Electrochemical determination of vitamin B₆ in water and juice samples using an electrochemical sensor amplified with NiO/CNTs and Ionic liquid

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Measurement of food additives helps a lot to check the food quality. Also, Vitamin B₆ is one of the most important vitamins in food samples. In this study, we fabricated an electroanalytical food sensor based on the amplification of a carbon paste electrode (CPE) as well as NiO-CNTs nanocomposite and 1-methyl-3-octylimidazolium hexafluorophosphate (MOHFPE). The NiO-CNTs/MOHFPE/CPE showed the catalytic activity for the determination of vitamin B₆ and also improved the oxidation current of vitamin B₆ up to about ~ 2.5 times. Also, in comparison to CPE, the oxidation potential of vitamin B₆ was shifted to a negative value of about 100 mV, which confirmed the successful modification of CPE with NiO-CNTs and MOHFPE. The results related to differential pulse voltammetric (DPV) investigations showed a linear between the current and vitamin B₆ concentrations in the range of 4.0 nM - 500 µM with a detection limit of 0.9 nM. The NiO-CNTs/MOHFPE/CPE, as an analytical tool, was successfully used to determine vitamin B₆ in drinking and juices samples using the standard addition method.

Keywords: Vitamin B₆, Food analytical sensor, NiO/CNTs, Modified electrode

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