



## Microbial Quality of Ready-To-Eat (RTE) Mixed Vegetable Salads Sold in Thohoyandou Retail Stores, South Africa

Zanele Geraldin Shikwambana, Shonisani Eugenia Ramashia

University of Venda, Thohoyandou, South Africa

### Abstract

The health-conscious behavior of consumers has led to increased consumption of fresh produce and their products. Therefore, the aim of this study is to compare the microbial quality of RTE-mixed vegetable salads sold at different retail stores (RS) in Thohoyandou, South Africa. RTE vegetable salads (A, B, C, D, E and F) were purchased and collected in their original container from six (6) RS using a cooler box filled with ice. Total plate count (TPC), coliforms, *Salmonella* species, *Enterobacteriaceae*, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus cereus* were isolated from the samples. Identification of the microorganisms was done using Gram staining, indole, spore, methyl red, catalase and triple sugar iron tests.

The microbial analysis data was analysed using the SPSS version 27 software. Mean counts (CFU/g) were reported to range from 0.0 -  $5.9 \times 10^6$  for TPC, 0.0 -  $9.4 \times 10^2$  for coliforms, 0.0 -  $6.9 \times 10^3$  for *Enterobacteriaceae*, 0.0 -  $4.3 \times 10^1$  for *E. coli*,  $5.7 \times 10^4$  -  $1.1 \times 10^9$  for *S. aureus* and  $3.3 \times 10^3$  -  $2.0 \times 10^6$  for *B. cereus*. Comparing to the microbiological standards set by the Foodstuffs, Cosmetics and Disinfectants (FCD) Act (R.692 of 16 May 1997), the limits set are  $<2.0 \times 10^5$ /g,  $<2.0 \times 10^2$ /g, 0/g, 0/25g,  $<1.0 \times 10^2$ /g and  $<1.0 \times 10^2$ /g for TPC, coliforms, *E. coli*, *Salmonella spp.*, *S. aureus* and *B. cereus*, respectively. The salads with mean counts above the limit set by the FCD Act were salad C, D and E for TPC, salad A for coliforms, salad A, E and F for *E. coli* and all salads for *S. aureus* and *B. cereus*. The FCD Act doesn't specify a limit for *Enterobacteriaceae*.

The Department of Agriculture, Forestry & Fisheries (2012) stated that the acceptable limit for *Enterobacteria* in vegetables is  $<1.0 \times 10^3$ /g. The results revealed that RTE-mixed vegetable salads sold at retail stores (RS) in Thohoyandou are prepared under unhygienic conditions. Food premises must implement the good manufacturing practices (GMP) to minimize food contamination, therefore, controlling the risk of foodborne illness in consumers.

**Keywords:** Read-to-eat, vegetable salads, microbial quality, biochemical tests, pathogens, non-pathogens.

### **Biography: Shonisani E. Ramashia**

Dr. Shonisani E. Ramashia is the Head of the Department of Food Science and Technology. She joined the University as a contract Senior Laboratory Technician (2013-2014). She was then employed as Teaching Assistant (2015-2016). She teaches Food Microbiology, Food Commodity Processing, Product Development and Sensory Evaluation of Foods (coordinating). I am currently supervising two Masters' students and one PhD student. One master student completed and graduating in September 2019 graduation. I also supervised more than 20 BSc in Food Science and Technology final year (4th) research student. I worked in the Food Industry from 2008 to 2013 where I held different positions such as Quality Controller, Senior Food Microbiologist and Departmental Food Technologist. I have 10 published journal that are approved by DHET, one book chapter and two book chapters accepted. I am a project leader for WRC and ARC funded project.