

Control of crystallization and stability of oleogel and oleogel emulsion by emulsifier

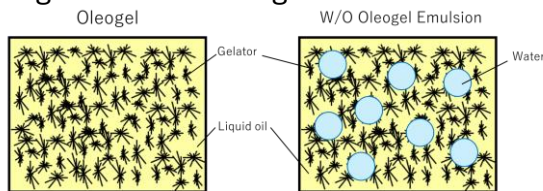
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1. Introduction

(1) Oleogel and W/O oleogel emulsion



Consist of small amounts of solid components (=gelator) forming a three-dimensional network structure.

Water phase is added to the oil phase, oleogel, and emulsified by stirring.

(2) Palm oil (Gelator)

TAG: 1,3-dipalmitoyl-2-oleoyl-sm-glycerol (POP) 23.7%,
Melting point: 35-40°C

→ Becoming semi-solid at room temperature

(3) Problem

Crystal formation in oleogels

→ The distortion of crystals occurs due to crystal lattice defects, which deteriorates the crystallinity

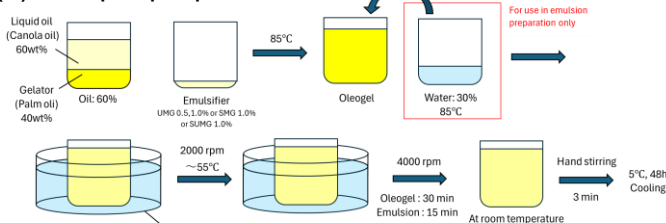
(4) Purpose

To investigate the difference in **crystallinity** and **storage stability** of oleogel and oleogel emulsion produced by using different emulsifiers

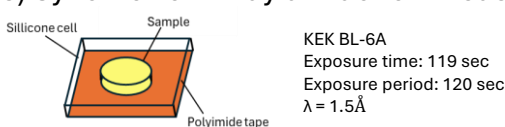
2. Materials and Methods

(1) Emulsifier UMG: Unsaturated monoglyceride (C18:0: 86.5%) 0.5, 1.0%
SMG: Saturated monoglyceride (C18:1: 82.2%) 0.5%
SUMG: UMG 0.5% + SMG 0.5%

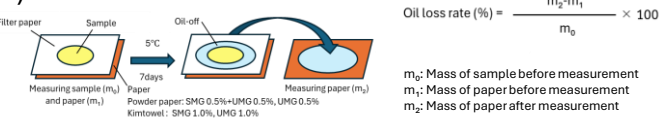
(2) Sample preparation



(3) Synchrotron X-ray diffraction measurement

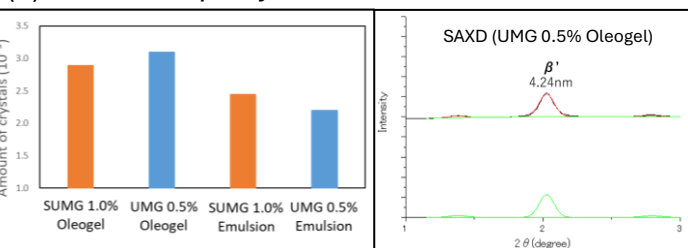


(4) Oil-off test



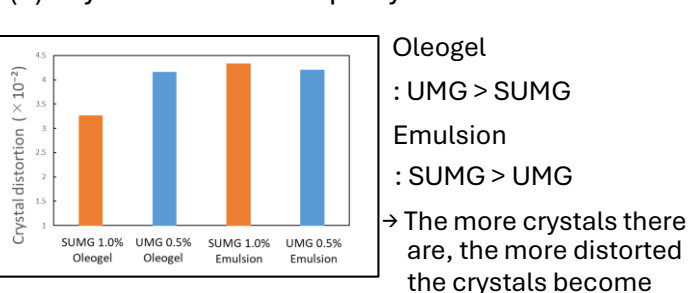
3. Result and Discussion

(1) Amount of β' crystals

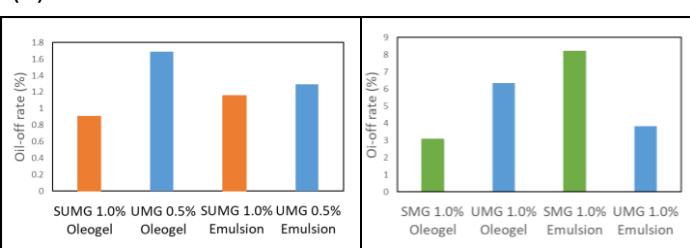


Oleogel: UMG > SUMG, Emulsion: SUMG > UMG

(2) Crystal distortion of β' crystals



(3) Oil-off



Oleogel and Emulsion : UMG > SUMG
→ Adding SMG improves storage stability

Oleogel: UMG > SMG
Emulsion: SMG > UMG
→ Emulsifying properties of emulsifiers affects storage stability

Saturated monoglycerides

: Fatty acids are straight chain
→ Oleogel: Easy to use as a template for crystals
Emulsion: Difficult to emulsify

Unsaturated monoglycerides

: Fatty acids are not straight chain
→ Oleogel: Difficult to use as a template for crystals
Emulsion: Easy to emulsify

4. Conclusion

• Effect of SMG+UMG at oleogel
→ SMG: Easy to use as a template for crystals
→ High stability

• Effect of SMG+UMG at emulsion
→ UMG: Easy to emulsification
→ High stability