Non-aqueous foams formed by whipping diacylglycerol stabilized oleogel

ABSTRACT

Formation of foams is critical for tailoring the texture and mouthfeel of fat-based products. Diacylglycerol (DAG) is regarded as a preferable alternative structurant to hydrogenated lipid. Effect of DAG concentration (2–10 wt%) on the characteristics of oleogels and foams including crystal polymorphisms, size and distribution, rheological and thermodynamic properties was investigated. Oleogel prepared with 10 wt% DAG had comparable whipping and foaming stability to that of 6 wt% fully hydrogenated palm oil (FHPO). DAG formed small plate-crystals which tend to occur at the bubble surface, whereas FHPO showed needle-like crystals that were formed mainly in the continuous phase. For the 2 wt% FHPO-8 wt% DAG-based oil foams, interfacial templating crystallization effect contributed to the smaller bubble size and improved rheological properties whereby less oil drainage and foam breakdown occurred. Hence, the non-aqueous foam formed by DAG has broad application prospect because of the thermoresponsive properties and the desirable health benefits.

Keyword: Dialcylglycerol; Oleogel; Oil foam; Interfacial crystallization; Rheological properties