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## Effect of Nanoparticles Application on the Germination and Growth of Tunisian Durum Wheat Varieties (Dhabee, Kareem and Inrat100) Under Simulated water Stress Conditions

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### Abstract

This study discussed the effect of five sorts of nanoparticles, SiO<sub>2</sub>, ZrO<sub>2</sub>, MgO, ZnO, and TiO<sub>2</sub> in the germination and growth of three varieties of Tunisian durum wheat (*Triticum turgidum* subsp. durum Desf.) (Dhabee, Inrat100, and Kreem) under the simulated stress conditions using poly ethanol glycol (PEG6000). Moreover, in this study, two levels of stress conditions were evaluated compared to control (distilled water). Also, the study checked the different concentrations of nanoparticles to determine their results on the germination, the root length, and the shoot length. The results declared that the water stress resulted in a significant decrease in the germination and growth rates. In addition to that the nanoparticles (TiO<sub>2</sub>, ZnO) get the highest efficiency in decreasing the side effects of the stress. The TiO<sub>2</sub> NPs at the concentration of 100 proved their efficiency in enhancing germination and growth special under severe stress conditions of -3 bar. Furthermore, the varieties showed significant differences in stress conditions as Inrat100 declared exceeding in stress resistance. These results highlighted the possibility of using the NPs, to improve the performance of crops under drought conditions in rainfed Agriculture.

**Key Words:** *Nanoparticles, Durum wheat, Water stress, Germination, Sshoot length*

