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Rapid green synthesis of gold nanoparticles using crocetin and their anticancer activity

Reyhane Hoshyar

Birjand University of Medical Sciences, Iran

Gold nanoparticles (AuNPs) have been used in various mechanisms including drug delivery, cancer diagnosis and treatment due to their unique chemical and physical properties. In this study, we applied one of main carotenoids of saffron stigma, crocetin, as reducing agent for one-pot green synthesis of controlled size AuNPs for the first time. To optimize the various factors on size and amount of produced AuNPs, different concentrations of gold ions (prepared from HAuCl₄, 0–5 mM) and crocetin (200–500 mM) were used at various time (1h–10 weeks) and temperatures (25–75°C). These AuNPs were characterized through UV–Vis, TEM and XRD techniques. The anti-cancer effect of AuNPs on breast cancer cells was determined using MTT assay. Optimal temperature and pH for biosynthesis of AuNPs conjugated with this antioxidant were 50°C and 7.5, respectively. XRD and TEM results were authorized AuNPs production in 5–10 nm and stable, spherical and uniform. The cellular data showed that these AuNPs significantly decreased cancerous cells' growth after 24 and 48 hours in a time- and dose-dependent manner ($P < 0.05$). Our study suggest that such AuNPs can be synthesized simply and quickly with invaluable clinical as well as pharmaceutical properties which can help to treat human breast cancer.

Biography

Reyhane Hoshyar is working at the Birjand University of Medical Sciences, Iran. Her experience includes various programs, contributions and participation in different countries for diverse fields of study. Her research interests reflect in her wide range of publications in various national and international journals.

reyhane.hoshyar@gmail.com

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