Nano-priming of *Eleusine coracana* seeds and evaluation of salinity stress tolerance

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Abstract

One of the biggest threat to agriculture is salinity world-wide, which inhibits crop growth and yield. Soil salinization directly impact the physiological and molecular processes of plants. The plants use a variety of tolerance mechanisms, including complicated physiological features, metabolic pathways, and molecular or gene networks, to battle salt stress. Though genetic engineering, plant breeding, and other methods have been used to increase plant growth and productivity. Priming techniques, on the other hand, have a lot of potential as a "stress reliever" in agricultural crop production due to their economic viability and simplicity of use. Seed priming improves seed germination and seedling growth by activating several physiological and metabolic processes. Through enhanced expression of numerous stress-related genes and proteins, priming controls molecular pathways which accelerate the stress and maintain cross-tolerance. Seed nano-priming has shown enhanced antioxidant activity in *Eleusine coracana* seedlings after challenging them with salinity stress. Nano primed seedlings showed better salinity stress tolerance as revealed by many stress markers like proline content, H_2O_2 content, chlorophyll content etc. The use of copper oxide nanoparticles (CuONPs) via seed priming is a novel and cost-effective approach that improves seed germination and subsequent plant growth in *Eleusine coracana* by strengthening antioxidant system and providing resistance against salinity stress.