

Highly sensitive determination of sunset yellow FCF (E110) in food products based on Chitosan/Nanoparticles/MWCNTs with modified gold electrode

Abstract

Sunset Yellow belongs to the family of azo dyes, commonly used in food industry. High consumption of Sunset Yellow can cause health problem to human. Due to arising of the health issues, there are several analytical methods available for determination of Sunset Yellow. However, these methods are required skilled manpower, complicated procedures, time consuming and high cost. Herein, an electrochemical sensor was developed based on the combination of chitosan (CHIT), calcium oxide nanoparticles (CaONPs) and multiwall carbon nanotubes (MWCNTs) sensing film for detection of Sunset Yellow in food products. Electrochemical behavior of the modified gold electrode in the presence of Sunset Yellow was studied by using cyclic voltammetry (CV) and differential pulse voltammetry (DPV). The morphological characteristics of CHIT/CaONPs/MWCNTs were observed under scanning electron microscope and transmission electron microscope. Under optimal conditions, the DPV was detected with different concentrations of Sunset Yellow in the range of 0.9 to 10 ppm, with detection limit of 0.8 ppm. The developed method has successfully applied for monitoring the presence of Sunset Yellow with different food products including candy, royal jelly, ice cream and soft drink with satisfactory results.