



International Congress Nutrition: From Laboratory Research to Clinical Studies

Mashhad, Iran
September 6-8, 2017

Guest editors:

Amir Avan, Seyed Mohamad Reza Parizadeh, Mohammad Safarian
Majid Ghayour-Mobarhan

Abstract Book

Iranian Journal of
Basic Medical Sciences

Volume (2017): 20

Issue: 10



biocompatibility, biodegradability, non-toxicity, small size, and ability to deliver a wide variety of bioactive agents. On the other hand, liposomes as a versatile group of lipid-based encapsulation nanoparticles have received recently much attention among nutritional experts and food scientists because of their potential abilities regarding the improvement of food quality. Extra health benefits of liposomes in food products origin from their roles in the encapsulation, targeted delivery and controlled release of nutrient compounds and thus improving their physical and chemical stability, bioaccessibility, bioavailability as well as efficacy and bioactivity. In this case, there are many different types of functional compounds that liposomal systems could encapsulate and deliver them to their right destination, including antioxidants, vitamins, essential oils polyphenols, flavors, and food antimicrobials. The applications of liposomes in the food industry as an innovative technology is growing day by day and parallel to this, some limitations about using liposome-based systems in the food and nutrition such as susceptibility of liposomes to microbiological contamination, as well as handling, storage, and transport of final liposome-containing food products, must be overcome.

Keywords: Liposome, nutrition, food, nanoparticle

The applications of nanotechnology in the food sector

Saeid Khanzadi¹, Kobra Keykhosravi^{1,*}

1. Department of Food Hygiene and Aquaculture, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran.

*corresponding author, Email: k.keykhosravi@mail.um.ac.ir

Nanotechnology is a broad term used to represent an assemblage of processes, materials and applications that span physical, chemical, biological and electronic science and engineering fields. Use of nanotechnology is a relatively new approach and the benefits of these new technology must be weighed against possible adverse effects. Materials and structures are with nanoscale dimensions, usually in the range 1 – 100 nm. Nanotechnology in recent years has developed into a wide-ranging, multibillion-dollar global industry. A cursory look at the new technological developments shows that nanotechnologies offer wide-ranging benefits to the whole of the food chain; including: new

tastes, textures and sensations, reduction in the amount of fat, salt and other health-promoting additives, increasing the bioavailability of nutritional components, controlling the release of flavors, longer shelf-lives, delivery systems for nutrients and supplements, better traceability and security of food products through innovative packaging applications. Currently, food packaging applications make up the largest share of Nano-food market, followed by Nano-sized and/or Nano-encapsulated ingredients and additives for food applications. Considering the global nature of food business, and that several companies and research institutions are currently exploring new possible applications in the food and related sectors. It is not unreasonable to expect that Nano-food products will be available to the consumer in an increasing number and variety in the coming years. Nanotechnology applications for food have undoubtedly opened up enormous opportunities for innovation and new developments, but at the same time have also raised new challenges in regard to ensuring the consumer safety. However, only small and most products and applications are still at R&D stage. In this context, the advent of nanotechnology has raised new hopes that it can address many of the industry's needs.

Keywords: Nanotechnology, Food, Application, Packaging

Nanotechnology in food packaging and its health safety aspects

Nagar Samadi, Mohammad Mohsenzadeh*

Department of Food hygiene and Aquaculture, Ferdowsi University of Mashhad, Mashhad, Iran

*Corresponding author's email: mohsenza@um.ac.ir

In food production systems nanotechnologies cover different aspects such as food safety, bioavailability, food born pathogen detection and packaging materials. Demand for palatable and safe food products represents crucial challenges for the food-packaging industry with the idea to design and produce novel packaging solutions able to maintain the safety and quality of products. For this purpose, besides the obvious need for an improvement of food quality, packaging technology is played a key role. A recent challenge in the food packaging is "smart packaging", in which the packaging is not a passive container, but it also provides some extra functions. Active packaging materials change the

condition of the packaged product to extend shelf-life and improve microbial food safety and sensorial properties. Antimicrobial packaging systems have been found highly effective in killing or inhibiting spoilage and pathogenic microorganisms that can contaminate food products. Nano sensors detect spoilage, bacterial growth and to monitor incorrect storage condition. Metal nanoparticles are nanometric materials exhibiting unique optical and chemical and antimicrobial properties that make them particularly attractive for a wide range of application. In fact, nanotechnology is going to change the fabrication of the entire packaging industry and nanomaterials can be used to make packaging that keeps the product inside fresher for longer. It is widely expected that nanotechnology-derived food products will be available increasingly to consumers worldwide coming years. In this study, we will review the advent of nanotechnology that has proved the way to innovative food packaging materials with enhanced mechanical barrier, safety and antimicrobial properties.

Keywords: nanotechnology, food packaging, nanoparticles, food safety

Electrospinning nanofiber for food-grade applications

Atefeh Sarafan Sadeghi^{1*},
Farahnaz Ghollasi Moud^{1*}

1. Department of Food hygiene and Aquaculture, Ferdowsi University of Mashhad, Mashhad, Iran

*Corresponding author's email: atefeh_sarafan@yahoo.com
fnghollasee@yahoo.com

Rapidly growing electro hydrodynamic process, namely electrospinning is a facile, cost effective and adaptable fabrication technique that utilize for generating of non-woven fibers with diameters below 100 nm from a wide range of biopolymers (include polysaccharides such as cellulose, chitin, chitosan, and dextrose besides proteins like collagen, gelatin, silk and DNA) and synthetic polymers (such as polyethylene oxide, poly vinyl alcohol and polyamide). The electro spun nanofibers have been shown to possess several useful structural and functional characteristics due to their significant biological and chemical properties such as high surface-to-volume ratio, nanoporosity, biocompatibility, bioactivity, polycationicity and high safety. This review gives an

introduction to the prospective food based uses of electrospinning method. Some industrial applications of nanofibrous films in food processing include: 1) as ingredients if they are composed solely of edible polymers and generally regarded as safe (GRAS) ingredients, (e.g., fibers could contain functional ingredients, for example, nutraceuticals, antioxidants, antimicrobials, and flavors), 2) as active packaging materials, 3) as processing aids (e.g., catalytic reactors, membranes, filters specially for beverage products at high flow rate), 4) as encapsulation of bioactive food ingredients to release control as most important application in food, 5) as enzyme immobilization, 6) food surface coating, 7) as carrier of plant extracts, and 8) as sensors (e.g., Nano biosensors for pesticide residue detection).

Keywords: Electrospinning, food-grade, nanofiber

Food mediated synthesis of cellulose nanocrystals (CNCs) and food storage application

Elahe kamelnia¹, Majid darroudi^{2,3,*}

¹Department of Biochemistry, Faculty of Science, Science and Research Branch, Islamic Azad University, Tehran, Iran

²Nuclear Medicine Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

³Department of Modern Sciences and Technologies, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

*Corresponding author's Email: darroudim@mums.ac.ir, majiddarroudi@gmail.com

Cellulose, the most abundant natural biopolymer in the world, can be a good candidate for a wide of variety of application, such as food mediated, biomaterials and etc. Cellulose nanocrystals (CNCs) are a suitable choice for food mediated due to their biocompatible and biodegradable nature. The nanoparticles are usually made by treatment or acidic hydrolysis of initial cellulose samples such as rice, wheat, oat, sugar beet pulp at different temperature and following mechanical or ultrasound disintegration. The CNCs have a great utility in biopolymer formulation for food storage that could be used for nanocomposites purposes in made of bioactive utensils and transparent films. These

Iranian Journal of Basic Medical Sciences

Volume (2017): 20

Issue: 10

Mashhad University of Medical Sciences (MUMS) has aimed to develop an international congress regarding basic sciences related to health and human nutrition in cooperation with ministry of health of Iran. This international congress is in line with the objectives of the UNESCO and WHO. One of the most important benefits of this international congress is the opportunity to establish a Health Related Basic Science and Human Nutrition study center. To achieve this goal, we are excited to be hosting the first International Congress of "Nutrition: from Laboratory Research to Clinical Studies" (NLRCS). The purpose of the congress is to bring together cellular and molecular researchers, nutritionists, physicians, experts in food and health and other specialists to discuss the challenges of the interplay between Nutrition Sciences and medical intervention in all age groups. This scientific meeting is an invaluable opportunity to exchange ideas and knowledge regarding nutrition and health issues, which is in line with the First International Symposium of Nutritional Implication for Public Health. The symposium will be conducted with technical support of WHO and in collaboration with UNESCO.