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PEG-BASED POLYMERS FOR CONTROLLED IBUPROFEN DELIVERY

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Hydrogels are a group of polymeric materials that can hold large amounts of water within their three-dimensional structures. Simultaneously, they have the capacity of being highly biocompatible, and easily tunable characteristics. The use of PEG-based polymers as a biomaterial is particularly interesting due to its ease manipulation and has been vastly explored for pharmaceutical applications. UV photopolymerization is one of the preferable chain polymerization methodologies to produce hydrogels, because it is a fast procedure and avoids the exposure to thermal energy. Reactive groups, free radicals like, propagate through the unsaturated vinyl or allyl bonds on PEG-based monomers, resulting in chain polymerization. 2-(4-Isobutylphenyl) propanoic acid (ibuprofen) is a nonsteroidal anti-inflammatory agent (NSAIA) with analgesic and antipyretic properties. Ibuprofen has pharmacologic actions like those of other prototypical NSAIAs, which are thought to act through inhibition of prostaglandin synthesis. Topical delivery of non-steroidal anti-inflammatory drugs such as ibuprofen has been explored as a potential method to avoid the first pass metabolism effect and the consequent gastric irritation, which may occur when used per os. Although the use of PEG-based polymers in topical semisolid pharmaceutical formulations is not new, this work provides an opportunity to further investigate its drug delivery efficiency. We aimed to encapsulate ibuprofen in photopolymerized membranes and study its dissolution profile. Membranes production followed a photopolymerization methodology through the action of a UV photoinitiator as a crosslinking agent. Solubility tests were performed to predict sink conditions required for complete drug dissolution. Dissolution assays were carried out and UV spectrophotometry was used for cumulative release percentage determination. The obtained data were mathematically evaluated and fitted into mathematical dependent models; the dissolution efficiency was also determined. The produced membranes are expected to be a promising contribution in the development of new controlled drug delivery systems for ibuprofen topical administration with applications in orthopedics and ophthalmology.

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