Editorial

Nanotechnology is an enable technology that has the potential to revolutionize agriculture, food systems and medicine. Nanotechnology, technology that use nanometer (10^-9 m)/sub-microscopic-scale materials, holds great promise to provide benefits not just within food products but also around food products. Food and water are naturally made up of nanoscale particles (e.g. milk is an emulsion of nanoscale fat droplets). Food nanotechnology is then becoming a fast growing area of high interest due to its importance for many applications in the modern agro-industry and nutritional therapy, albeit uncertainty and health concerns are also emerging [1-7].

Indeed, food nanotechnology is anticipated to become a driving economic force in the near future to overcome several limitations and introduce new chances for innovation (e.g. sustainability and protection of agriculturally produced foods, healthier and less toxic crops productivity for human consumption and animal feeding without causing soil damages and water contamination, delivery of dietary antioxidants to prevent neurodegenerative diseases and cancers) [3,4,6,7,8].

For instance, in the development of intelligent food packaging, food nanotechnology opens up new important possibilities to: (i) improve plastic material barriers; (ii) incorporate and deliver functional attributes (e.g. additives, flavorings, minerals); (iii) extend product food shelf life (e.g. nano-release of preservatives); (iv) prevent food contamination; (v) spoiling and toxicity (e.g. reduced presence of bacteria, reduced use of pesticides, application of nanosensors in crop protection for quick identification of diseases and residues of agrochemicals); and (vi) boost the agricultural productivity (e.g. use of genetic engineering and nanodevices for the development of insect-resistant varieties, use of nano-agrochemicals such as pesticides and fertilizers for crop improvement) [2,3,8].

However, while nanotechnology represent statistically significant opportunities for agri-food organizations, the development of further nano material risk assessment studies are requested and current global legislation regulation of food nanotechnology by Government agencies and stakeholders must be definitively strengthened in order to ensure safety for the consumers, the occupational health of workers and diminish the risk for environment [3, 5, 9,10,8,11]. Indeed, it remains crucial to ensure nanomaterials are safely used (e.g. to avoid potential systemic toxicity), do not migrate from packaging or containers to foodstuff, and better understand the interaction of different nanomaterials with various organisms in specific food chains and environmental conditions [1,11]. Eventually, enhancement of reliable information and knowledge shall contribute to overcome obstacles to the adoption of nanotechnologies amongst agri-food organisations [9].

Acknowledgment

The author thanks Dr. Abder Menaa, MD and Bouzid Menaa, PhD for our pertinent discussions about nutrition, food nanotechnology, strategies against poverty worldwide and potential health concerns of nanomaterials in food products.

References


*Corresponding author: Farid Menaa, Consulting Expert in Healthcare and Biosystems, School of Medicine, Department of Pharmaceutical Sciences, University of Liege (ULg), Liege, Belgium, E-mail: dr.fmenaa@gmail.com

Sub Date: 26 July 2015, Acc Date: 26 August 2015, Pub Date: 1 August 12 2015.

Citation: Farid Menaa (2015) Food Nanotechnology: A Safe Innovation for Production and Competition?. BAOJ Nutrition 1: 003.

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