

عنوان مقاله:

Silver nanoparticles synthesized with a fraction from the bark of Eysenhardtia polystachya with high chalcone and dihydrochalcone content effectively inhibit oxidative stress in the zebrafish embryo model

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خلاصه مقاله:

Objective(s): In this study, we describe a simple eco-friendly approach for the synthesis of a potent, stable and benign silver nanoparticles to carry and deliver chalcones and dihydrochalcones present in a methanol extract of Eysenhardtia polystachya (EP). Materials and Methods: In this process silver nanoparticles carrying EP compounds (EP/AgNPs) are synthesized in a single step by eliminating the additional handling associated with incorporating EP compounds. The resulting nanoparticles (EP/AgNPs) were characterized using several physicochemical techniques. Cell viability was measured in vitro with RAW264.7 murine macrophage cells. In addition, we evaluated the ability of EP and EP/AgNPs to protect against glucose-induced oxidative in vivo stress using zebrafish embryos. Results: The synthesized EP/AgNPs showed an absorption peak at 413 nm on ultraviolet-visible spectroscopy (UV-vis), revealing the surface plasmon resonance of the nanoparticles. Transmission electron microscopy (TEM) indicated that most of the particles were spherical with a diameter of 10 to 12 nm, a polydispersity index (PDI) of 0.197 and a zeta potential of -32.25 mV, suggesting high stability of these nanoparticles. This study also demonstrated the biocompatibility of the nanoparticles when tested in RAW264.7 cells and its protective efficacy against oxidative stress induced by the exposure of zebrafish embryos to high glucose concentrations. Treatment with EP/AgNPs increased the activity of anti-stress biomarkers such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), and total soluble protein. Exposure of the embryos to EP/AgNPs significantly ($P < 0.05$) suppressed the formation of malondialdehyde (MDA) and lipid oxidation (LPO). Conclusion: EP/AgNPs synthesized from E. polystachya extract provide an effective defense against oxidative stress in zebrafish embryos.

کلمات کلیدی:

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