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Metallic and carbon nanoparticles differentially impact physiological traits of four agricultural plant species

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Recently, scientific community dedicated to the development of sustainable agricultural techniques have focused their attention and concern towards the application of engineered nanoparticles (ENPs), since the use of metal oxide nanoparticles could result in their accumulation in soil, threatening higher terrestrial plants. ENPs are able to interact with biomolecules, creating functional nanosystems for transportation within cells, and leading to the study of their potential applications in the field of Plant Biotechnology. On the other hand, the physical and chemical features of carbon nanomaterials such as multi-walled carbon nanotubes (MWCN) and graphite oxide (GO) NPs, had been used to promote plant's growth, and seeds germination. Therefore, this report focus on the application of copper nanoparticles (Cu NPs), iron oxide (Fe₂O₃ NPs), MWCN and GO NPs, to seeds and plants of *Solanum lycopersicum*, *Capsicum annuum*, *Cucumis melo* and *Rhapanus sativus*, to evaluate germination and plant growth characteristics. Imbibition of tomato seeds in Cu NPs significantly improved germination

(14.3%), seedlings vigour (69%), plumule and radicle length increased by 20% and 95% respectively compared to control. In pepper seeds, Cu NPs also promoted vigour (118%) and seeds germination (10.2%); improved seedlings growth was reflected by longer plumule and radicle length (8% and 15% correspondingly). For *C. melo* Fe₂O₃ NPs also enhanced vigor (30%), germination (16.5%), plumule and radicle length by 20% and 95% respectively compared to control plants. On *R. Sativus* MWCN and GO NPs reduced plants growth and vegetative development, suggesting a phytotoxic effect by these carbon NPs.

Speaker Biography

Lira-Saldivar R H has completed his PhD from University of California, Davis. He is a Senior Researcher at the Centro de Investigación en Química Aplicada (CIQA) belonging to the Mexican Federal Government, located in Saltillo, Coahuila, Mexico. He has published more than 35 papers in reputed journals and has been serving as an Editorial Board Member of several journals.

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