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Role of Nanotechnology in the Food Industry

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ABSTRACT: In the present scenario, it has been estimated, that out of the 7 billion people inhabiting the Earth, 0.9 billion face inadequate food supply (food insecurity) and 2 billion are malnourished, out of which over 800 million suffer from severe malnutrition and 36 million more die from lack of food. The projected rise in population curves indicate that by the year 2020, earth will be populated by 8 billion people, and by 2050, the global population is expected to hit 9.6 billion. Wastage of food in various forms (lack of efficient storage methods, delayed transportation to market, pathogen and pest attacks, natural calamities, poor bioavailability, short shelf life) lead to ineffective utilization of the produced food.While various strategies exist to counter these issues, it is postulated that nanotechnology can also play a significant role in mitigating many of the contributing factors. Food supplements can be incorporated in the form of nanoparticles to enhance nutritional value or to improve the taste, texture and consistency attributes of the food. Nano-textured foodstuffs enable reduction of fat usage thereby contributing to healthier food. Nanotechnology has application in packaging food materials as it can provide resistance to physically stressful conditions, from agents that cause degradation of the packaging material and from pathogens and can also facilitate in increasing the shelf life of the food items. Silver and gold nanoparticles in biosensor-incorporated packaging material can detect spoilage or contamination of food. In agriculture, nanoparticulate fertilizers can be more effective with their increased surface area. Nano-pesticides can be enabled for controlled release under desired conditions by adsorption onto porous hollow structures. Despite these promising aspects, concerns remain about toxicity of nanoparticles inside the body. Nevertheless, rapid advances have resulted in many countries designing specific regulations focussing on nanotechnology aspects.

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