Characterizing the ecology and diversity of bacterial communities from imported Date Fruits to control *Listeria monocytogenes*

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Illnesses caused by foodborne pathogens still remain a major public health and economic concern in Canada. One approach to help control these pathogens is to better understand the interaction(s) between the microbiome of foods and the foodborne pathogens. Member(s) of the food microbiome can help inactivate pathogens and/or prevent their growth based on a number of factors, such as competitive exclusion. Thus, this project investigates the microbiome of imported, ready-to-eat (RTE) date fruits in the Canadian market. Date fruits were selected over other imported RTE foods we tested (such as pollen, seaweed, seeds, and pistachios) based on the microbiome diversity of the dates and the ability of the associated microbiota to show inhibitory growth against *L. monocytogenes*. Thus, based on our preliminary findings, it is hypothesized that date fruits contain unique bacteria that show anti-bacterial properties against the foodborne pathogen *Listeria monocytogenes*.

Dates from five different geographical regions were obtained. These regions include China, Iran, Palestine, Saudi-Arabia, and Tunisia. Bacterial strains were isolated from dates using TSA agar enriched with 5% of defibrinated sheep blood that permits both the distinction between morphological phenotypes and the growth of fastidious microorganisms. A rich diversity of bacteria was obtained from the dates, with a total of 191 isolates belonging to 91 different phenotypes being observed. The isolates were then screened using a growth inhibition plate assay against *L. monocytogenes*. In total, 35 isolates were found to produce a zone of inhibition against this pathogen, with zone sizes ranging from 0.5 to 5.7 mm. These isolates have all been initially identified as *Bacillus* spp. using 16S rRNA sequencing.

Characterization of the inhibition compounds will include, among other things, determining the mode of action, and the impact on the virulence of *L. monocytogenes.* Promising isolates will also be characterized with more scrutiny to the species/strain level. The results from this research could lead to the discovery of either novel antimicrobial metabolites or beneficial bacteria that could be added to foods to inactivate and/or control the growth of *L. monocytogenes*. These novel compounds will also be assessed for their potential activity against other foodborne pathogens and could eventually lead to novel probiotics and/or bio-compounds that can help reduce foodborne illness in Canada.

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