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A SERS based aptasensor for Salmonella typhimurium detection

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S. *typhimurium* is one of the most frequently occurring pathogens in food that affects people's health and it is widely distributed in nature. The classical culture methods as well as recently developed PCR and ELISA methods have their own drawbacks which limit the further application. Here, an aptasensor was built for the detection of *S. typhimurium* based on the gold nanoparticles enhanced Raman scattering property. First, the sandwich structure combined with the capture probe, the signal probe and the target bacterium was investigated. The magnetic gold nanoparticles immobilized with the aptamer of *S. typhimurium* were used as the capture probes which make it easier for the pre concentration and separation of *S. typhimurium*. In addition, gold nanoparticles modified with Raman signal molecules (MBA) and the aptamer of *S. typhimurium* were utilized as the Raman signal probe for the signal collection and quantitative analysis of *S. typhimurium*. MBA exhibited a characteristic scattering peak at 1582 cm-1 which was chosen as the basis for quantitative analysis. Under the optimal experimental conditions, the Raman scattering spectra were recorded upon the addition of gradient dilutions of *S. typhimurium*. Results showed that there was a good linear correlation between the Raman intensity and *S. typhimurium* in the range of 10 cfu/mL~107 cfu/Ml (y=395.920+823.711x, R2=0.9968) with a low detection limit of 5 cfu/mL. This method is simple, rapid and of high sensitivity and specificity. In comparison with the result of the traditional plate counting method and the SERS test, the spiked recovery experiment indicated that the Raman aptasensor could be used in pork sample.

Biography

Ma Xiaoyuan, Ph.D., Associate professor. 2006 Bachelor in Chemical Engineering, Nanjing University of biological engineering graduate, bachelor's degree; 2011 at the Southeast University, State Key Laboratory of biological electron eligible for application of chemical engineering doctorate (Ph.D candidate); October 2011 to date in Food Jiangnan University. With years of biology, nano-materials science and spectroscopy research experience, mainly engaged in the preparation of nano-materials and LSPR analysis technology research and development work, the main research direction for nano-bioanalytical and food and nutrition security analysis. Up to now, has presided over the Jiangsu Science and Technology Support Program - Social Development Project (BE2012614), bioelectronics, Southeast University, State Key Laboratory for fund projects, National Natural Science Foundation plans to cultivate research projects (90,923,010), 863 projects (2007AA022007), university research in Jiangsu Province industrialization projects (JH09-34), the National Natural Science Foundation of China (20475009) and other research work has been published and employ more than 10 papers SCI, a Chinese invention patents items.

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