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Prospects of nano-nutraceuticals for better and healthier future

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Nutraceuticals are defined as non-toxic food components extracted from foods that has scientifically established potential health benefits for disease treatment and disease prevention. Nutraceuticals that are for human consumption are marketed in concentrated forms such as capsules, pills, and powders for oral delivery and tinctures for topical applications or as suppositories containing food bioactive components. The reduced bioavailability, stability and permeability of the bioactive components in the gastrointestinal (GI) fluids leads to their partial absorption from the GI tract during their first pass metabolism. This results in their reduced or almost no biological activity, which is a major concern of the researchers today. In the conventional mode of delivery of nutraceuticals, a portion of the administered nutraceutical dose is absorbed and reaches the actual pharmacological site of action where as the remainder portion is either excreted or instigates non-specific toxicity and adverse side effects owing to undesirable bio-distribution. To overcome these problems, principles of nanotechnology have been used for the efficient delivery of nutraceuticals. The concept of nano-delivery system has emerged to acquire several modes of administration to interpret the problems associated with their absorption. There has been a significant progress in the development of nano-nutraceuticals and delivery of lipophilic nutraceuticals via nanotechnology. Effective solubilization, encapsulation, and delivery, based on nanoscience and technology, as biocompatible systems are projected to bestow them with properties like excellent absorption in lower doses, reduced frequency of administration, and amended therapeutic index. The nano-formulations also offer targeted delivery of the encapsulated nutraceuticals and also demonstrate slow and sustained release from the nano-formulation. An excellent example to demonstrate the advent of nanotechnology for the incredible enhancement in the solubility and the bioavailability of curcumin, a potential nutraceutical with several significant properties including anti-cancer potential, has been evidenced by various *in vitro* and *in vivo* studies, by the development of various nano-formulations. We have demonstrated that the encapsulation of curcumin along with magnetic nanoparticles exhibited excellent reduction in cancer cells *in vitro* in the synergistic with that of magnetic hyperthermia. We have also successfully encapsulated lutein, another potential nutraceutical, into polymeric nanoparticles, thus enhancing the solubility of the same. We have also developed a cream using nano-lutein and curcumin for cosmetic applications.

Biography

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