



## Formulation, Optimization, and Photostability Assessment of Microemulsion Gel for Topical Quercetin Delivery

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**SUMMARY.** The present study aims to optimize formulations and evaluate the stability of quercetin which was loaded into microemulsion and microemulsion-based gel to treat keloids. The results show that the optimal microemulsion formulation to incorporate quercetin consisted of Tween 80, Transcutol, Capryol 90, and water. Further, the quercetin-incorporated microemulsion-based gel (QMG) was successfully formulated using 15% Carbopol Aqua as the gelling agent. To analyze the photostability, controlling the pH of the microemulsion to 7.4 could improve the photostability of the loaded quercetin. Although the permeability of QM was significantly higher than that of QMG, the superior quercetin, which was retained in porcine skin, was found from QMG at 6 h after the application. It was concluded that microemulsion based gel can be considered as an attractive formulation for skin delivery of quercetin to treat keloids.

**RESUMEN.** El objetivo de este estudio es optimizar las formulaciones y evaluar la estabilidad de la quercetina cargada en microemulsión y del gel a base de microemulsión para tratar queloides. Los resultados muestran que la formulación de microemulsión óptima para incorporar quercetina consistió en Tween 80, Transcutol, Capryol 90 y agua. Además, el gel a base de microemulsión incorporado a quercetina (QMG) se formuló satisfactoriamente utilizando 15% de Carbopol Aqua como agente gelificante. En cuanto a la fotoestabilidad, regular el pH de la microemulsión a 7,4 podría mejorar la fotoestabilidad de la quercetina cargada. Aunque la permeabilidad de QM fue significativamente mayor que la de QMG, la quercetina superior, que se conservó en la piel porcina, se encontró a partir de QMG a las 6 h después de la aplicación. Se concluyó que el gel basado en microemulsión puede considerarse como una formulación atractiva para el suministro de quercetina en la piel para el tratamiento de queloides.

**KEY WORDS:** microemulsion, photostability, quercetin, skin penetration, skin permeation

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