

Smart Nanomaterials Technology

Azamal Husen *Editor*

Plant Response to Gold Nanoparticles

Plant Growth, Development,
Production, and Protection

 Springer

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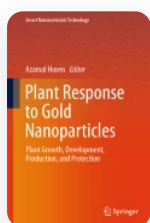
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Mitigation of Metal Toxicity in Plants Using Gold Nanoparticles

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[Mohammad Areeb Siddiqui](#), [Archana Vimal](#), [Swati Sharma](#), [Poonam Sharma](#) & [Reena Vishvakarma](#) 



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Abstract

In recent times, the emergence of trace elements in the environment at potentially harmful amounts has become a global concern. High potentially hazardous levels of these elements in the environment are building up due to anthropogenic activities like construction, mining, and population growth. Plants that are exposed to settings contaminated with metals suffer significant effects on their vegetative and reproductive growth, which ultimately affects crop productivity and performance. Finding ways to

lessen the stress that hazardous substances create in plants that are important to agriculture is therefore imperative. In this regard, it is well known that metal nanoparticles, such as those of zinc and iron, can reduce metal toxicity and encourage plant development under a variety of stressful circumstances. Using gold nanoparticles (AuNPs) to mitigate the deadly effects of metals and promote crop development is a relatively new strategy. Astaxanthin synthesized gold nanoparticles (Ast-AuNPs) and AuNP produced from melatonin (Mel-AuNPs) are two examples of nanocomposites that contain AuNPs, however they have been only researched in rice to reduce metal toxicity, primarily of cadmium. With an emphasis on potential mechanisms to lessen metal toxicity in plants, this chapter aims to help researchers understand the potential of AuNPs to reduce metal stress and enhance plant growth and foster future investigation of full potential of these nanoparticles for the alleviation of metal stress in crops and other agricultural fields.

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