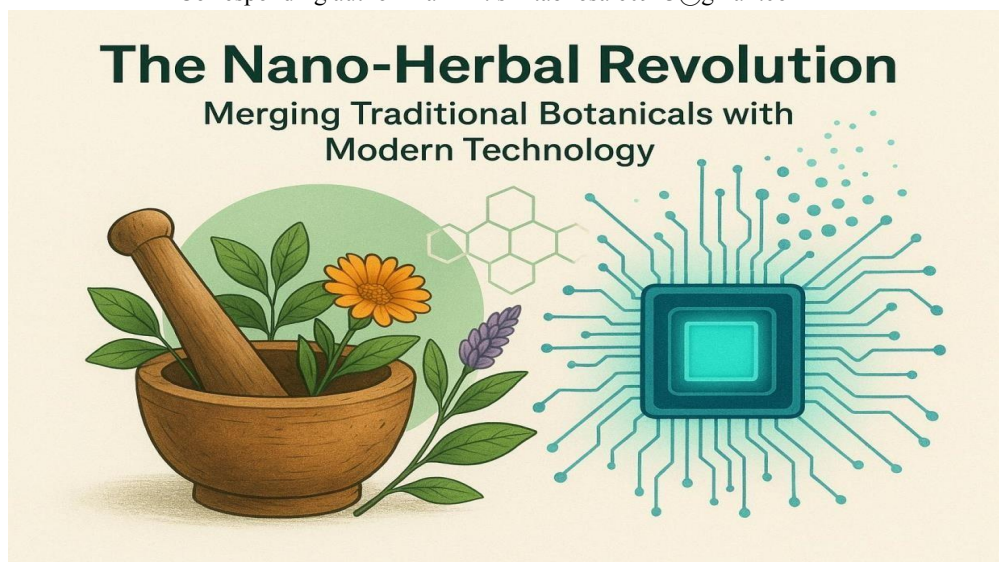


The Nano-Herbal Revolution: Merging Traditional Botanicals with Modern Technology

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Abstract: The integration of nanotechnology with plant-based medicinal compounds is bringing major improvements to modern drug delivery and treatment methods. Herbal medicines have been used for a long time because they are effective and usually cause fewer side effects. However, traditional herbal preparations often have limitations, such as poor absorption in the body, large particle size, and low availability of active compounds. Nanotechnology helps overcome these issues by enhancing absorption, increasing bioavailability, and allowing medicines to target specific areas in the body more effectively. Plant-based nanoparticles also provide an eco-friendly and sustainable solution, offering better drug release control and improved therapeutic performance. For example, nanoparticles like silver and gold produced using plant extracts have shown strong potential in fighting infections and cancer.

Nanotechnology is helping herbal medicines work better in the body. By turning herbal compounds into very tiny particles, they become easier to absorb and more effective in treating problems like cancer, infections, and inflammation. These small carriers protect the medicine from being damaged in the stomach or broken down too early by the liver. This helps the herbal drugs reach the right place in the body and work more efficiently, making the treatment safer and more reliable.

Nanotechnology brings many benefits to herbal medicine by making treatments more effective and easier to use. It helps the medicine release slowly, so its effects last longer. It also allows the drug to work directly at the target site, which lowers side effects. This improves patient comfort and makes it easier to follow treatment routines. In addition, nanotechnology improves how well herbal medicines dissolve, get absorbed, and act in the body, while also increasing their safety. Because of this, patients often need smaller doses and do not have to take the medicine as frequently.

Nanomedicine is growing rapidly and is expected to play a much bigger role in the future. Nano-based herbal medicines have shown the potential to help in the treatment of different types of cancer, such as



lung, liver, bone, and skin cancers. These advancements are opening new possibilities for improving the way plant-based medicines work in the body. However, while nanotechnology offers many benefits, it is important to understand its safety and long-term effects. More studies are needed to make sure these nano-formulations are safe and reliable for regular medical use. By combining traditional herbal medicine with modern nanotechnology, we can create more effective and advanced healthcare solutions. The growing use of nanoparticles in herbal medicine represents a new direction in developing safer, more efficient plant-based treatments and drug delivery systems.

Keywords: Nanoparticles, plant extracts, green synthesis, drug delivery, nanomedicine, Herbal drugs, nanotechnology, NDDS, Nanodelivery system, Liposomes, phytosome, solid lipid nanoparticles, Nanocarriers, Herbal remedies, Drug delivery system, Traditional knowledge, Botanical diversity, curcuma longa, Pharmacological activity

