PE9) Treatment with Gold Nanoparticles Using *Cudrania tricuspidata* Root Extract Induced Downregulation of MMP-2/-9 and PLD1 and Inhibited the Invasiveness of Human U87 Glioblastoma Cells

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The green synthesis of gold nanoparticles (GNPs) is advantageous over physical and chemical approaches as it is cost effective, maintainable, eco-friendly, dependable, can be easily scaled up, and reduces the production of harmful by-products. The present study demonstrated that the *Cudrania tricuspidata* root extract is more beneficial for the preparation of GNPs over other conventional methods due to a large number of phytochemicals that are responsible for the reduction, capsulation, and stabilization of GNPs.

We found that the hydrodynamic size distribution, zeta potential and the PDI value of the CTR-GNPs were 89 ± 5.21 nm, -26.93 ± 1.41 mV and 0.24 ± 0.01, respectively. Typical HR-TEM micrographs displayed many spherical particles and the CTR-GNPs were found to be of average diameter size of 23.3 ± 3.7 nm. The SAED and FFT pattern of CTR-GNPs also indicated face-centered cubic crystal structure, which was manifested by bright circular spots. The distribution of the Au atoms in the CTR-GNPs was studied using HAADF-TEM, EDS analysis revealed the surface chemistry of the green synthesized Au-NPs.

Our study illustrated that GNP with *Cudrania tricuspidata* enhanced the anti-invasive effects when compared to the *Cudrania tricuspidata* root extracts alone possibly because of the presence of the functional groups from the CTR extract that act as reducing, stabilizing, and capping agents. Our results also demonstrate that CTR-GNPs showed more effective inhibition than CTR extract on cell migration and invasion via the down-regulation of MMP-9 and PLD activity and expression. Based on the results of this study, we conclude that CTR-GNPs can potentially inhibit metastasis and assist in the treatment of glioblastoma.