

Preparation and evaluation of curcumin pickering emulsions stabilised by cellulose nanocrystals

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ABSTRACT

Introduction: Curcumin, turmeric's primary yellow bio-component, is a popular spice that is extracted from *curcuma longa*. It has numerous pharmacological effects. However, there are a few limitations of curcumin like poor solubility and stability. Various approaches have been undertaken to enhance the solubility and stability of the curcumin. One of the approaches is preparing a Pickering emulsion wherein the emulsion contains a solid particulate emulsifier that can help to stabilise the emulsion. In this study, cellulose nanocrystals (CNCs) as solid particles were used to stabilise the emulsions. The objective of this study is to enhance the solubility and stability of curcumin Pickering emulsions by using CNCs. **Materials and methods:** The emulsions were prepared by homogenising the aqueous phase (CNCs and distilled water) and the oil phase (medium chain triglyceride oil and curcumin) using a high-speed homogenizer. Different formulations were prepared with different amounts (varied from 5% - 15%) and the concentration of CNCs (0.5% and 1%). The prepared emulsions were tested for phase separation, pH, viscosity, and solubility studies. Later, the emulsions were also subjected to stability studies by subjecting them to freeze-thaw cycles. **Results and conclusion:** All the prepared emulsions showed phase separation but, were able to redisperse easily upon moderate shaking. The results revealed that at pH 2.0, the emulsions were more stable at a concentration of 0.5% CNC. Results of the solubility studies revealed a marked increase in solubility of curcumin in Pickering emulsions. No significant changes in pH and viscosity were observed post freeze-thaw cycles. Hence, it is concluded that CNC is a good stabilizer for the preparation of Pickering emulsions as well as for enhancing curcumin solubility.