Florfenicol binding to molecularly imprinted polymer nanoparticles in model and real samples

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A simple and straightforward technique for coating microplate wells with molecularly imprinted polymer nanoparticles (nanoMIPs) to develop assays similar to the enzyme-linked immunosorbent (ELISA) assay to determine and quantify florfenicol (FF) in real food samples such as liquid milk and salmon muscle is presented here. The nanoMIPs were synthesized by a solid-phase approach with an immobilized FF (template) and characterized using dynamic light scattering, a SPR-2 biosensor system and transmission electron microscopy. Immobilization of nanoMIPs was conducted by preparing a homogenous solution of FF-nanoMIPs in water mixed with polyvinyl alcohol (PVA) 0.2% (w/v) in each well of a microplate. The detection of florfenicol was achieved in competitive binding experiments with a horseradish peroxidase?florfenicol (FF-HRP) conjugate. The assay made it possible to measure FF in buffer and in real samples (liquid milk and salmon muscle) within the range of 60?80 and 90?100 ng/mL, respectively. The immobilized nanoMIPs were stored for six weeks at room temperature and at 5 °C. The results indicate good signal recovery for all FF concentrations in spiked milk samples, without any detrimental effects to their binding properties. The high affinity of nanoMIPs and the lack of a requirement for cold chain logistics make them an attractive alternative to traditional antibodies used in ELISA.

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Florfenicol

Nanoparticles

Polymer