Fabrication and Characterization of Dissolvable Microneedle Patches Using Different Compositions and Ratios of Hyaluronic Acid and Zinc Oxide Nanoparticles

Authors : Dada Kolawole Segun

Abstract : Transdermal drug delivery has gained popularity as a non-invasive method for controlled drug release compared to traditional delivery routes. Dissolvable transdermal patches have emerged as a promising platform for delivering a variety of drugs due to their ease of use. The objective of this research was to create and characterize dissolvable transdermal patches using various compositions and ratios of hyaluronic acid and zinc oxide nanoparticles. A micromolding technique was utilized to fabricate the patches, which were subsequently characterized using scanning electron microscopy, atomic force microscopy, and tensile strength testing. In vitro drug release studies were conducted to evaluate the drug release kinetics of the patches. The study found that the mechanical strength and dissolution properties of the patches were influenced by the hyaluronic acid and zinc oxide nanoparticle ratios used in the fabrication process. Moreover, the patches demonstrated controlled delivery of model drugs through the skin, highlighting their potential for transdermal drug delivery applications. The results suggest that dissolvable transdermal patches can be tailored to meet specific requirements for drug delivery applications using different compositions and ratios of hyaluronic acid and zinc oxide nanoparticles. This development has the potential to improve treatment outcomes and patient compliance in various therapeutic areas.

Keywords : transdermal drug delivery, characterization, skin permeation, biodegradable materials
Conference Title : ICADDSDPDDS 2024 : International Conference on Advanced Drug Delivery Systems and Devices and Polymer Drug Delivery Systems
Conference Location : Helsinki, Finland
Conference Dates : July 18-19, 2024