TITLE: ESCHERICHIA COLI AND OTHER ENTEROBACTERIACEAE AS INDICATORS OF THE HYGIENIC-SANITARY QUALITY OF READY-TO-EAT MINIMALLY PROCESSED VEGETABLES

AUTHORS: SANTOS, T.S.¹; CAMPOS, F.B.¹; DIAS, M.³; MENDES, M.A.³; MAFFEI, D.F.¹²

INSTITUTION: ¹LUIZ DE QUEIROZ COLLEGE OF AGRICULTURE (ESALQ) – UNIVERSITY OF SAO PAULO, PIRACICABA, SP (AV. PÁDUA DIAS 11, CAIXA POSTAL 09, 13418-900, PIRACICABA, SP, BRAZIL).
²FOOD RESEARCH CENTER (FoRC-CEPID), SAO PAULO, SP, BRAZIL.
³DEMPSTER MS LAB, POLYTECHNIC SCHOOL - UNIVERSITY OF SAO PAULO, SAO PAULO, SP, BRAZIL.

ABSTRACT:
Ready-to-eat minimally processed vegetables (RTE MPV) are fresh vegetables subjected to several steps that modify their natural structure, while maintaining the same freshness and nutritional quality as the fresh produce. One of these steps is washing-disinfection, which aims to reduce the microbial load and eliminate pathogenic microorganisms that may be present. However, failures during this step can render it inefficient and enable the occurrence of cross-contamination, posing health risks to consumers. This study aimed to assess the occurrence of generic Escherichia coli and other Enterobacteriaceae as indicators of the hygienic-sanitary quality of RTE MPV samples sold in the city of Piracicaba, SP – Brazil. While generic E. coli is widely accepted as a fecal contamination indicator, populations of Enterobacteriaceae have been often used as an indicator of hygiene practices, since they are easily inactivated by sanitizers. A total of 100 samples of RTE MPV were collected in supermarkets and grocery stores located in the city and submitted to detection and enumeration of generic E. coli using standard MPN method and enumeration of Enterobacteriaceae by plating on MacConkey Agar. In addition, 168 colonies of bacteria belonging to the Enterobacteriaceae family isolated from 61 samples of RTE MPV were randomly selected and submitted to identification at genus and species levels on a MALDI-TOF MS Biotyper™. Generic E. coli was detected in 16 samples (average 1.4±0.9 log MPN/g). The average count of Enterobacteriaceae was 7.1±1.2 log CFU/g and the most frequent bacteria identified by MALDI-TOF were Rahnella aquatilis (13.1%), Lelliottia amnigena (11.9%) and Enterobacter cloacae (10.7%). Overall, the occurrence of E. coli and high counts of Enterobacteriaceae found in this study indicate a poor hygienic-sanitary quality and pose health risks to consumers, since these products have already been sanitized and are marketed as RTE.

Keywords: food safety, fresh-cut vegetables, Enterobacteriaceae, MALDI-TOF.
Development Agency: Programa Unificado de Bolsas de Estudos para Apoio e Formação de Estudantes de Graduação (PUB-USP) and FAPESP (#2013/07914-8).