

Smart Nanomaterials Technology

Azamal Husen *Editor*

Emerging Carbon Nanomaterials for Sustainable Agricultural Practices

Synthesis, Plant Growth, Performance,
Production and Protection

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Carbon-Based Nanomaterials in Crop Plant Disease Management



Tahmeena Khan, Kulsum Hashmi, Sabeeha Jabeen, Seema Joshi,
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Abstract Nanomaterials are being increasingly explored for their utility in modern agricultural practices. Nanomaterials are characterized by their nanoscale dimensions, offering a diverse array of benefits in the agricultural sector. Nanoparticles (NPs) can be used for biosensor designing in the diagnosis of plant diseases and as agrichemicals. They are also being explored in phytopathology and plant disease management. This chapter presents an overview of the applications of nanotechnology in plant disease management, particularly the role of carbon-based nanomaterials (CNMs) which have been shown to improve plant stress tolerance and agricultural production. Some specific applications of CNMs such as nano pesticides, herbicides, growth stimulators, and nano biosensors are being disseminated. CNMs such as carbon nanotubes, graphene, reduced graphene oxide etc. have found extensive use as special sorbents for the removal of heavy metals owing to their unique physical and chemical properties. Because of the increasing demand for food production in response to climate change, nanotechnology can mitigate several challenges related to plant health and disease management. Henceforth, the regulation of nanomaterials in agriculture is a topic of increasing importance which also requires responsible oversight to ensure the welfare of both farmers and the environment and the impact of NPs on the environment requires thorough investigation.

Keywords Carbon-based nanomaterials · Agriculture · Nanotechnology · Nanopesticide · Plant stress · Disease control

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