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TITLE

Effect of biologically synthesized silica nanoparticles on germination of maize and rice varieties

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Nanoparticles are known to exhibit unprecedented variations in their properties which are size dependent. They interact with surrounding substrate/cells and can be taken up by cells via endocytosis or even may move inside through intact cell membranes and infiltrate internal tissues. Functionalization of nanoparticles with chemicals and organic/inorganic molecules could lead to development of products that can be utilized to solve several problems related to seed germination, smart targeted and long term delivery of agrochemicals like fertilizers/pesticides and in fabrication of sensors for on-field rapid detection of contaminants. The present investigation delivers the implications of silica nanoparticle application on maize seed germination under aseptic laboratory conditions. The findings exhibit enhancement of germination in maize seeds along with better growth due to nanosilica treatment. It is envisaged that enhanced growth may be attributed to increased imbibition of water by seeds under the influence of nanosilica particles. The root-shoot length and number of new emerging lateral roots were also enhanced in comparison to control plants under similar set of conditions. The root SE microscopy showed the occurrence of agglomerates of silica nanoparticles adsorbed on the outer root hair surface as well as the SEM-EDS studies further clarified the presence of silica nanoparticles on surface as well as inside the root tissues .This could be a boon for use of nanosilica particles for enhancement of germination in maize and further as vehicles to deliver desired molecules into the seeds during germination that can protect them from the insect attack and diseases.