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Magnetic solid phase microextraction for determination of caffeine coupled with poly (Alizarin Red) modified screen-printed carbon electrode detection

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Caffeine (CAF) is a natural stimulant most commonly found in some plant species. Caffeine is present naturally or added to widely consumed foods. It is also found in cola-type soft drinks and energy drinks that mainly contain artificial CAF. However, too much CAF consumption can cause the muscles effects for a move erratically. The quantity of the CAF in the matrix, whether it is the major compound or if it is found in trace quantity, is the very important topic. We introduce magnetic solid phase microextraction coupled with electrochemical detection. Screen-printed carbon electrode-based electrochemical detection has been successfully combined with m-SPME for the first time. SPCEs modified with conducting polymer (poly-alizarin red S) are employed as electrochemical transducers in the analyte detection stage. The Fe3O4 coated MWCNTs nanocomposite was prepared as a sorbent to quickly extract analyte from aqueous samples. m-SPME) is a well-known process for the enrichment of hydrophobic species from water sample without the use of toxic organic solvents. Miniaturization of both analytical instrumentation and analytical methodologies has become very popular, and many efforts have focused on carrying out chemical analysis at a reduced scale.

In the study, the commercially available disposable screen-printed carbon electrodes modified with poly Alizarin Red S are employed as electrochemical sensors in the detection stage. However, the suitability of m-SPME for electroanalytical methods such as SWV has not been declared. With our optimized conditions in hand, the system response was linearly proportional to the concentration of caffeine in the range of 0.5–20 μM with a correlation coefficient of about 0.9987. The LOD of the sensing system at a signal to noise ratio of 3 was 0.05 μM. At the end of the study, the suitability of this new procedure for the analysis of energy drink and soft drink samples was demonstrated.

Biography

Hayati Filik obtained his PhD degree in Analytical Chemistry from Istanbul University, Istanbul, Turkey in 1993. He currently works as a Professor of Chemistry at Istanbul University. His fields of interest are analytical chemistry, environmental chemistry and electroanalytical chemistry.

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