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BIOCHEMICAL BEHAVIOR OF *Salvadora persica* CALLUS TOWARDS TiO_2 AND CuO NANOPARTICLES

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ABSTRACT

The use of modern techniques in the field of nanotechnology is one of the important recent trends for enhancing active constituents production through tissue culture. Therefore, in this study, the effect of nanoparticles (TiO_2 and CuO) at different concentrations (0.5, 1 and 2 mg/l) on growth, active constituent production (benzyl isothiocyanate) and their relation to some biochemical constituents in *Salvadora persica* callus were examined. The results showed the promotive effect of TiO_2 NPs (1 mg/l) on benzyl isothiocyanate production after 30 days of callus growth. On the other hand, a clear inhibition was observed after 45 days from this treatment. Also, CuO NPs have a positive effect on benzyl isothiocyanate content, especially when used at low concentrations (0.5 mg/l). This was associated with a marked decrease in the callus content of malondialdehyde and H_2O_2 as well as an increase in amino acids content. It was also observed that nanoparticles had a positive effect on antioxidant enzymes (superoxide dismutase and peroxidase), where treatment of callus with TiO_2 NPs resulted in new band appearance of superoxide dismutase and a marked increase in band intensity.

The research recommended the application of TiO_2 NPs (1 mg/l) and CuO NPs (0.5 mg/l) in the tissue culture field for the production of benzyl isothiocyanate in *S. persica* callus for its industrial and medicinal importance in anticancer therapy, which associated with increment in activity of antioxidants (enzymatic and non-enzymatic). Also, this study draws attention for the need to complete the work on these nanoparticles with new concentrations and new particle sizes.

Key words: *Salvadora persica*, callus, TiO_2, CuO, nanoparticles, benzyl isothiocyanate