



## Development of Novel Microemulsion-based Hydrogel for Topical Delivery of Sinomenium

Shuangying GUI<sup>1,2,3\*</sup>, Enyuan PAN<sup>1</sup>, Peng LIU<sup>1</sup>, Chuanhua LU<sup>1</sup> & Daiyin PENG<sup>1,2,3</sup>

<sup>1</sup> Department of Pharmacy, Anhui College of Traditional Chinese Medicine,

<sup>2</sup> Anhui Key Laboratory of Modern Chinese Medicine & Materia,

<sup>3</sup> Research & Development Innovative Team of Anhui Province for 11th Five-Year Plan,  
45 Shihe Road, Hefei, 230031, P.R. China

**SUMMARY.** The objective of the present investigation was to develop and evaluate microemulsion-based hydrogel (MBH) for the topical delivery of sinomenium. The solubility of sinomenium in oils and surfactants was evaluated to identify components of the microemulsion, the pseudo-ternary phase diagrams were developed to identify the area of microemulsion existence and obtain the optimization  $K_m$  (the weight ratio of surfactant to cosurfactant). The transdermal ability of various microemulsion formulations were evaluated *in vitro* using Franz diffusion cells fitted with rat skins and sinomenium was analyzed by HPLC. The permeation of microemulsions accorded with the Fick's first diffusion law and the optimal formulation of the microemulsion was obtained. The MBH formulation containing 2 % sinomenium was prepared with Carbomer 940 as the gelling matrix. Stability test showed that MBH stored at 4°C and 25 °C for 3 months had no significant change in physicochemical properties. Pharmacokinetic study *in vivo* was conducted using rabbits, and the area under curve of plasma concentration-time ( $AUC_{0 \rightarrow \infty}$ ) of MBH was 1.27 times greater than that of the hydrogel. These results indicated that MBH might be a promising vehicle for the transdermal delivery of sinomenium.

**KEY WORDS:** Microemulsion, Microemulsion-based hydrogel, Sinomenium, Topical delivery.

\* Author to whom correspondence should be addressed: *E-mail:* guishy\_ah@yahoo.cn