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Detection and Killing of Food Poisoning Salmonella Typhimurium in Cheese by Using Monoclonal Antibody and Nanoparticles Complex

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Abstract: Present studies were conducted to test the ability of gold nanoparticles (GNPs) to detect and kill the bacterial contaminated food samples like cheese. The GNPs were prepared in two methods, sample A was purple 72 to 78.3 nm, while sample B was wine-red and the size was 51.5 to 58 nm. The results obtained suggest that the GNPs were synthesized with different particle size. UV-VIS spectroscopy and zeta potential tests showed that increasing in size led to increase UV-VIS absorbance spectra for PEG capped GNPs from 519 to 525.5 nm for sample A and from 520.5 to 522 nm for sample B. While zeta potential changed from -26.55 to -8.2 mV for sample A, and 27.25 to -5.4 mV for sample B. The colorimetric assay resulted by conjugation of monoclonal antibody (mAb) with the nanoparticles to detect poisoning *S. typhimurium* in cheese showed a distinct color change when bacteria were found. Also bio-conjugated GNPs also can serve as "nanoscopic heaters" in the presence of suitable wavelength light, we showed all sizes of the GNP capped with citrate, GNP capped with PEG and GNP-PEG-mAb, cause a decrease in *S. typhimurium* after radiation and the killing efficiency was more by GNP-PEG-mAb

Keywords: Size-dependent effects, gold nanoparticles, polyethylene glycol, UV-VIS spectroscopy
