

Edible Applications Technology

Session: Manipulating Fat for Plant Based Product Development

Effect of High-intensity Ultrasound on the Oleogelation and Physical Properties of High Melting Point Monoglycerides and Triglycerides Oleogels

 Thursday, May 6, 2021  5:50 PM – 6:10 PM CDT

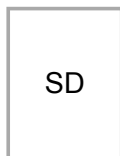
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Abstract: Oleogels and oleogelation routes have been extensively studied in the past decade; however the industry has not yet implemented this technique due to price, availability and clean label. The objective of this study was to evaluate the synergism of binary oleogels structured by monoglycerides (MG) and high melting point triacylglycerols (HF) with and without high-intensity ultrasound (HIU) according to their physical properties. MG:HF (0:6, 1:5, 2:4, 3:3, 4:2, 5:1 and 6:0) oleogels were produced by mixing at 70°C with a stirring of 350rpm for 5 min, followed by a cooling and storage at 20°C for 24h. A 20kHz HIU was applied for 10s, 30s or 10s using 3 pulses (10sON/10sOFF) during the cooling step via macro tip (12.7mm) and 50% amplitude (56W) in the presence of few crystals. Samples were evaluated according to their hardness, oil binding capacity (OBC), microstructure, melting behavior, viscoelasticity and flow behavior. The best physical properties were found in the MG6:HF0 oleogel, with a hardness of 1.2N, elasticity of 5.5kPa, viscosity of 99Pa.s and 99%OBC. These properties were reduced with the decrease of MG in the blend. The

sonication did not improve the MG6:HF0, instead it affected its properties negatively. However, sonication showed a positive effect on the blends of MG and HF. The hardness was improved at least 3-fold and OBC around 20%, these effects were already observed using only 10s sonication. Sonocrystallization induced secondary nucleation and changed the crystalline material only in blends containing HF indicating the better effect of the sonocrystallization on oleogels in the presence of high-melting points triacylglycerols.

Description: Oleogels are a valuable alternative in food industry to replace *trans* and reduce saturated fatty acids content in many food products. The combination of a binary structuration and use of high-intensity ultrasound that is a physical green technology will give the food industry information on how to improve the physical properties of oleogels without increasing the amount of oleogelators, giving a future alternative to clean label and sensory claims of oleogels applications.