

Improving Lutein Bioavailability by Nanotechnology Applications

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Abstract : Lutein is a member of xanthophyll group of carotenoids found in fruits and vegetables. Lutein accumulates in the macula region of the retina and known as macular pigment which absorbs damaging light in the blue wavelengths. The presence of lutein in retina has been related to decreased risk of two common eye diseases, age-related macular degeneration, and cataract. Being a strong antioxidant, it may also have effects on prevention some types of cancer, cardiovascular disease, cognitive dysfunction. Humans are not capable of synthesizing lutein de novo; therefore it must be provided naturally by the diet, fortified foods, and beverages or nutritional supplement. However, poor bioavailability and physicochemical stability limit its usage in the food industry. Poor solubility in digestive fluids and sensitivity to heat, light, and oxygen are both affect the stability and bioavailability of lutein. In this context, new technologies, delivery systems and formulations have been applied to improve stability and solubility of lutein. Nanotechnology, including nanoemulsion, nanocrystal, nanoencapsulation technology and microencapsulation by complex coacervation, spray drying are promising ways of increasing solubilization of lutein and stability of it in different conditions. Bioavailability of lutein is also dependent on formulations used, starch formulations and milk proteins, especially sodium caseinate are found effective in improving the bioavailability of lutein. Designing foods with highly bioavailable and stabile lutein needs knowledge about current technologies, formulations, and further needs. This review provides an overview of the new technologies and formulations used to improve bioavailability of lutein and also gives a future outlook to food researches.

Keywords : bioavailability, formulation, lutein, nanotechnology

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