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Formulation and evaluation of microemulgel containing a non-steroidal anti-inflammatory drug

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Capsaicin is a non-steroidal anti-inflammatory drug, and it is used widely in topical formulations for mild pain associated with rheumatoid arthritis and muscle strains. Microemulgel is a novel drug delivery system combining the properties of microemulsion and gel, which can effectively encapsulate poorly soluble drugs, such as BCS Class II drugs, for localized application. This study has been designed to synthesize and evaluate the efficacy of capsaicin-loaded microemulgel for inflammation treatment. The microemulsions have been prepared based on the pseudo-ternary phase diagrams through the phase titration method by using the combination of oil phases turpentine oil, clove oil, and cinnamon oil with Tween 80 as a surfactant and *n*-butanol as a co-surfactant. The microemulsions have been dispersed into Aerosil and chitosan gelling agents and turned into microemulgels. Formulations are checked for physical appearance, *p*H, spreadability, *in vitro* drug release, and particle size. The microemulsion system have proven to be stable with the globule size of 31.6 nm along with high drug content. Turpentine oil acted as an efficient oil phase compared to the rest, whereas 3.5% chitosan shows greater release, spreadability, and extrudability compared to Aerosil. In conclusion, chitosan-based microemulgel containing turpentine oil has proved to be the best formulation, which provides better drug delivery properties and stability for use in topical anti-inflammatory formulations.

Keywords: Microemulsion, Microemulgel, Capsaicin, Pseudoternarydiagram, Aerosil, Chitosan