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Can Nanotechnology Improve Detection of the Seed-borne Pathogens through PCR?

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Abstract:

Pathogens carried on or in seeds which scientifically called seed-borne may cause heavy yield losses. The failure to adequately identify and detect plant pathogens using conventional morphological techniques has led to the development of nucleic acid-based molecular approaches. Immuno-diagnostic tools can also be successfully employed for differential diagnosis, disease surveillance of seed-borne pathogens. The commonly used seed health tests in laboratories around the world lack specificity, sensitivity, speed, simplicity, cost-effectiveness, and reliability. PCR has many beneficial characteristics that make it highly applicable for detecting pathogens from seeds. In the PCR diagnosis study, the development of DNA extraction is one of the most important steps. The nanotechnology approaches using AgNPs and FeNPs in the DNA extraction method help to enhance the quantity and purity of the DNA template for successful PCR assay, resulting in improved detection of seed-borne plant pathogens.

Keywords: Seed-borne pathogens, immuno-diagnostic tools, nano-particles, DNA extraction.