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Title of thesis

Development of Hydrogels as Drug Delivery Systems and Testing these systems using Franz Diffusion Cells

Biography

The author is a postgraduate student currently pursuing a master's degree in Applied Biotechnology, at the University of Iceland. She has a background in Microbiology and graduated in 2012 from Benson Idahosa University, Nigeria. Through her academic journey, she has developed a strong interest in the pharmaceutical field. Her research interest is focused on drug development and drug delivery, which strongly aligns with her master's research on the development of drug delivery systems. She is committed to continuous learning and professional development within the pharmaceutical field and aims to build expertise that will support future contributions to pharmaceutical research.

Abstract

This study involved the development of alginate-based hydrogels using the electrodeposition technique to assess their potential for drug delivery. The effects of electrodeposition parameters on hydrogel structure and drug release behavior were investigated. Hydrogels were characterized in terms of thickness and morphology. Results showed that higher applied electrical conditions and longer deposition times produced thicker and physically damaged hydrogels, rendering them unsuitable for drug delivery systems. Drug release of three selected active pharmaceutical ingredients (diclofenac sodium, caffeine, and ketoconazole) from the hydrogels was tested using Franz diffusion cells. The release followed a sustained, time-dependent pattern influenced by both hydrogel properties and the physicochemical characteristics of the APIs. Caffeine showed the fastest release, while ketoconazole was the slowest. Overall, these findings demonstrate that electrodeposited hydrogels are tunable and reproducible systems suitable for controlled drug delivery