

NANOTECHNOLOGY: SCOPE AND LIMITATIONS IN AGRICULTURE

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ABSTRACT

Nanotechnology is one of the fastest developing fields with potential to revolutionize industries such as pharmaceuticals, electronics, military, manufacturing, and agriculture. Nanomaterials have significant applications in food and agriculture systems as smart delivery mechanisms for agrochemicals, nano-formulations, nano-biosensors for precision farming and food packaging, nano-bioremediation, nanofibres for genetic manipulation etc. Besides direct applications of nanotechnology in agriculture, the engineered nanomaterials that are used in commercial products and industries (non-agricultural) may also affect agriculture indirectly. Many nano-based products are already in the market with or without proper labeling. Not much information is available on the interactions between nanomaterials and biological systems. Therefore, understanding the impact of nanomaterials and related technologies on soil and plant health is very important. The present review focuses on the application of nanotechnology in agriculture and its possible impact on plant growth and soil microflora. It emphasizes on more research to study the impact of nanotechnology on agriculture and develop regulatory protocols for safe production, use and release of nanomaterials to minimize environmental nanotoxicity.

KEY WORDS: Nanotechnology, Agriculture, Soil microorganisms, Nanotoxicity, Regulation.