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Nanoencapsulated nutraceuticals: Potential drug delivery systems for immune health

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Abstract

Nanotechnological products along with nutraceuticals are fast emerging as sought after products for good health. The enhancement in usage of these technological improvisations is mainly attributed to the better bioavailability, reduction in adverse reactions due to targeted delivery and over toxicity, sustained release requiring fewer doses day and better sustainability. In current times especially after the pandemic, the emphasis on development of nanonutraceuticals, as supplements, and its consumption, to not only maintain health and immunity but also to treat a number of diseases, has taken a boost. The current review summarizes the utility of some nanonutraceuticals for health through strengthening immunity, which can further lead to healthy being from many disorders diseases.



1. Introduction

The SARS-CoV2 infection initiated since November 2019, spread rapidly and in March 2020, WHO declared it as a pandemic. With widespread mortality, the world recognised the nonpareil role of immunity in maintaining good health. It has always been accepted that nutrition plays a significant role in strengthening immunity. Hereditary predispositions along with environment have also been known to influence immunity. Over-nutrition as in obesity as well as malnutrition, results in adversely affecting immunity leading to malfunctioning of innate as well as adaptive immune responses, thereby leading to a higher vulnerability to infection (Calder and Yaqoob, 2020). A positive correlation exists between nutrition and functionality of the immune system. A strong support to the immune system is provided by micronutrients as vitamins A, C and D ;

copper, magnesium, selenium, zinc, etc. (Gombart *et al.*, 2020; Maggini *et al.*, 2018).

Studies have recommended that foods rich in (a) antioxidants and vitamins, e.g., vegetables and fresh fruits (Cena and Chieppa, 2020), nuts (Yahfoufi *et al.*, 2018), (b) omega-3 fatty acids (Seidemann *et al.*, 2018), (c) micronutrients (Jampilek and Kralova, 2020), have a positive influence on the immune system. A new branch of science is nutraceuticals which is defined as foods and their derivatives, supplemented along with diet catering to important nutrients that support holistic wellness. These nutraceuticals use natural phytoconstituents with therapeutic effects and helps to maintain good health. As they are natural in origin, the adverse reactions are minimal and thus, the market for nutraceuticals has been growing exponentially in the past few decades.

The most convenient and desirable route of delivery of drugs or nutraceuticals or supplements is oral which has inherent issues especially low availability and first pass metabolism (Jampilek and Kralova, 2018, 2019). Nanoformulations are now evolving as the desired route for drug delivery, because it allows the targeted distribution of drugs to the selected tissues as well as controlled and sustained release, overcoming the undesired drug accumulation

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