

Formulation and evaluation of ketoprofen gels with different gelling agents

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Introduction and Objectives: Ketoprofen (KT) is a non-steroidal anti-inflammatory drug used for the treatment of rheumatoid and osteoarthritis. Topical KT gels are highly preferred due to their minimal side effects. Gels form at the critical concentration of the gelling agent. The type and concentration of gelling agents influence drug release. Hence, different gelling agents at different concentrations could be incorporated to find the best gelling agent for the topical delivery of KT. This study aimed to formulate and evaluate topical KT gels with different gelling agents such as Carbopol 940, hydroxypropylmethyl cellulose (HPMC) and sodium carboxymethyl cellulose (SCMC).

Methods: KT was dissolved in 95% ethanol with a slow stirring, while methyl and propylparaben were dissolved in propylene glycol, which was added to the drug mixture. It was then loaded into the prepared gel bases of 0.5%, 1% and 1.5% of Carbopol 940, 4% of HPMC and 4%, 5% and 6% of SCMC. Prepared gels were evaluated for their organoleptic characters: homogeneity, pH, viscosity, spreadability, drug content and in-vitro drug release using the dialysis tubing membrane. Drug release data was analyzed to find out the kinetic model they fit in using DDSolver-software. One-way ANOVA was used to compare the best-prepared formulations with marketed products, and the t-test was used to compare their stability data.

Results: Considerable changes were observed in the physicochemical characters of prepared gels. Results of evaluation of prepared gels showed that Carbopol gels were comparable to marketed KT gel among the prepared gels. According to ANOVA analysis, Carbopol gels showed significant differences with marketed KT gel in physicochemical characters. Further drug release studies also showed significant differences between prepared Carbopol gels and marketed KT gel. Stability test revealed that Carbopol gels were the most stable formulations among prepared gels. Drug release from all KT gels best fitted to Korsmeyer-Peppas model.

Conclusion: Carbopol gels were the most stable formulations and comparable to marketed gel among prepared gels. Carbopol gels could be effectively used for the topical delivery of KT, and the drug release occurs by polymer chain relaxation in a gel matrix.

Keywords: Ketoprofen, Gelling agents, Gels, Evaluation