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Circular Dichroism Study of DNA-Gold Nanorod Nanobioconjugates

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Nobel plasmonic nanoparticles have offered variety of applications in biomedicine and biosensing. Nanobioconjugates of DNA and nanoparticles have been introduced in designing new generation of nanoprobes for detection purposes. Amongst plasmonic nanoparticles, gold nanostructures of rod morphology have been nominated as good candidates for different biological and biochemical applications. So far, there have been a number of reports based on drug/gene delivery and diagnostic capability of gold nanoparticles. However, fundamentals of interaction between nanoparticles and biomolecules are yet to be understood. In some cases, conjugation of biomolecules with nanoparticles of interest might induce adverse effects on the structure and function of the biomolecules, where the applicability of nanoparticles remains under question. Herein, we present the interaction between gold nanorods and a single-strand DNA, to monitor the conformational changes of nucleic acid upon interaction with rod-shaped nanostructure. Colloidal gold nanorods were synthesized according to conventional sequential seed mediated growth method. Formation of rod shape was characterized by monitoring the typical surface plasmon resonance absorption bands in the visible and near infrared region. The nanorods were further characterized by transmission electron microscopy (TEM) and Atomic absorption spectroscopy (AAS), to reveal the shape and size. The purified samples were then interacted with a fixed concentration of nucleic acid (0.5 mg. mL-1) and incubated at ambient temperature for several hours. Circular dichroism spectra of the complexes were recorded in the UV region (200-300 nm). Results showed that typical bonds of ssDNA at 245 and 268 nm have not changed considerably and the nucleic acid has maintained its conformation upon interaction with gold nanorods. Outcomes of this investigation could encourage the possibility of using gold nanorods in the upcoming research fields of applied nanobiotechnology for detection, immobilization and stabilization of nucleic acids.

Keywords: Gold Nanorods, Surface Plasmon Resonance, Circular Dichroism.

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Synergic Antioxidant Activity of Tea (Camellia Sinensis) and Mentha Pulegium

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Active oxygen species (ROS), produced during some natural aerobic processes, could be involved in various disorders. Harmful action of free radicals can be reduced by antioxiant compounds that scavenge free radicals and detoxify the organism. Antioxidants are recognized for their potential in promoting health and lowering the risk of many human disorders such as cancer, hypertension and heart disease.The aim of this study was to investigate the antioxidant activity of various mixtures of tea and Mentha Pulegium.In practice, 80% methanol extracts of individual samples of dried tea leaves and Mentha Pulegium were prepared. Different ratios of extracts were then made for synergistic studied.Total phenolic content (TPC) and antioxidant activity of various mixtures of tea-menthe pulegium were measured using Folin-Ciocalteau, DPPH-free radical scavenging and ferric-reducing antioxidant power assay (FRAP). The correlation of TPC with DPPH and FRAP assay of plants extracts were investigated.According to the results, the ratio of 50 - 50 showed the highest antioxidant power relative to isolated samples of tea and Mentha pulegium. Considering that both plants had high antioxidant activity, flavin bridges are likely to be higher in synergistic mixture, and enhance antioxidant power properties of poly-phenolic hydrogen peroxide.

Keywords: Antioxidant, Synergic, Tea, Mentha Polegium, Extract, Total phenolic content, DPPH radical Scavenging Assay, Ferric – Reducing Antioxidant Power Assay.
