

Applications of Nanobiotechnology in the food sector and future innovations

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Nanotechnology includes the fabrication of nanoscale materials and/or engineering of the functional system at the molecular level. Research findings have shown the competence of nanotechnology in various sectors including food, pharma, and medicine. Nanobiotechnology in the food sector is considered to be far superior to conventional technologies, owing to their enhanced food quality, where nanostructures are used for pathogen detection by nanosensors and nano traces, nanoencapsulation, target, and control delivery, food processing, food preservation, nano fertilizers, nano additives, nutraceuticals production, and intelligent packaging. The solubility and bioavailability of many bioactive components such as mangiferin, curcumin, resveratrol were enhanced by nano-based delivery systems, with a plethora of applications in the food, pharmaceutical, and nutraceutical industries. Nanoemulsion of eugenol oil using gum Arabic and lecithin as a food-grade natural emulsifier showed excellent re-dispersibility in water and maintained their physicochemical properties after rehydration. Hence this is one of the pioneering developments in the food industry. The application of nanosensors in smart food packaging for monitoring the quality of the stored foods is also discussed. Safety assessment and regulation policies need to be followed before marketing nanoproducts to control health-related risks. Novel innovations of nanobiotechnology in the food sector can be achieved by further innovations in nanostructures and by developing methods to achieve controlled interactions at the molecular level. This review highlights the functionality and applicability of nanobiotechnology in the food industry and their safety assessment.

Keywords: Bioactive components, Food Nanotechnology, Nanoencapsulation nanosensors Nanostructures, nanoemulsions Safety issues

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