7th International Conference on

PHARMACEUTICS & ADVANCED DRUG DELIVERY SYSTEMS

March 27-28, 2023 | London, UK

Received date: 13-03-2023 | Accepted date: 15-03-2023 | Published date: 03-04-2023

Formulation development of dexibuprofen topical gel formulation: *In-vitro* profile and stability studies

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Non-steroidal anti-inflammatory drugs are widely indicated in pain disorders such as rheumatism and muscular disorders. Unfortunately, their long-term usage leads to gastric issues. Topical gel formulations are one of the preferred valuable strategies used in the pharmaceutical field to overcome the toxicity profile of NSAIDS. They offer benefits such as convenience and palatability.The present piece of work has been envisaged to develop a stable dexibuprofen topical gel formulation. The gels were fabricated using different gelling agents such as Carbopol 940, HPMC and CMC, and lutrol® F 127. Total of twelve trials were developed in four batches tagged as DEX-1, DEX II, DEX-III, and DEX-1V. Each batch contained three sets of gel trials. The formulations were tested for physical properties, rheology, pH, consistency, and spreadability. Trials DEX-I and DEX-III contained HPMC and carbopol 940 respectively whereas, batch II and IV trials containing CMC and lutrol®F127. All HPMC-based gel formulations exhibited low viscosity with precipitate formation and were excluded from the study. Trials containing CMC polymer (DEX-II) were found smooth and precipitates free but lacked viscosity (TD4, TD5, and TD6) so also rejected from the study. The trials developed with carbopol 940(TD7, TD8, and TD9) maintained the gelling consistency but also produced precipitates. Lastly, lutrol®F127 based trials(FD10, FD11, and FD12) gave promising results showing translucent appearance smooth texture, and viscous behaviour. The in-vitro drug release of the selected trials TD5, TD6, TD10, TD11, and TD12 was determined by Franz diffusion. Hence, lutrol®F127 led to slower drug release among all. The drug release was further fitted to drug kinetic models. The best fitted model was the Weibull model with the goodness of fit (r2>0.999, AIC, MIC).The trials TD5, TD6, TD10, TD11, and TD12 were also monitored for accelerated stability testing. The results revealed stability issues with TD5, TD6 and TD10. Only TD11 and TD12 remained stable.Hence, the topical delivery of dexibuprofen gel is a safer stable and an alternative approach to attain the analgesic and anti-inflammatory effects.

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Biography

Muhammad Anas Hanif graduated in 2013 as Pharmacist from Ziauddin University in December, 2013. He started his professional career in 2014 as regulatory affairs pharmacist at Pharmatec Pakistan. Later in 2016 he joined Pfizer Pakistan as officer regulatory affairs. Due to his passion towards research and development of pharmaceutical products along with teaching he was admitted in M.Phil Pharmaceutics at Ziauddin University in 2015 and successfully completed in 2020. Currently, he is serving as a lecturer at Jinnah Sindh Medical University. He has published articles on formulation and analytical method development of drugs. In 2021, he was appointed as reviewer Drugs Outcomes Research and Policies" (specialty section of Frontiers in Pharmacology). As a researcher he has participated as oral and poster presenter in different national and international symposiums.

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