

Title: Ultrasonic-assisted extraction of curcumin complexed with methyl-beta-cyclodextrin

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Abstract: Turmeric flavour is important in Asian cuisine; however, the production of turmeric-based ingredient with the current method of extraction of turmeric oleoresin is very laborious, time consuming and consumes large amount of solvent, coupled with limited solubility in aqueous solution, which limits its application to food system. The extract was optimised by determining the content of three marker curcuminoid compounds, namely, curcumin (C), demethoxycurcumin (DMC) and bisdemethoxycurcumin (BDMC). The optimised extraction parameters for ultrasonic-assisted extraction (UAE) with aqueous extraction solvent for curcuminoids were amplitude of 100, particle size of 0.30–0.60 mm, extraction time of 20 min, extraction solvent volume of 10 mL and extraction temperature of 60 °C. The applications showed remarkable improvements in terms of reduced extraction time, solvent consumption, extraction yield and the quality of extracts. The turmeric oleoresin was successfully solubilised in aqueous solution by forming inclusion complex with methyl-β-cyclodextrin (Mβ-CD). Phase solubility studies used curcumin as a marker compounds to represent turmeric oleoresin. In the presence of Mβ-CD, the curcumin was enhanced. Result from characterisation of inclusion complexes with Fourier transform infrared (FTIR) spectrometry indicates that all the mixing methods were found to be suitable for encapsulation. However, scanning electron microscopy (SEM) shows a drastic change in particle sizes, indicating a formation of a new solid phase in kneading method, implying it as the best mixing method.