.5), and corn starch (2%) (CEY0). The results of the proximate composition indicated there was a significantly higher content of moisture, crude ash, crude fat, crude fiber and carbohydrates in CEY1.5, CEY2.5 and CEY3.5 than those of CEY0. In the current study, the nutritional composition was significantly higher in CEY1.5, CEY2.5 and CEY3.5 than in CEY0 with regards to amino acids, fatty acids, minerals and vitamin C, with values increasing with increase in quantity of chia seeds in the formulation. The concentration of lauric acid and palmitic acid decreased significantly, between CEY0 and all chia enriched samples (CEY1.5, CEY2.5 and CEY3.5), with the increase in the concentration of chia seeds in the yoghurt formulations. On the other hand, the concentration of stearic acid, oleic acid, linoleic acid and  $\alpha$ -linolenic acid gradually increased significantly, as the quantity of chia seeds used in the yoghurt enrichment increased with CEY3.5 recording the highest concentration and CEY0 the lowest. The results of physicochemical characteristics showed chia seeds had no effect on the pH and titratable acidity values of the yoghurt. From the results of sensory analysis, the panelists preferred the texture, taste, colour and appearance of CEY0 and CEY1.5 over those of CEY2.5 and CEY3.5. In shelf life studies, pH decreased significantly while titratable acidity and syneresis increased significantly during refrigerated storage in both CEY0 and all the CEY. In conclusion, CEY1.5, CEY2.5 and CEY3.5 showed enhanced nutritional (amino acids, fatty acids, minerals and vitamin C contents), physicochemical (pH and titratable acidity) and sensory properties compared to CEY0 thus chia seeds could be a potential ingredient in yoghurt formulation.