



## FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED CHEMISTRY

PROJECT TITLE

A study of migration of styrene from polystyrene packaging material into meat and milk products.

SPECIAL COLLECTION  
LIBRARY USE ONLY



NAME : SITHOLE BRYN R

STUDENT ID : N0110527W

SUPERVISOR : Dr H Chiririwa

This dissertation is submitted in partial fulfillment of the requirements for Bachelor of Applied Sciences Honors Degree in Applied Chemistry May, 2015

BRYN SITHOLE



N0110527W

## List of abbreviations and symbols

### Abstract

Acrylonitrile-butadiene-styrene

The migration study of the styrene monomer from polystyrene (PS) takeaway trays and cups was conducted during this research at temperatures of 25 °C, 40 °C, 60 °C and 80 °C. These experiments were performed in contact with food and not food simulants. The flasks were filled in each of the defined temperatures and stored for each of the defined days, in relative intervals of (1, 3, 7, 12, 72, 168 hours and 2 months). The amount of migration which occurred was determined by High Performance Liquid Chromatography (for samples stored for longer periods like the 72, 168 hours and 2 months) and quantified by means of iodometric titration (for samples in all the storage periods). An increase in temperature was directly proportional to the amount of migrated styrene. The increase in styrene storage extraction time was directly proportional to the amount of migrated styrene. No styrene migrated in 1, 3, 7 and 12 hours at all temperatures. The resulted migrated styrene content was 0.07 mg/g at both 40 °C and 60 °C and 0.10 mg/g at 80 °C in 72 hours. In 168 hours the amount of migrated styrene content was 0.10 mg/g, 0.14 mg/g and 0.17 mg/g at 40 °C, 60 °C and 80 °C respectively.

**Keywords:** styrene, migration, iodometric titration.

PCs	Polycarbonate
PS	polystyrene
PVC	polyvinyl chloride
PAF	Polystyrene-Polyacrylonitrile copolymer
T <sub>g</sub>	Glass transition temperature
UV-FL	Ultra-violet fluorescence
VOC	Volatile Organic Compound