

## **Impact of Hydroxyapatite NPs on tomato plantlet metabolism and seed germination**

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The use of innovative techniques in crop mineral nutrition based on nanostructures opens the possibility to improve fertilizers distribution, to decrease detrimental effects on the environment and to lower management costs. In particular, calcium/phosphate nanoparticles (hydroxyapatite, HA-NPs) show a promising peculiarity since they might function as nutrient-delivery shuttles as well as additional phosphate provision, due to their chemical composition. The implementation of this new fertilization method requires some preliminary tests aiming to define in detail the behavior of the HA-NPs once released in the field and their possible effects on plant metabolism. Morphological and biochemical markers have been evaluated to study how different concentrations of HA-NPs could affect tomato seed germination, as well as plant metabolism in hydroponic medium.