World Academy of Science, Engineering and Technology
International Journal of Health and Medical Engineering
Vol:17, No:06, 2023

# Ex Vivo Permeation Comparison Study of Flurbiprofen from Nanoparticles through Human Skin

**Authors :** Sheimah El Bejjaji, Lara Gorsek, Chandler Quilchez, Joaquim Suñer, Mireia Mallandrich

**Abstract :** Flurbiprofen is an anti-inflammatory drug used in several treatments. The purpose of this study was to compare the permeation of two different formulations of flurbiprofen through the human skin. The first formulation was a solution of flurbiprofen dissolved with polyethylene glycol 3350 (PEG 3350). The second formulation was flurbiprofen encapsulated in poly-ε-caprolactone (PεCL) nanoparticles (NPs), stabilized with poloxamer 188, submitted individually for freeze-drying with PEG 3350 as a cryoprotectant and sterilized by gamma-irradiation. Human skin was obtained from the abdominal region of a healthy patient. The experimental protocol was approved by the Bioethics Committee of Barcelona SCIAS Hospital (Spain), and they obtained the written informed consent forms. After being frozen to -20ºC, the skin samples were cut with a dermatome at 400 µm. The ex vivo permeation study was performed in Franz diffusion cells with a diffusion area of 2.54 $cm^2$. Skin samples were placed between two compartment sites, the dermal side in contact with the receptor medium and the epidermis side in contact with the donor chamber to which the formulation was applied. The permeation study was conducted for 24 hours at 32 ± 0.5 °C in accordance with sink conditions. The results were analyzed with an unpaired t-test, and the p-values indicate the formulation with nanoparticles had a higher permeability coefficient, flux, partition parameter, diffusion parameter, and lag time. The applicability of this formulation topically can benefit articulations and ligament inflammation as an alternative to oral drugs.

**Keywords :** anti-inflammatory drug, flurbiprofen, human skin, nanoparticles, skin permeation
**Conference Title :** ICSDISC 2023 : International Conference on Skin Disorders, Infections and Skin Care
**Conference Location :** London, United Kingdom
**Conference Dates :** June 22-23, 2023