



A novel high performance dual biosensor for the detection of aspartame in food samples

Venkatasubba Naidu Nuthalapati

Sri Venkateswara University, India

Abstract:

An improved high performance dual enzyme based biosensor has been developed for the determination of aspartame in food samples. The nanobiocomposite involves ammonium piperidine dithiocarbamate (APDC) capped copper nanoparticles (CuNPs) loaded on multi walled carbon nanotubes (MWCNTs) and assimilated with β -cyclodextrin. Finally, the dual enzyme system was immobilized onto the electrode surface to construct CHT-LAAO/CuNPs-APDC-MWCNTs- β -CD/GCE. Characterization was performed using Transmission electron microscope (TEM), Thermogravimmetric analysis (TGA), X-ray diffraction (XRD) and Fourier transition infrared spectroscopy (FT-

IR). The biosensor showed optimum response within 5s at pH 7.5 and 35°C, when polarized at 0.25 V vs. Ag/AgCl. Furthermore, CHT and LAAO were adsorbed tightly on the surface of the modified electrode and shows enzyme activity to convert aspartame to its oxidized product of keto ester and H₂O₂. There was a linear relationship between biosensor response (mA) and aspartame concentration in the range 0.001–2.0 mM. The sensitivity of the biosensor was 78.35 μ A cm⁻²mM⁻¹ with a detection limit of 0.005 mM (S/N=3). The long term stability of the sensor in terms of 89.0% of the original response on the third day was observed when conducted over a range of ten runs for five days using the same coating. The biosensor was evaluated and employed for the measurement of aspartame concentrations in different commercially available food samples.

Biography:

Venkatasubba Naidu Nuthalapati has completed his PhD from Sri Venkateswara University and currently working as a Professor in the Department of Chemistry, Sri Venkateswara University, India. His research involves the development of novel and cost effective spectroscopic and electrochemical methods for the detection of organic and inorganic molecules from different matrices. He has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of reputed.