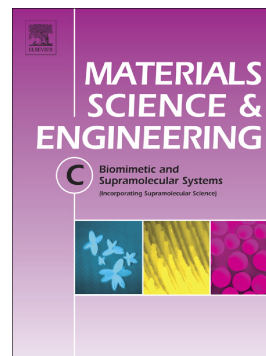


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Green synthesis of water-soluble nontoxic inorganic polymer nanocomposites containing silver nanoparticles using white tea extract and assessment of their in vitro antioxidant and cytotoxicity activities



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**Green synthesis of water-soluble nontoxic inorganic polymer nanocomposites containing silver nanoparticles using white tea extract and assessment of their in vitro antioxidant and cytotoxicity activities**

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**Abstract:** The use of nontoxic biological compounds in the synthesis of nanomaterials is an ecofriendly and cost-effective approach in nanotechnology. The present work was carried out to develop silver nanoparticles (Ag-NPs) by a green method using *white tea* (Wt) extract as reducing agent for reduction of silver nitrate as silver precursor into the lamellar space of inorganic polymer montmorillonite (Mt) as an effective protective reagent and support as well. The bioformed Wt/Ag@Mt nanocomposite (NCs) was compared with pure biosynthesized Wt/Ag-NPs under free stabilizer condition and effect of Mt stabilizer on antioxidant, cytotoxicity and structural properties were also investigated. The prepared Wt/Ag-NPs and Wt/Ag@Mt-NCs were characterized by UV-vis spectroscopy, FTIR, XRD, TEM, SEM and EDX. The interlamellar space limits were without many changes, therefore Ag-NPs formed on the exterior surface of Mt. The XRD study showed that the particles are crystalline structure in nature, with a facecentered cubic (fcc) structure. The TEM result shows the bioformed Ag-NPs are spherical in shapes with mean particle size of  $19.77 \pm 3.82$  nm for Wt/Ag-NPs and  $15.87 \pm 2.38$  nm for Wt/Ag@Mt-NCs. In vitro cytotoxicity studies on MOLT-4 cells, a dose dependent toxicity with non-toxic effect of concentration below  $40 \mu\text{g/mL}$  was shown. The outcome shows that  $\text{IC}_{50}$  of our green synthesized Wt/Ag@Mt-NCs was 0.0039 in comparison to 2.13329 for Doxorubicin and  $0.013 \mu\text{M}$  for Cisplatin which is much better than  $\text{IC}_{50}$  of these anticancer drugs and more active than them for MOLT-4 cell line. Antioxidant activity indicated that they can be applied as potential radical scavenger and also showed that DPPH activity increased in a dose dependent manner. The bio-synthesized nanoparticles can potentially useful in pharmaceutical and biomedical applications.

**Keywords:** Green synthesis; Ag-NPs; *White tea*; Anticancer Activity; Inorganic polymer; MOLT-4 Cell line

## 1. Introduction

Nanomaterials are becoming extremely popular as biological, therapeutic, medical, antimicrobial agents, fluorescent tags and also as transfection vehicles [1].

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