

TITLE PLASMA-TREATED POLYETHYLENE FILM : A SMART MATERIAL APPLIED FOR SALMONELLA TYPHIMURIUM DETECTION

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ABSTRACT Salmonella is a major cause of foodborne illness worldwide and is not allowed to be present in any food in all countries. The purpose of this study is to develop a simple alternative method for the detection of Salmonella based on functionalized polyethylene (PE) surfaces. Salmonella Typhimurium was used as a model bacterium. PE film was treated using dielectric plasma in order to alter the wettability of the PE surface and consequently introduce functionality on the surface. The PE film characterized by ATR-FTIR spectroscopy revealed the presence of CO stretching of ketones, aldehydes and carboxylic acids. The antibodies against O or H antigens of Salmonella and S. Typhimurium were then respectively immobilized on the PE surface after activation of the carboxylic group using NHS/EDC followed by protein A. The evidences from ATR-FTIR, scanning electron microscopy and optical microscopy showed the presence of S. Typhimurium attached to the plasma treated PE surfaces via the two types of anti-Salmonella antibody. The plasma treated PE film developed is simple and allows efficient association of bacterial cells on the treated surfaces without the necessity of time-consuming centrifugation and washing steps for isolation of the cells. This material is considered to be a smart material applicable for S. Typhimurium detection.