

In vitro Cytotoxicity Study on Silver Powders Synthesized via Different Routes

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Abstract : Engineered powders offer great promise in several applications, but little information is known about cytotoxicity effects. The aim of the current study was the synthesis and cytotoxicity examination of silver powders using pyrosol method at temperatures of 600°C, 650°C and 700°C, respectively sol-gel method and calcinations at 500°C, 600°C, 700°C and 800°C. We have chosen to synthesize and examine silver particles cytotoxicity due to its use in biological applications. The synthesized Ag powders were characterized from the structural, compositional and morphological point of view by using XRD, SEM, and TEM with SAED. In order to determine the influence of the synthesis route on Ag particles cytotoxicity, different sizes of micro and nanosilver synthesized powders were evaluated for their potential toxicity. For the study of their cytotoxicity, cell cycle and apoptosis have been done analysis through flow cytometry on human colon carcinoma cells and mesenchymal stem cells and through the MTT assay, while the viability and the morphological changes of the cells have been evaluated by using cloning studies. The results showed that the synthesized silver nanoparticles have displayed significant cytotoxicity effects on cell cultures. Our synthesized silver powders were found to present toxicity in a synthesis route and time-dependent manners for pyrosol synthesized nanoparticles; whereas a lower cytotoxicity has been measured after cells were treated with silver nanoparticles synthesized through sol-gel method.

Keywords : Ag, cytotoxicity, pyrosol method, sol-gel method

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