Title: Comparison of the Microbiological Quality and Safety between Conventional and Organic Vegetables Sold in Malaysia

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Abstract: Given the remarkable increase in public interest in organic food products, it is indeed critical to evaluate the microbiological risk associated with consumption of fresh organic produce. Organic farming practices including the use of animal manures may increase the risk of microbiological contamination as manure can act as a vehicle for transmission of foodborne pathogens. This study aimed to determine and compare the microbiological status between organic and conventional fresh produce at the retail level in Malaysia. A total of 152 organic and conventional vegetables were purchased at retail markets in Malaysia. Samples were analyzed for mesophilic aerobic bacteria, yeasts and molds, and total coliforms using conventional microbiological methods. Combination methods of most probable number-multiplex polymerase chain reaction (MPN-mPCR) were used to detect and quantify foodborne pathogenic bacteria, including Escherichia coli O157:H7, Shiga toxin-producing E. coli (STEC), Listeria monocytogenes, Salmonella Typhimurium, and Salmonella Enteritidis. Results indicated that most types of organic and conventional vegetables possessed similar microbial counts (P > 0.05) of mesophilic aerobic bacteria, yeasts and molds, and total coliforms. E. coli O157:H7 and S. Typhimurium were not detected in any sample analyzed in this study. Among the 152 samples tested, only the conventional lettuce and organic carrot were tested positive for STEC and S. Enteritidis, respectively. L. monocytogenes were more frequently detected in both organic (9.1%) and conventional vegetables (2.7%) as compared to E. coli O157:H7, S. Typhimurium, and S. Enteritidis. Overall, no trend was shown that either organically or conventionally grown vegetables have posed greater microbiological risks. These findings indicated that one particular type of farming practice would not affect the microbiological profiles of fresh produce. Therefore, regardless of farming methods, all vegetables should be subjected to appropriate post-harvest handling practices from farm to fork to ensure the quality and safety of the fresh produce.

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