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## Nanotechnology in Herbal Medicines: A Review

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### Abstract:

Nanotechnology is an exciting and rapidly evolving field with the potential to revolutionize herbal medicine. Traditional herbal remedies, while rich in therapeutic benefits, often struggle with challenges like poor solubility, low bioavailability, and instability in the body, which can limit their effectiveness. By incorporating nanotechnology, herbal compounds can be encapsulated into nanoparticles, nanocarriers, and Nanoemulsions, enhancing their absorption, stability, and targeted delivery for improved therapeutic outcomes. Nanoparticles such as liposomes, solid lipid nanoparticles (SLNs), and nanostructured lipid carriers (NLCs) enable controlled release and precise delivery of herbal compounds, reducing side effects and making treatments more effective. This technology also paves the way for innovative herbal formulations, including transdermal patches, oral capsules, and topical applications, making natural remedies more accessible and efficient. However, while nanotechnology offers immense promise, challenges like toxicity concerns, safety issues, and regulatory complexities must be carefully addressed to ensure its safe and widespread use. With continued research and development, nanotechnology has the potential to significantly enhance herbal medicine, improving existing treatments and introducing new, personalized therapeutic options for a range of health conditions.

**Keywords:** Nanotechnology, herbal medicine, bioavailability, nanoparticles, drug delivery, controlled release, nanocarriers, stability, targeted therapy, safety, regulation.

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