NUTRITIONAL & PHYTOCHEMICAL COMPOSITION, FUNCTIONAL PROPERTIES OF ROSELLE (*Hibiscus sabdariffa*) AND SENSORY EVALUATION OF SOME BEVERAGES MADE FROM ROSELLE CALYCES

ABRAHAM WAHID LUVONGA

MASTER OF SCIENCE

(Food Science and Technology)

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

2012

ABSTRACT

There have been claims of medicinal benefits obtained from *Hibiscus sabdariffa* L. The main objective of this study was to determine the nutritional composition, functional properties of roselle and evaluate the quality of its novel beverages.

Proximate composition was determined according to established AOAC methods. Antioxidant activity (AA) was determined using 1-1 diphenyl picryl hydrazyl radical (DPPH) and color degradation index (CDI) was done using the Hunter CIE LAB Color Meter. Water soluble vitamins (WSV) and major organic acids were analyzed using HPLC methods. Total polyphenols, tannins, antioxidant activity and flavonoids were analyzed using UV-visible spectrophotometer. Mineral composition was determined using Atomic Absorption Spectroscopy. Roselle product formulations were done at ratios of (roselle extract: fruit juice) 1:1, 3:1and 3:2 for all the product categories of Roselle Apple Drink (RAD), Roselle Orange Drink (ROD) and Roselle Mellon Drink (RMD). Sensory evaluation and consumer acceptability tests were determined based on a 9-point hedonic. Total plate count (TPC), yeast and mold counts were determined after every 14 days to establish the shelf life of the novel beverages.

Results showed that proximate composition of roselle was constituted mainly by soluble carbohydrates at 66.3% (DBM). The physic-chemical properties of roselle extract before and after pasteurization included pH of 3.9 ± 0.00 and 3.4 ± 0.1, total acidity of 2.2 ± 0.0 and 2.2 ± 0.3 %, total polyphenols of 6.1 ± 0.2 and 5.8 ± 0.1 mg/g roselle extract, respectively. The antioxidant activities before and after pasteurization were 230.0 ± 2.4 and 235.3 ± 0.8 μg/ml, respectively. Iron and calcium contents were 8.6 ± 0.3 and 14.8 ± 0.6 mg/100g respectively. Shelf life studies showed good stability of products where the microbial load was low and within

the acceptable limits (10^3g/Kg) for total plate count, yeasts and moulds by Kenya Bureu of Standards and Codex Alimentarius Commission (CAC) up to 90 days.

The RAD and ROD blended with 50 %, 60%, 75% and 100% roselle were highly acceptable in all the sensorial properties of taste, appearance, flavor, consistency and overall acceptability. However, RMD with 75% roselle was the only acceptable with an average score above 5 on a 9-point Hedonic scale. Those with a score lower than 5 were deemed unacceptable. The most preferred pair of beverages for ROD and roselle drink were generally acceptable to consumers. This was an indication for a clear market success scenario in Kenya.