

## **Comparative study of the cytotoxicity of gold nanoparticles produced by green nanotechnology and by conventional methods**

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### **ABSTRACT**

Researchers and laboratories around the world have studied gold nanoparticles (AuNPs). In medicine, several studies demonstrate the applicability of gold nanoparticles in the treatment and diagnosis of cancer. Green nanotechnology uses phytochemical agents to synthesize and stabilize nanoparticles. Researchers have shown that some reducing phytochemicals such as mangiferin (MGF) and epigallocatechin-gallate (EGCG), in addition to reducing and stabilizing the gold nanoparticles, are able to functionalize them. These molecules have chemical groups that allow binding to overexpressed receptors on some types of tumor cells. Developed by the International Organization for Standardization (ISO-International Organization for Standardization), the set of known standards such as ISO 10993 addresses the safety of medical devices through the identification of diverse types of biocompatibility. The objective of this work was to compare the cytotoxicity of the AuNPs obtained through green nanotechnology and compare with data found in the literature of AuNPs synthesized by conventional methods such as Turkevich. The cytotoxicity assay was carried out by exposing the cell culture to the solutions of AuNPs in culture medium MEM (1:1) at 37 °C. The NCTC clone 929 cell line was acquired from Adolfo Lutz Institute cell bank. The cytotoxicity effect was evaluated by neutral red uptake (NRU) methodology according to the International Organization for Standardization (ISO). The results showed that the AuNPs obtained by green nanotechnology presented lower toxicity than those obtained by the Turkevich method using the same concentration of NaAuCl<sub>4</sub> in the AuNPs synthesis. It is necessary to consider that the particles differ in size and hydrodynamic volume according to the data obtained in the physical chemical characterization of the AuNPs obtained by both methods.

**Keywords:** Cytotoxicity. Gold nanoparticles. Green nanotechnology. Turkevich method. Biomaterials