

# MICROBIOLOGICAL QUALITY OF FRESH-CONSUMED LEAFY VEGETABLES IN SALES OUTLETS IN ANURADHAPURA MUNICIPALITY

W.P.S.P. Kumara<sup>1</sup>, M.C.M. Zakeel<sup>2</sup>, L.K.W. Wijyaratne<sup>2</sup>,  
N.W.I.A. Jayawardana<sup>1</sup> and L.R.T. Nuwangi<sup>2</sup>

<sup>1</sup>*Department of Animal and Food Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka*

<sup>2</sup>*Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka*

Fresh-consumed leafy vegetables are considered to be a regular components of main meal in Sri Lankan diet, probably due to its health and nutritional benefits, and low-cost. However, the safety of these produce is debatable especially in developing countries mainly due to microbiological status. Leafy vegetables are naturally vulnerable to contamination by pathogenic and non-pathogenic microorganisms throughout pre-and post-harvest operations. Consumption of low-quality leafy vegetables leads to hazardous food-borne illnesses in humans. In Sri Lanka, leafy vegetables are generally sold in different market outlets. The conditions of market outlets attributes to varied levels of microbiological contaminations in leafy vegetables. The aim of this study was to assess the microbiological quality of fresh-consumed leafy vegetables in different sales outlets in Anuradhapura municipality. Two types of leafy vegetables, *Gotukola* (*Centella asiatica*) and Lettuce (*Lactuca sativa*), sold in three supermarkets and seven other market outlets in Anuradhapura were investigated for mesophilic aerobic bacteria, yeasts and moulds, total coliforms, *Escherichia coli*, *Salmonella* spp. and *Listeria monocytogenes*. Five samples from each location were collected for each vegetable type. Colony Forming Units (CFU) of mesophilic aerobic bacteria and yeasts and moulds, and Most Probable Number (MPN) of total coliforms were analyzed using Poisson regression. The results revealed that microbiological quality of fresh-consumed leafy vegetables in supermarkets significantly differed from local markets ( $p < 0.05$ ). Estimated Poisson regression coefficient ( $\beta$ ) of total mesophilic aerobic bacteria count, yeast & moulds count and total coliform count ( $\beta = 0.2730, 0.3824, \text{ and } 0.6631$  respectively) were higher in other market outlets compared to supermarkets. The microbiological quality of *Gotukola* was significantly different from Lettuce ( $p < 0.05$ ). Poisson regression analysis showed a higher level of total mesophilic aerobic bacterial count ( $\beta = 0.8944$ ) and total coliform count ( $\beta = 1.16$ ) in *Gotukola* than Lettuce. In contrast, *Gotukola* showed lower level of yeast and mould count ( $\beta = -2.1096$ ) compared to Lettuce. Six (20%) supermarket and 20 (28.6%) other market outlet samples were found to be *Escherichia coli* positive. Out of the *Escherichia coli* positive leafy vegetable samples (14), 53.8% were *Gotukola*. *Listeria monocytogenes* and *Salmonella* spp. were not found in any of the samples studied. The present study reveals that consumption of fresh-consumed leafy vegetables from supermarket is safer than other market outlets.

**Keywords:** Anuradhapura municipality, CFU, Fresh-consumed leafy vegetables, Market outlets, Microbiological quality, MPN