SiO_2-Coated Magnetostrictive Biosensors for *Campylobacter jejuni* Detection

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Campylobacter is one of the most common genera of foodborne pathogens. Contaminated foods, water, undercooked foods or contact with infected animals could cause campylobacteriosis. Magnetostrictive particle (MSP), as a high-performance biosensor platform, was introduced recently. In this study, a magnetostrictive particle (MSP) in size of 1.0 × 0.2 × 0.25 mm or 2 × 2 × 0.25 mm is fabricated and coated with three layers of silica. The coatings are highly stable according to the resonance frequency response in pure water and poultry rinse water. Anti-*Campylobacter* antibodies are well immobilized on silica-coated sensors by covalent bonding to form a biosensor and the immobilization efficiency was tested by ELISA. SEM images and resonance frequencies show that the MSP based biosensors can capture *Camplylobacter jejuni* in washing water. The responses of the biosensor in *Camplylobacter jejuni* suspension with different concentrations were studied, which were used to determine the detection limit of the biosensor. The detection limits of both silica-coated MSP biosensor in bacterial detection is around 10^2 CFU/mL. However, the silica coated MSP biosensors may have better performance in more complex food systems due to its strong covalent binding antibody attachment. The silica coated MSP biosensors will have higher potential application in the food industry for onsite monitoring of microbial populations to improve food safety due to the inexpensive preparation and stronger antibody attachment.