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Light-Enhanced Detection of Stress Hormones: Developing a SERS Filter System

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Abstract: This study presents the development of a novel filter-based Surface-Enhanced Raman Scattering (SERS) substrate designed for the sensitive detection of glucocorticoids. The fabrication process involves pre-treating a filter with methanol and an aqueous NaCl solution, followed by the deposition of silver nanoparticles (AgNPs) using a low-pressure suction filtration method. The pre-treatment includes the gradual addition of methanol and a subsequent 10-minute soaking in NaCl solution. Silver nanoparticles are deposited via the Silver Mirror Reaction (SMR) technique. The performance of the fabricated filter was evaluated using Rhodamine 6G (R6G) as a reference analyte and compared to a commercial paper-based silver SERS substrate. The limit of detection (LOD) for both R6G and glucocorticoids was determined and benchmarked against UV-Vis spectroscopy and the commercial SERS substrate. Statistical analysis using ANOVA was performed to assess the significance of the results.

Biography: Praveena Satkunam is a Ph.D. student specializing in experimental biophysics, with a research focus on biomolecular detection and stress hormone analysis. She earned her bachelor's degree in Physics from the University of Jaffna, Sri Lanka, and her master's degree from Southern Illinois University, Carbondale. Her work aims to develop sensitive and efficient approaches for studying complex biological systems.