

## Immunosuppressive Effect of *Litsea cubeba* Essential Oil on Dendritic Cell and Contact Hypersensitivity Responses

Ming-Kuem Lin<sup>1</sup>, Meng-Shiou Lee<sup>1</sup>, Wen-Te Chang<sup>1</sup>, Hsiu-Chun Chen<sup>2</sup>

<sup>1</sup>Department of Chinese Pharmaceutical Sciences and Chinese Medicine Resources, College of Pharmacy, China Medical University, Taichung, Taiwan.

<sup>2</sup>Department of cosmeceutics, College of Pharmacy, China Medical University, Taichung, Taiwan.

*Litsea cubeba*, also named as Makaoy, is a traditional herb and has been used as cooking condiment or tea brewing to treat diseases for aborigines. It is commonly found in medium-high altitude area in Taiwan. In this study, *Litsea cubeba* essential oil (LCEO) was extracted by steam distillation and its components were analyzed by GC-MS with or without a combination with solid-phase microextraction. The main components in LCEO were determined as *Z*-citral and *E*-citral, although the percentage values are different between the results obtained by the two methods. In addition, an immunosuppressive activity of LCEO was also investigated. Bone marrow-derived dendritic cells (DCs) are a critical role for the connection of innate and adaptive immunity. Thus DCs are important targets in discovering immunomodulators. In this study, the effects of LCEO on DC activation and contact hypersensitivity responses in mice were examined. Our results clearly showed that LCEO decreased the production of cytokines (IL-12 and IL-6) in a dose-dependent manner in LPS-induced DCs. Also, contact hypersensitivity responses were inhibited in mice cosensitized with LCEO. Therefore, we demonstrate for the first time that the LCEO containing *Z*-citral and *E*-citral exhibit immunosuppressive effects on DC activation and contact hypersensitivity responses. Moreover, these findings indicate that LCEO can potentially be applied in the treatment of chronic inflammatory and autoimmune diseases.

**Keywords:** *Litsea cubeba*, Makaoy, Dendritic cell, Citral, Contact hypersensitivity responses