

Public Abstract

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Title:Development of a Biosensor for the Detection of Helicobacter hapaticus Utilizing Multifunctioning Immobilization Platforms

Optical biosensor development is a process involving the careful selection of the material for the immobilization platform, design of the detection mechanism and integration with optical and electronic equipment. The ability of biosensor to outperform the currently available technology, while reducing the cost and providing ease of use is of utmost importance. This work describes the research performed in effort to develop a high surface area material for biosensor immobilization, which improves the biosensor's function with the incorporation of fluorescence. Two silica-based nanoporous materials were evaluated, the nanoporous organosilicate (NPO) and fluorescent electrospun sol-gel nano/microfibers. The biosensor was also developed utilizing the immunosensing technique in a sandwich-based assay. The fluorescence based optical biosensor involves the use of organic fluorophores along with colloidal gold nanoparticles. When used as reporter molecules, the gold nanoparticles quench fluorescence of the fluorophores in the biosensor immobilization platform, thus signaling the presence of analytes. The results indicate that utilizing materials with high surface area to volume ratios, with embedded fluorescence, and the sandwich-based immunoassay provides a highly specific biosensor with a low level of detection.