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## Chitosan stabilized silver nanoparticles for reducing 4-nitroaniline using electrochemical methods: Electrocatalytic activity

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4-Nitroaniline is one of the most common organic pollutants, which widely exist in industrial and agricultural wastewaters. If it presents even at very low concentration (1mg/L), it produces high environmental risk and poses a great intimidation to human health. So, the accurate detection of 4-NA is more important concern in public and environmental protection. A number of electrochemical sensing techniques have become one of the most convenient method for the environmental and biological analysis because of its low cost, rapid, good selectivity, highly sensitivity and easy to operate. Nanotechnology has emerged as a very significant field of current research with potential applications in medical and electronics. In recent years, silver nanoparticles (Ag-NPs) have emerged as an arch product in the field of nanotechnology due to their chemical stability, good conductivity, catalytic and electrocatalytic activity. In

this work, a material comprised of chitosan-stabilized silver nanoparticles (nAg-chitosan) was prepared and characterized by UV-vis and FT-IR. A carbon paste electrode was immersed in the liquid suspension of nAg-chitosan to obtain a voltammetric sensor (nAg-chitosan/CPE sensor). This sensor was successfully used for the catalytic reduction of 4-NA. A reduction peak was observed at -400 mV, which shifted toward more positive directions under optimized experimental conditions. This study was investigated using cyclic voltammetry and chronoamperometry with measurement of different electrochemical parameters. Therefore, the results show that the silver electrode exhibited high catalytic properties toward 4-NA reduction. Moreover, the analytical determination of 4-NA was also evaluated using differential pulse voltammetry.

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