

A Review on Microneedles Patches Transdermal Drug Delivery System

Gitanjali Nana Patil¹, Chetana Sanjay Patil², Harshada Bhupendra Patil³,
Dinesh Bhimrao Nikume⁴, Asst. Prof. Vishal V. Kalal⁵

Students^{1,2,3,4}

Assistant Professor⁵

Jijamata Education Society's College of Pharmacy, Nandurbar, Maharashtra, India

Abstract: *A revolutionary approach transdermal drug delivery has emerged as a viable alternative to traditional oral and injectable routes, offering improved patient compliance and reduces side effects. Microneedle patches have garnered significant attention in recent years as a promising technology for transdermal drug delivery. these microscopic needle arrays create micro- channels in the skin, enabling the delivery of therapeutics, including small molecules, peptides, proteins. Recent studies have demonstrated the efficacy of microneedle patches in delivering various therapeutics, including vaccines, hormones, and painkillers. The patches have shown improved bioavailability, reduced dosing frequency, and enhanced therapeutic outcomes. Additionally, microneedle patches have been found to be safe and well-tolerated, with minimal skin irritation and no significant adverse effects. Despite the promising results, challenges persist, including scalability, cost-effectiveness, and regulatory hurdles. Ongoing research aims to address these limitations, exploring new materials, designs, and manufacturing processes. The development of microneedle patches for transdermal drug delivery has the potential to transform the pharmaceutical industry, offering improved treatment outcomes, enhanced patient compliance, and reduced healthcare costs.*

Keywords: Microneedle patches, Transdermal drug delivery, Bioavailability , Targeted delivery, Patient compliance