

WIU CENTENNIAL HONORS COLLEGE
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Abstract

Poster

Major: Forensic Chemistry

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Detection of GBL Using PVP Capped Metal Nanoparticles

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Among the world-wide drug crisis, comes the issues with the use of date rape drugs. Gamma hydroxybutyrate (GHB) is one of the most commonly used date rape drug and is classified as a Schedule I drug. Gamma-butyrolactone (GBL), a Schedule II drug, poses a great challenge to law enforcement officers because of its use as a precursor to GHB. GBL will create similar effects in the body compared to GHB. Due to GBL being found naturally in the body, in small amounts, it is metabolized at a faster rate than GHB, which creates an urgency for detection. Current tests for GBL (HPLC, GC-MS, and ELISA) are difficult to interpret without a chemistry background, are time consuming, and expensive to maintain. A portable test employing metal-polyvinylpyrrolidone (PVP) nanoparticles will be more efficient and easier to understand. This project uses metal nanoparticles (copper, silver, and gold) capped with PVP to detect GBL. PVP is used to stabilize the metal particles, as well as provide increased fluorescence of the nanoparticles relative to the lone metals. Copper nanoparticles are particularly conducive for various applications because of their mild synthesis conditions and cheap precursors. Silver nanoparticles are very significant because of their anti-inflammatory, anticancer, and antimicrobial properties. Gold nanoparticles have unique physicochemical and optical properties. The techniques of fluorescence, UV-VIS, and SEM are used to monitor the progress of nanoparticle synthesis.