B123 Electrochemical Screening of Synthetic Cannabinoids

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Learning Overview: After attending this presentation, attendees will be able to understand the use of electrochemical techniques as screening tools in forensic science.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by advancing toward a micro electrochemical novel sensing method that will provide qualitative and quantitative information to enhance workflow in laboratories to speed up screening tests and analysis samples, reducing costs.

The proposed approach will allow on-site testing of synthetic cannabinoids supporting for non-invasive sample analysis with minimal volume at a low concentration as a rapid detection system. New screening tools in forensic science are of growing importance and will have implications in screening of new abuse drugs that pose a significant threat to the United States people and other countries. The collective term Synthetic Cannabinoids (SCs) addresses a drug group that doesn't have any resemblance to classical cannabinoids. The name has its origin in the effect that these substances exert on the central and peripheral nervous system. A large number of intoxications and some deaths have been linked with its use. Most new versions of SCs are chemically modified quickly and thus are not banned as illegal substances.

Newest generation SCs include N alkyl indole indazole derivatives. Usually, chemical analysis of cannabinoids can be accomplished by means of gas and liquid chromatography with mass detection. While these are definitive techniques, the high cost of chromatographic equipment should be considered by laboratory facilities. By contrast, electrochemical techniques could be used as preliminary screening tests because they use low cost equipment and miniaturized electrodes, require minimal sample amounts, and can be easily adapted to forensic science research. Moreover, the development of portable equipment is an attractive advantage. Although electrochemical techniques should be considered, there are some difficulties with electrochemical determination, such as high oxidation potentials. Another problem is contamination of electrodes with insoluble oxidation products. Both were overcome using Diamond Boro Doped (DBD) electrodes and optimizing an electrochemical procedure of cleansing. Thus, this electrochemically eco-friendly method was developed for the screening of synthetic cannanbinoids. This was performed in a 100µL cell of home-built design. Analysis of cannabinoids was performed at concentrations between 0.1mg/L–1.0mg/L at pH 5.02 in an artificial saliva media by Pulse Differential Voltammetry (DPV) in cathodic and anodic mode. Peak potentials were determinate for 11 synthetic cannabinoids. The same cell was used to obtain calibration curves in Acetonitrile/Tetraethyl Ammonium Perchlorate (CH_3CN/TEAP 0.01 M) in low concentrations using DPV. Cyclic Voltametry (CV) was also performed in CH_3CN/TEAP 0.01M. At concentrations between 8–20mg/L of cannabinoids using Pipette Tip Solid-Phase Extraction (PTSPE) with another cell adapted for organic solvents, peak potentials were determined on drops of solution. Three micro methods were developed and applied to 25B-NBOMe.HCl, N benzyl piperazine; 1,3 chlorophenyl piperazine; NN dimethyl tryptamine, Cis 4,4 dimethyl aminorex, JW018, JWO73; XLR 11, MAM220, and AB Pinaca and Fubinaca. All are known drugs of abuse in seized street samples. Absorption spectra were obtained for every compound tested. The use of these micro methods is possible as a presumptive screening method prior to identification.

Diamond Boro Dopped, Microscreening, Synthetic Cannabinoids

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