Nanoemulsion-based Oleogel Formulation of Lidocaine for Topical Delivery

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Abstract

The main objective of this study was to deliver the low–soluble drug lidocaine topically using nanoemulsion–based oleogel formulations. An optimized formulation for the o/w nanoemulsion of oil, surfactant and cosurfactant was selected based on nanoemulsion mean droplet size, clarity, stability, and flowability, and incorporated into the gelling agent Compritol® 888. Rheological studies of the lidocaine conventional oleogel were conducted and compared to those of lidocaine nanoemulsion–based oleogels 2 and 4. The three gels exhibited an elastic behavior, where the storage or elastic modulus G' dominated the loss or viscous modulus G" at all frequencies, indicating the formation of strong gels. Lidocaine conventional oleogel exhibited the highest elastic properties. Strat–M® membrane, a synthetic membrane with diffusion characteristics that are well correlated to human skin, was used for the *in vitro* diffusion studies. Lidocaine nanoemulsion–based oleogels showed a controlled–release pattern over 20 h, which was correlated with the rheological properties of the oleogels.