

***Capsicum* oleoresin nanoemulsions as topical delivery systems for their potential as analgesic and anti-inflammatory agents.**

Ana Emilia Nava¹, PhD. Marilena Antunes¹, PhD. Daniel Guajardo Flores^{1*}

¹Instituto Tecnológico y de Estudios Superiores de Monterrey campus Monterrey, Nuevo León, México.

*danielgdo@tec.mx

Capsaicinoids, extracted from chili peppers, have proved analgesic and anti-inflammatory effects. However, these present secondary effects when applied topically such as irritation and erythema. A delivery system based on an oleoresin nanoemulsion from *Capsicum* was evaluated as a strategy to develop a formulation without capsaicinoids' secondary effects for topical use given its analgesic and anti-inflammatory potential. The purpose was to take advantage of agroindustry residues as they show potential in pharmaceutical and cosmetic industries. *Capsicum* oleoresin was extracted from chile habanero, ancho, mora, pasilla and chile de arbol using supercritical fluid extraction at different conditions. Capsaicinoids' profile was evaluated by HPLC-UV. Out of all the samples, chile habanero showed higher concentrations of capsaicinoids thus it was used to make the nanoemulsions. Nanoemulsions were formulated using surfactant and co-surfactant and they were processed using ultrasound. Nanoemulsions' stability was evaluated through time and the most stable and with highest yield was selected. Results showed highest concentrations of capsaicinoids recovered from the supercritical fluid extraction at 14MPa and 40°C. Also, the encapsulation of capsaicinoids into emulsions and their size disruption into nano-sized particles showed better stability compared to normal sized capsaicinoids. These particles can behave as delivery systems that can work as analgesic and anti-inflammatory agents. Therefore, it is feasible to obtain specific compounds from agroindustry residues in order to elaborate products with added value for cosmetic and pharmaceutic industries.