OPINION

Nanotechnology in food and food processing

Emanuel Ungaro

Ungaro E . Nanotechnology in Food and Food Processing. J Nanosci Nanomed.2022; 6(3):03-04.

ABSTRACT

Food nanotechnology is an emerging technology. Nanoscience and nanotechnology are new frontiers of our century. In comparison to their usage in medicine delivery and pharmaceuticals, their uses in agriculture and food are relatively new. Many scientists and engineers have identified nanotechnology's potential to dominate all food businesses in the twenty-first century. Even while practical applications of nanotechnology to food are still rare, certain fundamental nanoscale ideas have been thoroughly established. Two key uses of nanotechnology in the realm of food engineering are expected: food nanosensing and food nanostructured ingredients. Nanotechnology can be used to improve food quality and safety evaluation in the former field. Advances in technologies such as DNA microarrays, micro-electromechanical systems, and microfluidics will allow nanotechnology's potential for food applications to be realised. Food processing can be vastly improved in terms of smart nutrient delivery, bioseparation of proteins, rapid sampling of biological and chemical contaminants, nanoencapsulation of nutraceuticals, solubilization, delivery, and colour in food systems, to name a few emerging nanotechnology for food and agriculture topics. Meanwhile, food nanotechnology, being a novel technology, necessitates evaluations of both potential negative and good consequences. We wanted to discuss some of the latest discoveries in nanotechnology and how they apply to food and nutraceutical systems in this overview. It discusses some of the nanoscale-sized structures that are particularly relevant to the food industry, as well as the various food manufacturing techniques that could benefit from nanotechnology, as well as nanotechnology's applicability to food formulation and storage, as well as the remaining challenges.

Key Words: *Food; Food Packaging; Food Processing; Nanotechnology; Nutraceuticals*

INTRODUCTION

Since nanotechnology is the science of manipulating nanoparticles for a variety of purposes. It plays an important role in the food and agricult--ures industries, contributing to crop improvement, improving food quality and safety, and promoting human health through unique and inventive ways. Engineered nanometer-sized particles have gained more attention in medicine, agro-food sectors, sewage water treatment, and other industries due to their unique physical, chemical, and biological properties with large surface–volume ratios, as well as altered solubility and toxicity when compared to their macroscale counterparts. Due to their possible antibacterial properties, silver, gold, zinc oxide, titanium dioxide and carbon nanoparticles are created in tenfold the amount of other nanomaterials, and are employed in air filters, food storage containers, deodorants, and other applications. Furthermore, nanosized copper oxides have found widespread use in commercial nano-biocide products due to their powerful antibacterial activity. Food technology is one of the industries where nanotechnology is expected to play a significant role in the future. (14) Food additives (nano within) and food packaging are the two most prevalent types of nanofood applications (nano outside). Nanoscale food additives could be utilised to affect shelf life, texture, flavour, nutrient composition, or even detect food viruses and serve as food quality indicators. Nanotechnologies are mostly used in the food packaging industry to extend product shelf life, detect spoiled components, and improve overall product quality, such as by limiting gas movement across product packaging.

OPPORTUNITIES

The nanoscale is not new to the food and beverage industry, since different phenomena have already been observed and used in the formulation, manufacture, and processing of nutraceutical and functional foods. Colloid science, for example, has long been used to improve food products. A wide range of foods and beverages contain nanoscale components, and processing (for example, dairy) involves the modification of naturally existing nanoparticles. However, unique applications for additional capabilities and efficient delivery systems for food and beverages have just recently been investigated

FOOD APPLICATIONS WITH POTENTIAL

All organisms are made up of a collection of nanoscale-sized components. Atoms and molecules unite to generate dynamic structures and systems, which are the foundations of all living things. Cell membranes, hormones, and DNA are examples of essential structures in the nanometer range in humans. In reality, the presence and interaction of diverse nanostructures are responsible for the existence of every living entity on the planet. Even food components like carbs, proteins, and fats are formed via nanoscale mergers of sugars, amino acids, and fatty acids.

NANOTECHNOLOGY IN FOOD PROCESSING

Nanofood is defined as food that has been processed, produced, secured, and packaged utilising nanotechnology. In post-harvest food processing, nanotechnology offers enormous potential. It improves

Editorial office, Journal of Nanoscience and Nanomedicine, United Kingdom

Correspondence: Emanuel Ungaro, Editorial Office, Journal of Nanoscience and Nanomedicine, United Kingdom; E-mail: Nanomedsci@medicalres.org

Received: 06-May-2022, Manuscript No. PULJNN-22-4968; Editor assigned: 08-May-2022, Pre QC No. PULJNN-22-4968 (PQ); Reviewed: 15-May-2022, QC No. PULJNN-22-4968 (Q); Revised: 17-May-2022, Manuscript No. PULJNN-22-4968 (R); Published: 25-May-2022, DOI: 10.37532/puljnn.2022.6(3).03-04.

This open-access article is distributed under the terms of the Creative Commons Attribution Non-Commercial License (CC BY-NC) (http://creativecommons.org/licenses/by-nc/4.0/), which permits reuse, distribution and reproduction of the article, provided that the original work is properly cited and the reuse is restricted to noncommercial purposes. For commercial reuse, contact reprints@pulsus.com

food bioavailability, taste, texture, and consistency, or masks an undesirable taste or odour, and changes particle size, size distribution, cluster formation potential, and surface charge. Edible nano-coatings (thin coatings of 5 nm) can be employed as gas and moisture barriers in meat, fruits, vegetables, cheese, fast food, bakery items, and confectionery products. They also give manufactured items flavour, colour, enzymes, antioxidants, anti-browning chemicals, and a longer shelf life.

FOOD PACKAGING WITH NANOTECHNOLOGY

Food and beverage packaging accounted for about 55%-65% of the $130 billion spent on food and beverage packaging in the United States. The use of active and intelligent packaging techniques in prone-to-contamination muscle-based food products has expanded dramatically in recent years.

ACTIVE FOOD PACKAGING SYSTEMS

Moisture regulators, CO_2 scavengers and emitters, oxygen scavengers, and antimicrobials are all included in active packaging systems. Depending on the storage goal, active packaging systems are designed. Metallic-based nanocomposites have the potential to be used in active food packaging.

NANOMATERIALS IN FOOD: TOXICOLOGICAL ASPECTS

The area of nanotechnology is expanding, and public concern over nanomaterial toxicity and environmental effect is developing alongside it. Dynamic, kinetic, and catalytic properties, as well as functionalization, net particle reactivity, agglomeration, and the functional environment, all contribute to nanoparticle-mediated toxicity. Although nanoparticles on the packaging material's surface are not dangerous to humans, their transfer and incorporation into food may have an impact on human health.