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KINETIC STUDY OF THE INTERACTION OF GOLD NANOPARTICLES WITH THIOL COMPOUNDS: DETERMINATION OF N-ACETYLCYSTEINE USING LIGHT SCATTERING DETECTION

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The aggregation of gold nanoparticles in the presence of several thiol compounds and the cationic surfactant cetyltrimethyl ammonium bromide has been kinetically studied using light scattering detection. This study has given rise to a simple and rapid method for the determination of N-acetylcysteine (NAC). The aggregation process has been monitored by measuring the initial reaction-rate (v_0) and the light scattering signal at a prefixed-time (ΔIF_{10}), using stopped-flow mixing technique, which makes the method applicable to automate routine analysis. Each measurement was obtained in about 15 s, using an integration time of 0.2 s. The dynamic range of the calibration graph obtained for NAC, using the initial rate method, was 2.9 - 60 μmol L^{-1}, and the detection limit was 0.87 μmol L^{-1}. Similar results were obtained for other thiol compounds assayed. The precision of the method, expressed as relative standard deviation, ranged between 0.6 and 3.5 %. The method was applied to the determination of NAC in several pharmaceutical samples with acceptable recoveries in all instances, which ranged between 97.7 and 101.1 %.