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Chapter 4

Micro/nanoemulsions redefining cosmeceutical formulation for optimal skin health

Abstract: The evolving field of cosmeceuticals integrates skincare with pharmaceutical precision, addressing the growing demand for effective and safe solutions to enhance skin health. This chapter explores the transformative role of micro/nanoemulsions in modern cosmeceutical formulations. These advanced delivery systems exhibit unique properties, including enhanced stability, superior skin penetration, and controlled release of active ingredients, offering distinct advantages over conventional formulations. The formulation process involves a strategic combination of oil and aqueous phases, emulsifiers, and bioactive components, with plant-based extracts playing a pivotal role. Extracts like green tea, aloe vera, curcumin, and grape seed exhibit antioxidant, anti-inflammatory, and antiaging properties, while others such as licorice root and chamomile provide skin brightening and calming effects. The mechanisms of action emphasize the interaction of emulsions with the skin barrier, leveraging nanoscale droplet sizes for deeper penetration and synergistic effects with bioactive. Applications of micro/nanoemulsions span antiaging, hydration, acne treatment, skin brightening, and sunscreen formulations, showcasing their versatility. Despite their potential, challenges such as stability issues with natural extracts, phase separation, and droplet size growth require innovative stabilization techniques. Regulatory guidelines and safety evaluations ensure the development of products which is safe and effective, while recent patents highlight advancements in green and sustainable cosmeceuticals. This chapter underscores the transformative impact of micro/nanoemulsions in addressing consumer needs, advancing cosmeceutical science, and shaping the future of skincare.

Keywords: Cosmeceuticals, microemulsions, nanoemulsions, plant-based extracts, skin health, antiaging, stability

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