

**TITLE:** MALDI-TOF MASS SPECTROMETRY IDENTIFICATION OF *ENTEROBACTERIACEAE* ISOLATED FROM CONVENTIONAL, ORGANIC AND MINIMALLY PROCESSED VEGETABLES

**AUTHORS:** PADOVANI, N.F.A.<sup>1</sup>; SANTOS, T.S.<sup>1</sup>; DIAS, M.<sup>2</sup>; MENDES, M.A.<sup>2</sup>; MAFFEI, D.F.<sup>1,3</sup>

**INSTITUTION:** <sup>1</sup>LUIZ DE QUEIROZ COLLEGE OF AGRICULTURE (ESALQ) – UNIVERSITY OF SAO PAULO, PIRACICABA, SP (AV. PÁDUA DIAS 11, CAIXA POSTAL 09, 13418-900, PIRACICABA, SP, BRAZIL).

<sup>2</sup>DEMPSTER MS LAB, POLYTECHNIC SCHOOL - UNIVERSITY OF SAO PAULO, SAO PAULO, SP, BRAZIL.

<sup>3</sup>FOOD RESEARCH CENTER (FoRC-CEPID), SAO PAULO, SP, BRAZIL.

Fresh produce is recognized as a rich source of many nutrients, and it leads to numerous health benefits. However, it is also a source of foodborne disease (FBD) outbreaks. Most reported FBD outbreaks linked to the consumption of vegetables have been associated with bacterial contamination, mainly members of the *Enterobacteriaceae* family. While several studies quantify the population of *Enterobacteriaceae* in fresh and fresh-cut vegetables, the identification of the members of this family that compose the microbiota of such products is missing in most of these studies. On the other hand, new techniques for the rapid and accurate identification of microorganisms have been emerging in the last decades. The present study aimed to evaluate the Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS) technique for the identification of bacteria belonging to the *Enterobacteriaceae* family, isolated from samples of conventional (CON), organic (ORG), and minimally processed vegetables (MPV). A total of 300 samples (100 of each type) were obtained from local farms and supermarkets in the city of Piracicaba/SP (southeastern Brazil) and submitted to microbiological assays by plating on MacConkey Agar, for the isolation of putative *Enterobacteriaceae* colonies. A total of 1504 isolated colonies were randomly selected and submitted to identification on a MALDI-TOF MS Biotyper™. Of these, 826 (54.9%) were identified, 257 (31.1%) of which were from CON, 237 (28.7%) from ORG, and 332 (40.2%) from MPV samples. Additionally, of this total, 679 (82.2%) colonies were bacteria belonging to the *Enterobacteriaceae* family, while other non-*Enterobacteriaceae* were found in a small proportion (147; 17.8%). *Enterobacter* and *Pantoea* were the most common genera found in the three types of vegetables. The most frequent species in CON samples were *E. asburiae* (14.4%), *E. cloacae* (11.3%) and *P. ananatis* (10.1%); in ORG samples, *P. agglomerans* (24.5%), *E. cloacae* (11.8%) and *E. asburiae* (9.7%); and in MPV samples, *E. asburiae* (11.8%), *E. cloacae* (9.3%), *P. ananatis* and *agglomerans* (9.6%). Overall, the vegetables analyzed have a similar microbial profile for *Enterobacteriaceae* and the use of the MALDI-TOF MS technique proved to be a rapid and reliable assay to distinguish different microorganisms isolated from these types of samples.

**Keywords:** *Enterobacteriaceae*, food safety, fresh produce, MALDI-TOF, mass spectrometry.

**Development Agency:** CAPES, CNPq (#434469/2018-1) and FAPESP (#2013/07914-8).