**Effect of Tween 20 in monoglyceride-based structured oleogels and emulsion gels**

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The aim of this study was to investigate the development of innovative structured-vegetable oil systems (oleogels and emulsion gels) to facilitate the substitution of trans-fat and/or animal fat with high nutritive value vegetable oils. The conversion of a liquid oil into an oleogel and the formation of structure are achieved through the addition of one or more substances, the so-called gelators/structurants. Monoglycerides are lipid-based structurants that induce gelation by self-assembling into bilayers, forming a stable crystal network after storage for 2-3 days1 at room temperature. In this study, the effect of a non-ionic surfactant (Tween 20) on the monoglyceride crystal formation and the impact on oleogel formation and oleogel-in-water emulsions was investigated. Moreover, the impact of ultrasonication process on the crystal transition of the monoglyceride-based oleogel systems was evaluated. The physicochemical properties of oleogels/emulsion gels containing different levels of Tween 20 was examined by using differential scanning calorimetry, FT-IR spectroscopy, confocal/optical microscopy, and rheology. With addition of Tween 20, the crystal size and the melting/crystallization temperature of the monoglyceride crystals were altered, along with a strengthening of the oleogel structure. The presence of Tween 20 accelerated formation of the β-crystalline polymorph of monoglyceride in the oleogels. Eventually, an oil-in-oil emulsion gel was formed with the monoglyceride β- crystals acting as Pickering particles around the oil/Tween 20 droplets of the oleogel. Concerning the emulsion gels, the presence of Tween 20 promoted the formation of oil-in-water emulsion gels, reduced the size of monoglycerides crystals, and prevented the droplet coalescence and phase separation. These findings provided valuable information on the synergistic effect of a non-ionic surfactant on monoglyceride-based oleogels/emulsion gels, which could be beneficial in constructing multi-component gels with low level of saturated fats for potential food or cosmetic applications.

*References:*

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