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A NOVEL TECHNIQUE FOR PRODUCING ZANTHOXYLUM OIL PARTICLES BASED ON SUPERCRITICAL CO₂ EXTRACTION AND MICROENCAPSULATION METHODS

LAN CHEN¹

¹ School of Medical Instrument and Food Engineering, University of Shanghai for Science and Technology, China, Institute of Pharmaceutical Technology and Equipment, Deputy director, lanchen@usst.edu.cn

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ABSTRACT Zanthoxylum Bungearnum Maxim (ZBM) oil is a popular ingredient in oriental foods. Normally, the production of the oil from ZBM is based on organic-solvent extraction or distillation, by which the product is relatively impure and is difficult to preserve due to its volatility. In the current study, a novel technique is developed to manufacture the ZMB oil. This technique is initially extract the oil from ZBM using supercritical CO₂ extraction process, and then the extracted oil is microencapsulated by spray drying. In this novel technique, the coating materials for the particles consists of Arabic gum and maltodextrin with a mass ratio of 1:1, and the supercritical CO₂ is used as extraction solvent for the core material Zanthoxylum oil, and as the atomizing fluid for the coating materials. Results showed that feasible technical conditions for the novel technique were best when extraction temperature was at 45°C, pressure at 25MPa, coating material solution flow rate of 1ml/min, CO₂ flow rate at 2L/min and concentration of coating material of 28.6%, the microencapsulation efficiency was 57.6% and the diameters of most microcapsules were less than 5 μm. In addition, the mechanism of extraction, atomization and the microparticle or microcapsule formation were also discussed in the current study. This study confirms that the novel technique developed is an efficient method to extract and ‘solidify’ the volatile oil product.

Keywords: Microcapsule; Zanthoxylum oil; Supercritical CO₂ Extraction; Spray Drying; Coaxial nozzle; Atomization