Nutritional Science-2013

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Nutritional Science & Therapy

July 15-17, 2013 Courtyard by Marriott Philadelphia Downtown, Philadelphia, USA

Prospects for biocontrol of foodborne pathogens on leafy greens with *Pseudomonas fluorescens*

O. M. Olanya, B.A. Niemira, D.O. Ukuku, B.A. Annous and C.H. Sommers
U.S. Department of Agriculture, USA

Abstract

Foodborne outbreaks of Escherichia coli O157:H7 (Ec) and other pathogenic bacteria have been associated with consumption of leafy vegetables. In addition to food safety procedures during production, processing and handling, other controls of foodborne bacteria such as physical, cultural, chemical and biological controls are often used to enhance food safety. We evaluated the recovery and selectivity of Restaino and Frampton E. coli O157:H7 chromogenic medium (RFCM) for enumeration of Ec and the biological control organism Pseudomonas fluorescens (Pf) from spinach and media. The efficacy of Pf (non-pectolytic and non-plant pathogenic) for biocontrol of Ec on spinach was also determined. Spinach was dip-inoculated with Pf strains 2-79, Q2-87, and Q8R-1, prior to inoculation with Ec strains 43894, 43895, and 35150 individually or in a cocktail mixture. The inoculated spinach was stored at 20 deg C for 24 and 48 hours, and then evaluated for recovery of Ec populations. In subsequent experiments, the effects of storage time (24 and 48 hrs) and temperatures (5-30 deg C) on recovery and the efficacy of biocontrol were determined. Bacteria populations from mixed cultures plated and recovered from media were 3.6-8.7 and 4.2-7.7 log cfu/ ml for Ec and Pf, respectively.

On spinach, microbial counts ranged from 6.0-8.2 and 6.5-8.6 log cfu/g for the same bacteria above. Relative to the untreated control, the reduction of Ec by Pf ranged from 0.5-2.1 log CFU/g of spinach. The efficacy of biocontrol was significantly ($P<0.05$) affected by storage temperature and time. Suppressive effects were greater at 15 deg C (1.5-2.4 log CFU/g) than at other temperatures (<0.93 log CFU/g). These results provide a methodology for recovery and differentiation of Ec from Pf and assessment of the effectiveness of a biocontrol. As a post-harvest intervention measure, Pf may provide moderate reductions of Ec populations on spinach.

Biography

O. M. Olanya completed his Ph.D. from North Carolina State University at Raleigh, NC. He did his post-doctoral fellowship at International Institute of Tropical Agriculture (IITA) at Ibadan, Nigeria and was the Regional Pathologist at International Potato Center (CIP), Regional Office for Sub- Saharan Africa in Nairobi, Kenya. He is currently a Research Scientist with USDA-Agricultural Research Service at Wyndmoor, PA, and conducts microbiological research on post-harvest intervention measures for control of food-borne pathogens on leafy greens and other produce. He has published more than 65 papers in reputable journals.