APPLICATION OF SURFACE ENHANCED RAMAN SPECTROSCOPY TO FOOD SAFETY ISSUES

Lili He

Dr. Mengshi Lin, Dissertation Supervisor

ABSTRACT

In recent years, food safety issues caused by contamination of chemical substances or microbial species have raised a great deal of concern in the United States. Conventional chromatography-based methods for detection of chemical contaminants and microbial plating methods for detection of food-borne pathogens are time-consuming and labor-intensive. In this project, we explored the feasibility of using surface enhanced Raman spectroscopy (SERS) coupled with a variety of substrates (e.g. commercial gold substrates, fractal-like gold nanoaggregates, silver dendrites, and gold-coated zinc oxide nanonecklaces) for detection of various chemical and microbiological food contaminants, including melamine and its analogues, restricted antibiotics and prohibited dyes, and *Bacillus* spores. Our results demonstrate that SERS is capable of detecting, characterizing, and differentiating chemical and microbiological contaminants in foods quickly and accurately. The limit of detection of SERS could reach a single spore or parts per billion level for chemical samples. These results indicate a great potential of using SERS techniques for rapid detection, classification, and quantification of chemical and biochemical contaminants in food products.