

New Vista in Nanophyto Formulations: A New Way of Treatment

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Abstract

The integration of nanotechnology with phytotherapy has opened a promising new avenue for the development of advanced therapeutic formulations. Nanophyto formulations involve the incorporation of bioactive plant-derived compounds into nanoscale delivery systems to overcome limitations commonly associated with conventional herbal preparations. Many phytoconstituents, including polyphenols, flavonoids, alkaloids, terpenoids, and essential oils, exhibit significant pharmacological activities but may suffer from poor aqueous solubility, low bioavailability, rapid degradation, and limited cellular uptake. Nanotechnology-based approaches can potentially address these challenges by improving solubility, stability, controlled release, absorption, and targeted delivery of phytoconstituents. This paper explores the emerging potential of Nanophyto formulations as an innovative approach to disease management and therapeutic development. Various nanocarrier systems, including nano emulsions, liposomes, phytosomes, polymeric nanoparticles, and lipid-based nanoparticles, are discussed with respect to their ability to enhance the therapeutic performance of plant-derived compounds. The potential applications of Nanophyto formulations in the management of cancer, inflammation, microbial infections, metabolic disorders, and neurological conditions are also highlighted. Despite their promising advantages, challenges related to formulation optimization, standardization of herbal materials, reproducibility, toxicity assessment, scalability, regulatory approval, and long-term safety require further investigation. The development of scientifically standardized and clinically validated Nanophyto formulations may provide new opportunities for safer, more efficient, and targeted therapeutic interventions. Continued interdisciplinary research involving pharmaceutical sciences, nanotechnology, pharmacology, and phytochemistry is essential for translating these promising systems from laboratory research into practical healthcare applications.

Keywords: Nanophyto Formulations, Nanotechnology, Phytotherapy, Phytoconstituents, Nanocarriers, Drug Delivery, Bioavailability, Targeted Therapy, Herbal Medicine