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## Nanoparticulate delivery of zinc into plants-The essential for global food and nutritional security

**T N V K V Prasad**

Acharya N G Ranga Agricultural University, India

Agri-nanotechnology (Application of nanotechnology in agriculture and allied sciences) is considered to be one of the emerging branches of Nano biotechnology. Nanoparticulate delivery of nutrients into crop plants was promising and proved to be enhancing the productivity, quality and nutrient bio fortification. Zinc is one of the important micronutrients required by crop plants and its role is vital in stimulation of biochemical processes (co-factor of all the six classes of enzymes) and nutrient absorption. Zinc has the ability of providing resistance to the cultivating plants against biotic and abiotic stresses. However, compared to other micronutrients, zinc deficiencies are wide spread and affect crop yields significantly across the globe. Zinc deficiency alone contributes to the tune of 20-30% crop yield loss and sufficiency of zinc increases the disease resistance and reproductively in humans. Therefore, the essentiality of zinc supplement concerns not only crop productivity but also human health. Foliar application (twice) of nanoscale zinc oxide (n-ZnO) relatively enhanced the yields of groundnut to the extent of 30%. Approximately, 15% yield enhancement has been recorded in maize with the foliar application of spherical shaped n-ZnO with mean size of 25 nm. Interestingly, with the application of 100 ppm of n-ZnO, the grain zinc content was increased to 36 ppm. Cabbage and cauliflower crops responded well to the n-ZnO by recording significant yields (12%) over other forms of zinc supplement tested and similar results were recorded with the black gram crop (18% yield enhancement). Thus, nanoparticulate delivery of plant nutrients, zinc in particular, is effective and ensures second green revolution through nanotechnology.

### Biography

T N V K V Prasad is now Senior Scientist and In-Charge of Nanotechnology laboratory at Institute of Frontier Technology, Regional Agricultural Research Station, Acharya N G Ranga Agricultural University, Tirupati, and recognized as National Resource Person in Nanotechnology, India. He completed his MS and PhD in Physics with Materials Science specialization from Andhra University, Visakhapatnam India. He received prestigious Endeavour Research Award from the Govt. of Australia in 2010 to pursue Post-doctoral research in Nanotechnology at University of South Australia, Australia. He also did Post-doctoral research in Nanotechnology at University of Kentucky, Lexington, USA in 2011. He introduced the concept of Agri-nanotechnology (Applications of nanotechnology in agriculture and allied science) and filed/sanctioned two patents. More than 100 research papers were published in peer-reviewed journals and authored two book chapters and coined the term Phyconanotechnology. He received prestigious Dr. AV Krishnaiah gold medal for best research in Agricultural Sciences. He also received many best presentation awards in national and international conferences. He was the Founder Secretary of Society of Agri-Nanotechnology and Organizing Secretary of AgriNANO-2015. He visited many countries including USA, Australia, Malaysia, and Thailand as a delegate of high-level committee to study the agricultural curriculum. Currently, his research focus is on the development of agriculturally beneficial nanoscale materials and study of their behavior in agro-ecosystems.

tnkvprasad@gmail.com

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