

## Abstract

Aflatoxins are a group of mycotoxins that have deleterious effects on humans and are produced during fungal infection of plants or plant products. An electrochemical immunosensor for the determination of aflatoxin B<sub>1</sub> (AFB<sub>1</sub>) was developed with AFB<sub>1</sub> antibody (AFB<sub>1</sub>-Ab) immobilized on Pt electrodes modified with polyaniline (PANi) and polystyrene sulphonic acid (PSSA). Impedimetric analysis shows that the electron transfer resistances of the Pt/PANi-PSSA electrode, the Pt/PANi-PSSA/AFB<sub>1</sub>-Ab immunosensor and Pt/PANi-PSSA/AFB<sub>1</sub>-Ab incubated in bovine serum albumin (BSA) were 0.458, 720 and 1,066 k $\Omega$ , respectively. These results indicate that electrochemical impedance spectroscopy (EIS) is a suitable method for monitoring the change in electron transfer resistance associated with the immobilization of the antibody. Modelling of EIS data gave equivalent circuits which showed that the electron transfer resistance increased from 0.458 k $\Omega$  for the Pt/PANi-PSSA electrode to 1,066 k $\Omega$  for the Pt/PANi-PSSA/AFB<sub>1</sub>-Ab immunosensor, indicating that immobilization of the antibody and incubation in BSA introduced an electron transfer barrier. The AFB<sub>1</sub> immunosensor had a detection limit of 0.1 mg/L and a sensitivity of 869.6 k $\Omega$  L/mg.