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## APPLICATION OF NANOTECHNOLOGY IN AGRICULTURE

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### ABSTRACT

*From approximately 3.6 percent in 1985–1995 to less than 2 percent in 1995–2005, India's agricultural growth has slowed. This is far below the agriculture sector's goal of 4% annual growth by 2020. Food grain production is the main source of worry. Nanotechnology (NT) has been recognized as a promising technology for revitalizing the agricultural and food industries, as well as improving the life of the poor. Nanotechnology may help a variety of industries, including health care, materials, textiles, information and communication technology (ITC), and energy. Nanotechnology is used in crop production, food processing and packaging, food security and water purification, environmental remediation, crop enhancement, and plant protection in the agricultural industry. Agricultural production may be increased by using nanomaterials to create genetically better animals and plants, site-specific medication and gene delivery at the cellular/molecular level in animals and plants, and Nano array-based genetic alteration in animals and plants under stress. Nanotechnology has the potential to improve disease resistance, plant growth, and nutrient utilization by allowing precise administration of agrochemicals. Nano encapsulated solutions demonstrate the capacity to utilize pesticides, insecticides, and herbicides more effectively and site-specifically in an environmentally benign and greener manner. It has been effectively utilized in postharvest to preserve the freshness,*

quality, and shelf life of stored products while also avoiding disease outbreaks in a relatively safe manner. Nanomaterials are a relatively new technology in agriculture, and further study is needed. Nanotechnology's application in agriculture has social and ethical implications that must be addressed. The toxicity of nanomaterials must be assessed before they can be commercialized and used in the field.

**KEYWORDS:** Agriculture, Climate, Fertility, Nanotechnology Soil.

## REFERENCES

1. N. Dasgupta, S. Ranjan, D. Mundekkad, C. Ramalingam, R. Shanker, and A. Kumar, "Nanotechnology in agro-food: From field to plate," *Food Research International*. 2015, doi: 10.1016/j.foodres.2015.01.005.
2. S. Neethirajan, I. Kobayashi, M. Nakajima, D. Wu, S. Nandagopal, and F. Lin, "Microfluidics for food, agriculture and biosystems industries," *Lab on a Chip*. 2011, doi: 10.1039/c0lc00230e.
3. C. Witharana and J. Wanigasekara, "Drug Delivery Systems: A New Frontier in Nanotechnology," *Int. J. Med. Res. Heal. Sci.*, 2017.
4. S. Mousavi and M. Rezaei, "Nanotechnology in agriculture and food production," *J Appl Env. Biol Sci*, 2011.
5. J. K. Patra, G. Das, and K. H. Baek, "Towards a greener environment: Synthesis and applications of green nanoparticles," *Pakistan Journal of Agricultural Sciences*. 2016, doi: 10.21162/PAKJAS/16.3027.
6. H. K. et al. . Hajira Khanm et al., "Nano Zinc Oxide Boosting Growth and Yield in Tomato: The Rise of 'Nano Fertilizer Era,'" *Int. J. Agric. Sci. Res.*, 2017, doi: 10.24247/ijasrjun201724.
7. R. L. Maynard, "Nano-technology and nano-toxicology," *Emerg. Health Threats J.*, 2012, doi: 10.3402/ehjt.v5i0.17508.
8. E. SAKA and G. TERZİ GÜLEL, "Gıda Endüstrisinde Nanoteknoloji Uygulamaları," *Etlik Vet. Mikrobiyoloji Derg.*, 2015, doi: 10.35864/evmd.513387.
9. M. Magno, S. Marinkovic, B. Srbinovski, and E. M. Popovici, "Wake-up radio receiver based power minimization techniques for wireless sensor networks: A review," *Microelectronics J.*, 2014, doi: 10.1016/j.mejo.2014.08.010.
10. S. Abdalla, R. AL-Wafi, and A. Pizzi, "Stability and combustion of metal nano-particles and their additive impact with diesel and biodiesel on engine efficiency: A comprehensive study," *Journal of Renewable and Sustainable Energy*. 2017, doi: 10.1063/1.4979962.