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Progress on the bio-control of food-borne pathogens on leafy greens with non-pathogenic microbes

Pathogenic microbes such as *Escherichia coli* O157:H7, *Salmonella* serovars, and *Listeria monocytogenes* have been reported on fruits and leafy greens and represent enormous food safety risks. Biocontrol, physical and chemical measures are used to reduce and inactivate microbial contamination on produce. In this research, we investigated the efficacy of bio-control on fruits, leafy greens, and in broths. Pathogenic microbes were inoculated at 4 log cfu/g and the biocontrol applied at 6 log cfu/g or ml. In experiments on the efficacy of biocontrol of *Salmonella* serovars (Typhimurium, Poona, Montevideo) by *Pseudomonas* spp., reductions of *Salmonella* ranged from 0.29-1.47 log cfu/ml. Similarly, reductions of E. coli O157:H7 with *P. fluorescens* on spinach ranged from 0.5-2.1 log cfu/g. Bio-control efficacy was significantly ($P<0.05$) impacted by storage temperatures and time as optimum reductions were observed at 15 deg C (1.5-2.4 log cfu/g). When *P. chlororaphis* and *P. fluorescens* were co-inoculated with *Salmonella* serovars, their bio-control efficacies were similar. Assessment of *Bacteriovorax* spp. on *E. coli* O157:H7 and *Salmonella* serovars demonstrated predation of these foodborne pathogens with *Bacteriovorax* spp. implying great potential for bio-control of pathogenic bacteria on produce. It appears that concurrent use of multiple bio-control (non-pathogenic) microbes and combinations of measures may greatly enhance their efficacies on foodborne pathogens.

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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