

The Effects of Ultrasound on the Extraction of Ficus deltoidea Leaves

Authors : Nur Aimi Syairah Mohd Abdul Alim, Azilah Ajit, A. Z. Sulaiman

Abstract : The present study aimed to investigate the effects of ultrasound-assisted extraction (UAE) on the extraction of Vitexin and Iso-Vitexin from Ficus deltoidea plants. In recent years, ultrasound technology has been found to be a potential herbal extraction technique. The passage of ultrasound energy in a liquid medium generates mechanical agitation and other physical effects due to acoustic cavitation. The main goal is to optimised ultrasonic-assisted extraction condition providing the highest extraction yield with the most desirable antioxidant activity and stability. Thus, a series of experiments has been developed to investigate the effect of ultrasound energy on the vegetal material and the implemented parameters by using HPLC-photodiode array detection. The influences of several experimental parameters on the ultrasonic extraction of Ficus deltoidea leaves were investigated: extraction time (1-8 h), solvent-to-water ratio (1:10 to 1:50), temperature (50-100 °C), duty cycle (10-continuous sonication) and intensity. The extracts at the optimized condition were compared with those obtained by conventional boiling extraction, in terms of bioactive constituents yield and chemical composition. The compounds of interest identified in the extracts were Vitexin and Isovitexin, which possess anti-diabetic, anti-oxidant and anti-cancer properties. Results showed that the main variables affecting the extraction process were temperature and time. Though in less extent, solvent-to-water ratio, duty cycle and intensity are also demonstrated to be important parameters. The experimental values under optimal conditions were in good consistent with the predicted values, which suggested that ultrasonic-assisted extraction (UAE) is more efficient process as compared to conventional boiling extraction. It recommended that ultrasound extraction of Ficus deltoidea plants are feasible to replace the traditional time-consuming and low efficiency preparation procedure in the future modernized and commercialized manufacture of this highly valuable herbal medicine.

Keywords : Ficus, ultrasounds, vitexin, isovitexin

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