

Preparation and Characterization of Cinnamon Oil Nanoemulsions

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Abstract—*The purpose of this study is to formulate and characterize stable nanoemulsions which were prepared by using cinnamon essential oil. Essential oils have always been used as natural and efficient antimicrobials to check food borne pathogens and increase food safety. Incorporation of essential oils directly in food system to achieve high functional solubility is difficult due to their poor water solubility. This results in development of different emulsion oil delivery system. In this study, high energy approach ultrasonication was used to formulate oil in water nanoemulsions using two different surfactants; Tween 80 (Synthetic Surfactant) and Soy lecithin (Natural Surfactant). Tween 80 was incorporated at four different concentrations (33%, 50%, 60% and 66.67% v/v) whereas soy lecithin nanoemulsions were formulated by using three different concentration of surfactant (1%, 1.5% and 2% v/v). Prepared nanoemulsions were characterized for different parameters like morphology, zeta potential, poly dispersity index (PDI), droplet size, pH, optical transparency and stability. It was concluded that with increase in concentration of surfactant more stabilized nanoemulsions were formed. The minimum droplet diameter of tween 80 nanoemulsions was obtained at the concentration of 66.67% v/v with mean particle size of 22.68 nm. PDI and zeta potential values were 0.352 and -7.68mV respectively. For soy lecithin stabilized nanoemulsions the minimum droplet diameter was obtained at 1.5% v/v concentration with mean particle size of 75.61 nm and PDI and zeta potential values of 0.282 and -46.4 mV respectively. The study also revealed that tween 80 nanoemulsions remained stable for 2 months without any phase separation whereas soy lecithin nanoemulsions were found stable for 1 month. The prepared cinnamon oil nanoemulsions have important implication to be used as a natural delivery system to increase shelf life of the food products.*