

## USING NANOTECHNOLOGY TO ENHANCE NUTRIENT BIOACCESSIBILITY

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### ABSTRACT

Nanotechnology has become an increasingly important field in the delivery of various substances, including nutrients. The use of nanotechnology in nutrient delivery offers several advantages, including increased stability and bioavailability of the nutrient, improved targeting to specific tissues or cells, and decreased toxicity. However, there are also potential drawbacks associated with the use of nanotechnology in nutrient delivery. One major concern is the potential for toxicity associated with the use of nanoparticles. Additionally, there is limited information available on the long-term effects of nanoparticle exposure and the impact that nanoparticles may have on the body's normal physiological processes. Furthermore, there is a need for additional research to evaluate the safety and efficacy of nanoparticle-mediated nutrient delivery in different populations, including children, pregnant women, and elderly individuals. The size, zeta potential, encapsulation effectiveness, and release of nutrients nanoparticles may be related. Smaller nanoparticles typically have higher surface area-to-volume ratios, which can affect their zeta potential and encapsulation effectiveness. Higher encapsulation efficiency may be attained by increasing the stability of the nanoparticles in suspension as a result of a high zeta potential. However, a high zeta potential can also lead to a decreased release of the nutrients from the nanoparticles. On the other hand, larger nanoparticles may have lower zeta potentials and tend to have lower surface area-to-volume ratios. This may result in a decrease in encapsulation efficiency but could also increase the release of flavonoids from the nanoparticles. In this work, we reviewed the state of the art of nutrient release using nanotechnology-based delivery systems. Overall, the size and zeta potential of nanoparticles can affect their encapsulation effectiveness and release, but the precise relationship can depend on the particular composition and conditions of the nanoparticles.

**Keywords:** nanotechnology, nutrients, food.