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## Inactivation of bacteria in apple juice: A combination treatment of UV-light and radio frequency electrical fields processing

The need for a non-thermal intervention technology that can inactivate microbial populations without altering nutrient quality of liquid foods have been proposed and several of these non-thermal technologies have been commercialized including ultraviolet light (UV-L) and radio frequency electric fields (RFEF) processing. In this study, the efficacy of a combinational treatment using RFEF and UV-L processing in inactivation of bacteria in apple juice inoculated with E. coli bacteria at 7.8 log CFU/ml was investigated. The apple juice inoculated with bacteria was processed with a laboratory scale RFEF at 20 kHz, 15 kV/cm for 170 µs at a flow rate of 540 ml/min followed by UV-light treatment at 400C. Treated samples were monitored for the presence of surviving and injured bacteria. Also, the juice was analyzed for possible presence of UV-absorbing substances leaked out from membrane damaged bacteria. Sorbitol MacConky Agar (SMAC) and Trypticase Soy Agar (TSA) plates were used to determine viability loss and percent injury. UV-light treatment alone caused 6.3 log reduction of E. coli in apple juice while RFEF caused only 1.5 log reduction. Percent injury caused by RFEF and UV-light processing alone averaged 95% and < 1 %, respectively. A combination of the two processing treatments did not increase cell injury or leakage of UV-substances. However, the UV-absorbing substances determined in RFEF treated apple juice was significantly (P>0.05) different than UV-light treated samples, suggesting that the mechanism of bacterial inactivation by RFEF treatment is different from UV-light treatment. Also, RFEF treatment caused more membrane injury and cellular leakage of UV-substances than UV-light treatment.

## Biography

Dike O Ukuku has 27 years of professional experience in food technology, food chemistry and food microbiology in Universities, Industry and Government. He has authored more than 70 publications in different scientific journals including 9 proceeding papers, 8 invited book chapters, and 1 text book. He presented over 100 international and national presentations. He is a fellow of the Japan Society for the Promotion of Science (JSPS-Fellow) and also a King-Chavez-Parks future faculty fellow, a member of the science advisory board. He is an editor of three scientific journals and also is on the editorial board membership of applied and environmental microbiology, Journal of Food Science, Journal of Food Protection, International Journal of Food Microbiology, Hortscience, Journal of Food Technology and Processing including food technology as an in depth subject matter expert for manuscripts submitted to the journals.

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