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of fertilizers and pesticides from plant-based nanomaterials -- 12. Application of plant-based nanomaterials to increase the shelf life of food products -- 13. Plant-based nanomaterials for drug delivery -- 14. Plant bioactive-based nanomaterials for wound dressing applications -- 15. Plant-based smart nanomaterials -- 16. Limitations and challenges of medicinal plant-based nanoemulsions -- 17. Regulatory considerations for developing and commercializing plant-based nanomaterials -- 18. Potential environmental implications of plant-based nanomaterials -- 19. Economic feasibility and potential market for plant-based nanomaterials -- 20. Summary of recent trends and future prospects of nanoemulsions and applications.

Sommario/riassunto

Plant essential oil-based nanoemulsions and microemulsions represent a cutting-edge approach to harnessing the therapeutic potential of botanical extracts which have droplet sizes ranging from 10-100 nm. These finely dispersed oil-in-water or water-in-oil systems offer a wide range of applications across diverse fields. In pharmaceuticals, they enable improved drug delivery systems with enhanced bioavailability and controlled release, potentially revolutionizing the efficacy of herbal medicines. In cosmetics, they are used as natural and sustainable ingredients for skincare and perfumes, tapping into the rising demand for eco-friendly products. In agriculture, they serve as effective carriers for essential oils and pesticides, enhancing crop protection and yield. Additionally, these formulations hold promise in the food industry for flavor encapsulation and preservation, and they contribute to sustainable agriculture practices by reducing the need for chemical inputs. Overall, plant essential oil-based nanoemulsions and microemulsions open doors to innovative solutions that bridge the gap between traditional botanical knowledge and modern technology, offering a multitude of benefits to diverse industries. In antiaging therapies, nanoemulsions improve the penetration and absorption of active ingredients, leading to more effective and sustained results. Additionally, they are utilized in managing diabetes by facilitating better delivery of insulin and other antidiabetic medications, ensuring controlled and sustained blood glucose levels. For heart attack control, nanoemulsions aid in the precise delivery of cardiovascular drugs, improving patient outcomes and reducing the risk of adverse effects. Their ability to enhance drug solubility, stability, and bioavailability makes nanoemulsions a valuable tool in modern medicine. This book will examine the synthesis, characterization, and applications of plant-derived nanomaterials in various biomedical applications.