Biosynthesis of gold nanoparticles using an ecofriendly method and cytotoxicity assessment on Huh7 and HFFF2 cell lines

Introduction:

Gold nanoparticles are one of the most widely used materials in pharmaceutical industries. Due to their detectability in biological systems, suitable electrical and thermal conductivity, etc, gold nanoparticles serve as good vehicles in novel drug delivery systems. A relevant method toproduce gold nanoparticles is reducing Au^+ to Au^{0+} , usually using chemical reductants. However, replacing these conventional procedures with less expensive and more ecofriendly methods especially using reductive capability of plants is of utmost importance. The synthetized nanoparticles usually named as *green* nanoparticles. The purpose of this study wasthe biosynthesis of green gold nanoparticles by gold chloride regenerating methods using the reductive properties of tannins extracted from the plant Sumac (*Rhus coriaria*), a native plant of Iran.

Methods:

The plant gathered from Zanjan, Iran. Aqueous extract of the plant prepared and standardized based on the amount of the Gallic acid. Gold nanoparticles produced using extract sumac with gold chloride regenerating methods. The product was then confirmed by different methods such as XRD, TEM, Particle size analyzing, UV-Vis spectroscopy, etc. Cytotoxic properties of nanoparticles on human hepatoma cell line Huh7 and human normal cell lineHFFF2 were investigated in defferent time periods using MTT assay.

Results:

Our data confirmed the biosynthesis of green gold nanoparticles .The stability; particle size and other properties of the product were acceptable. Furthermore, cytotoxicity evaluations showed no cytotoxic effect on studied cell lines

Conclusion:

According to our results, we can introduce the plant *Sumac* (*Rhus coriaria*) as a suitable plant in biosynthesis of gold nanoparticles. This method is environmentally friendly and less expensive than conventional methods. Besides, no cytotoxic effect was observed in our investigations

which propose this product as a possible vehicle in targeted drug delivery systems; although more studies including in vivo studies is needed to confirm our findings.

Key Words:

Cytotoxicity, Green Gold Nanoparticles, Sumac