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Potential for bio-control of food-borne pathogens with *Bacteriovorax* spp. and implications for food safety

Bacteriovorax spp. (Bvx) is delta proteobacteria adapted to marine ecosystems where salinity concentration ranges from 1-3‰. Due to their predation of Gram-negative bacteria, Bvx may have great potential for bio-control of food-borne pathogens on fruits and leafy greens. The goal of this research was to optimize the plaque assay for quantifying Bvx isolates. We determined the predation of *E. coli* O157:H7 (Ec) and formation of Bvx plaques by Bvx strains G3, S11, OR7, and OS1 on polypeptone peptone medium (PP20) amended with sterilized seawater (SW) in a double agar plaque assay. For plaque assays of Bvx, bottom and top PP20 agar layers were amended with: a) NaCl (bottom layer) +SW (top layer), b) SW (bottom)+NaCl (top), c) SW (bottom)+SW (top), and d) NaCl-MgCl-CaCl (bottom)+NaCl (top) and plaques were enumerated on Ec host cells. The effects of incubation temperatures (22, 26, 31, 37°C) on plaque development were assessed on lawns of Ec. Plaque forming units (PFU/ml) on PP20 amended with SW ranged from 0.56 x 10⁶ (OR7) to 2.07 x 10⁶ (isolate S11). PP20 amended with NaCl and divalent calcium and magnesium had the lowest mean number of plaques (0.73 x 10⁶ PFU/ml), while SW+NaCl (1.22 x 10⁶) had the greatest counts. Storage temperatures varied with Bvx, as temperature optima for OR7 and S11 was 26 °C, but were non-significant (P>0.05) for G3. These results suggest that food-borne pathogens and Bvx may be assessed on PP20 devoid of SW, which could otherwise provide a source of variability from one seawater collection to another. Storage temperatures and media amendment provide useful parameters for quantifying *Bacteriovorax* efficacy as a bio-control agent.

Biography

Modesto Olanya has over 10 years of research experience with the USDA–Agricultural Research Service and is currently based at the Eastern Regional Research Center, Wyndmoor, PA. His laboratory is conducting applied research on Intervention Technologies for Minimally Processed Foods with emphasis on the bio-control of enteric pathogens on leafy greens at post-harvest. Prior to joining USDA-ARS, he was Regional Pathologist at International Potato Center and based at the Regional Office for Sub-Saharan Africa, in Nairobi, Kenya. He was also an Assistant Research Professor at the University of Maine and a Post-doctoral Fellow at International Institute for Tropical Agriculture at Ibadan, Nigeria. He has authored over 60 publications in reputable national and international journals, and active in various professional societies.

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