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Abstract

Poster

Major Forensic Chemistry

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Detection of Illicit Drugs with Fluorescent Biosensor Silica Nanoparticles

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Drugs pose a great threat to society. Drugs are widely abused by people of all classes. An efficient test that can be used on-site is crucial for countering this problem. Common techniques for detecting drugs like gas chromatography-mass spectrometry, high-performance liquid chromatography, and enzyme-linked immunosorbent assay are time-consuming, difficult to understand without proper education and training, and are not cost-efficient.

The detection of illicit drugs has been done using coinage metal nanoparticles. Silica nanoparticles are an economical and widely available choice when compared to coinage metals. This makes it ideal for the detection of illicit drugs. A fluorescent core is introduced to the nanoparticles for observing drug and nanoparticle interactions.

DNA aptamers, biologically specific molecules, are attached to the fluorescent-cored nanoparticles. The aptamer allows the nanoparticles to only interact with one target drug. This is helpful so that any legal analogs do not cause false positives.

Fluorescent spectroscopy and infrared spectroscopy are used to monitor the progress of nanoparticle synthesis, core and aptamer integrations, and drug interactions. A change in fluorescence can determine if a drug is present or not.