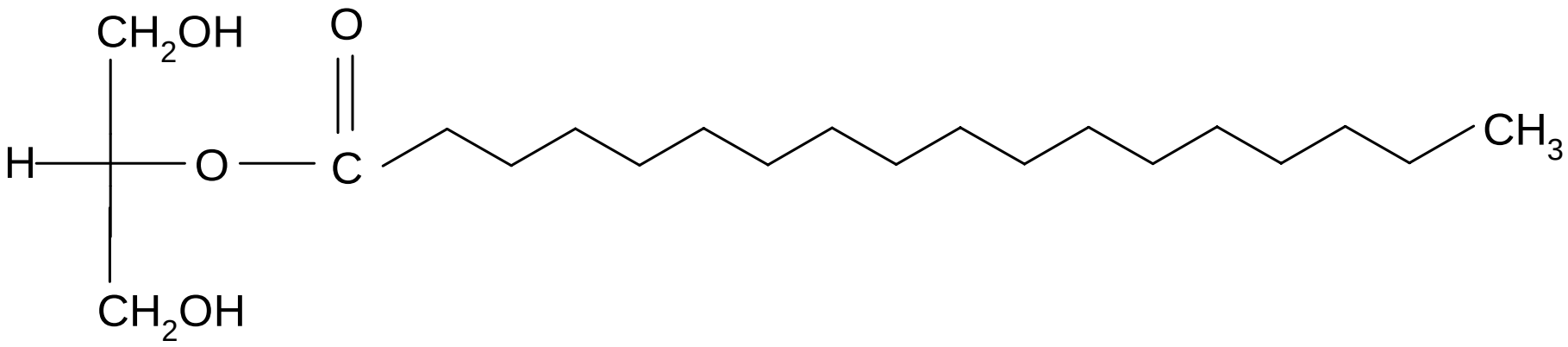
Structured emulsions:

Monoglyceride Gels

Monoglyceride

Monostearin (GMS)

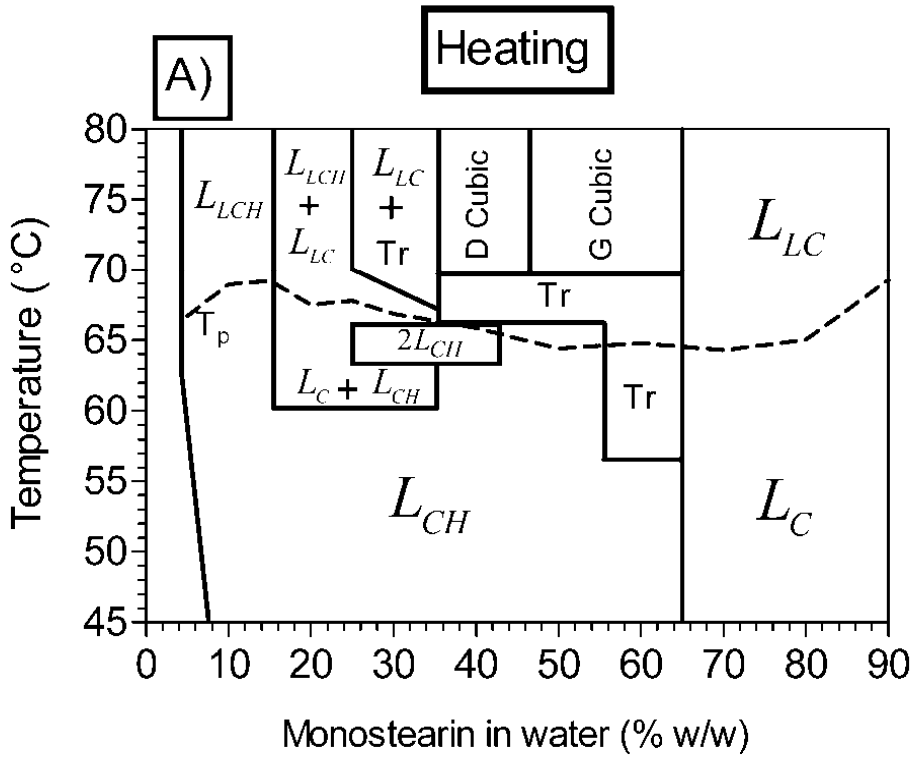


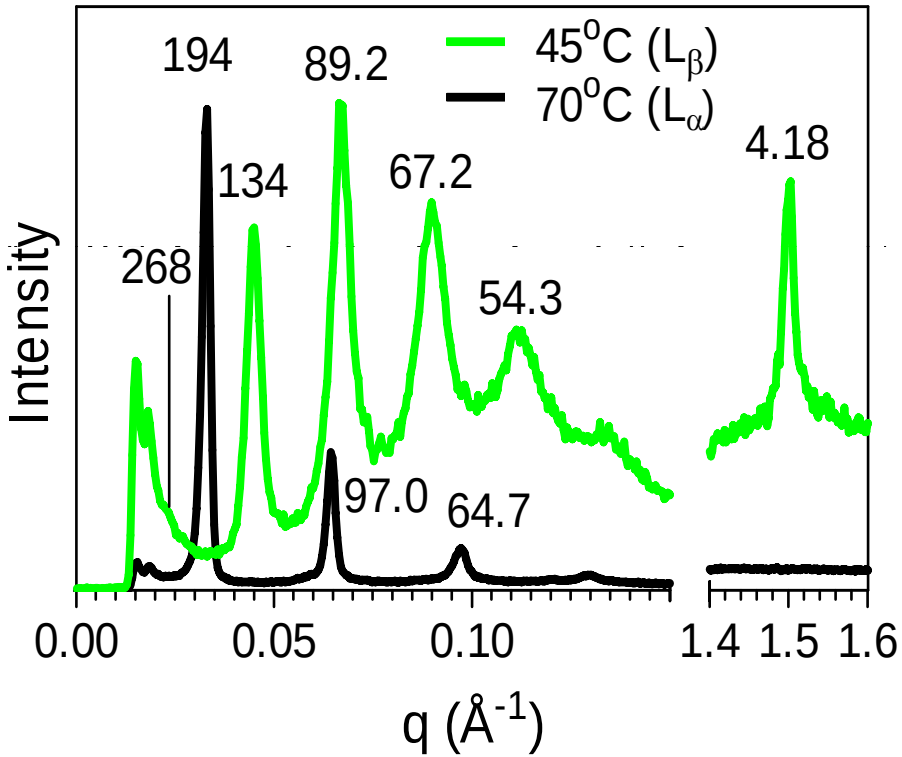
+ ionic co-surfactant

Amphiphillic Molecule

Forms lyotropic liquid crystals in water

MAG + stearic acid in alkaline water



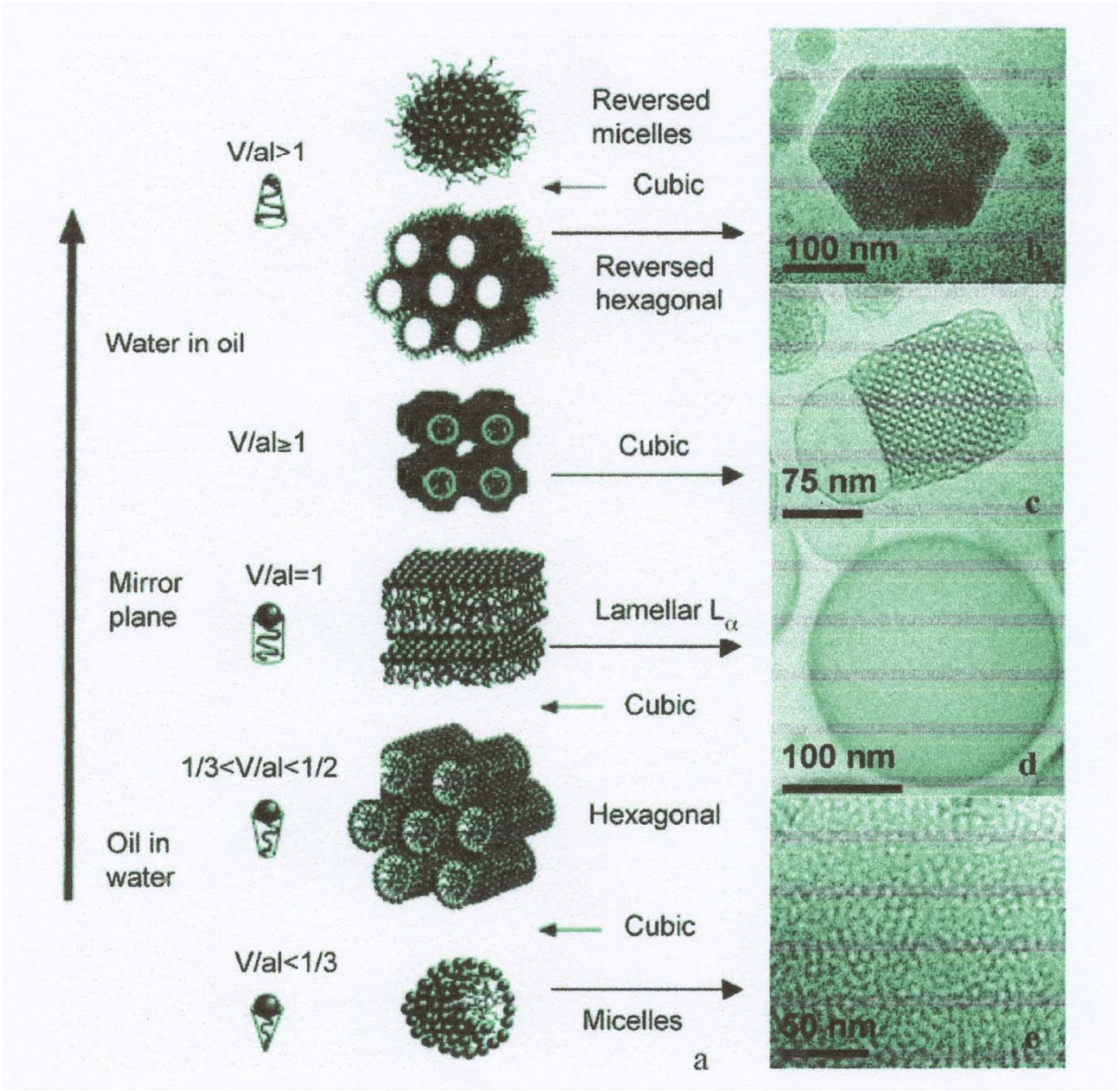


Critical Packing Parameter

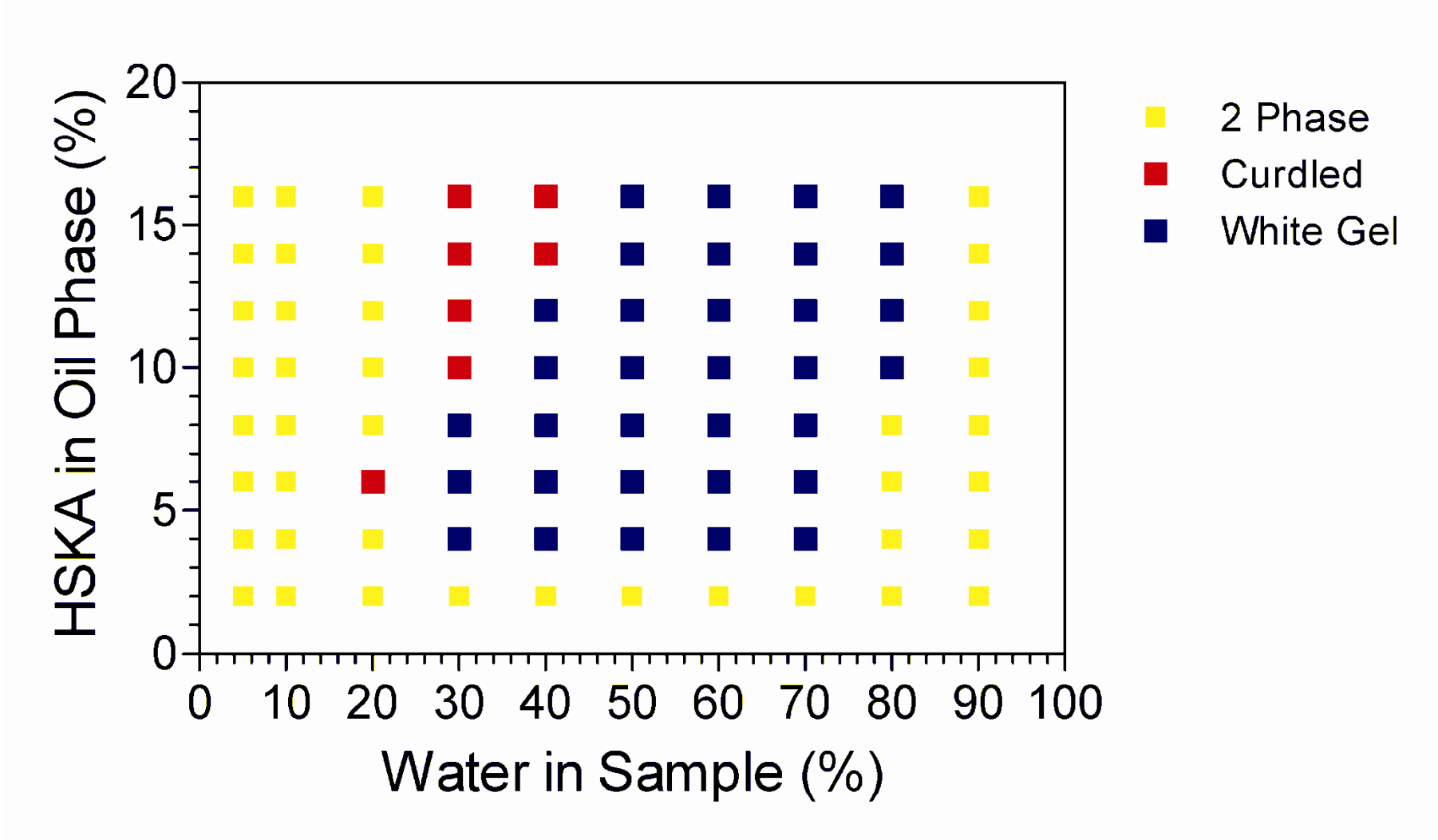
(Israelachvili, Mitchell, Ninham, 1976)

$$S = \frac{V}{a \cdot l}$$

V= molecular volume
a= hydrated cross sectional area of polar head group
l= molecular length



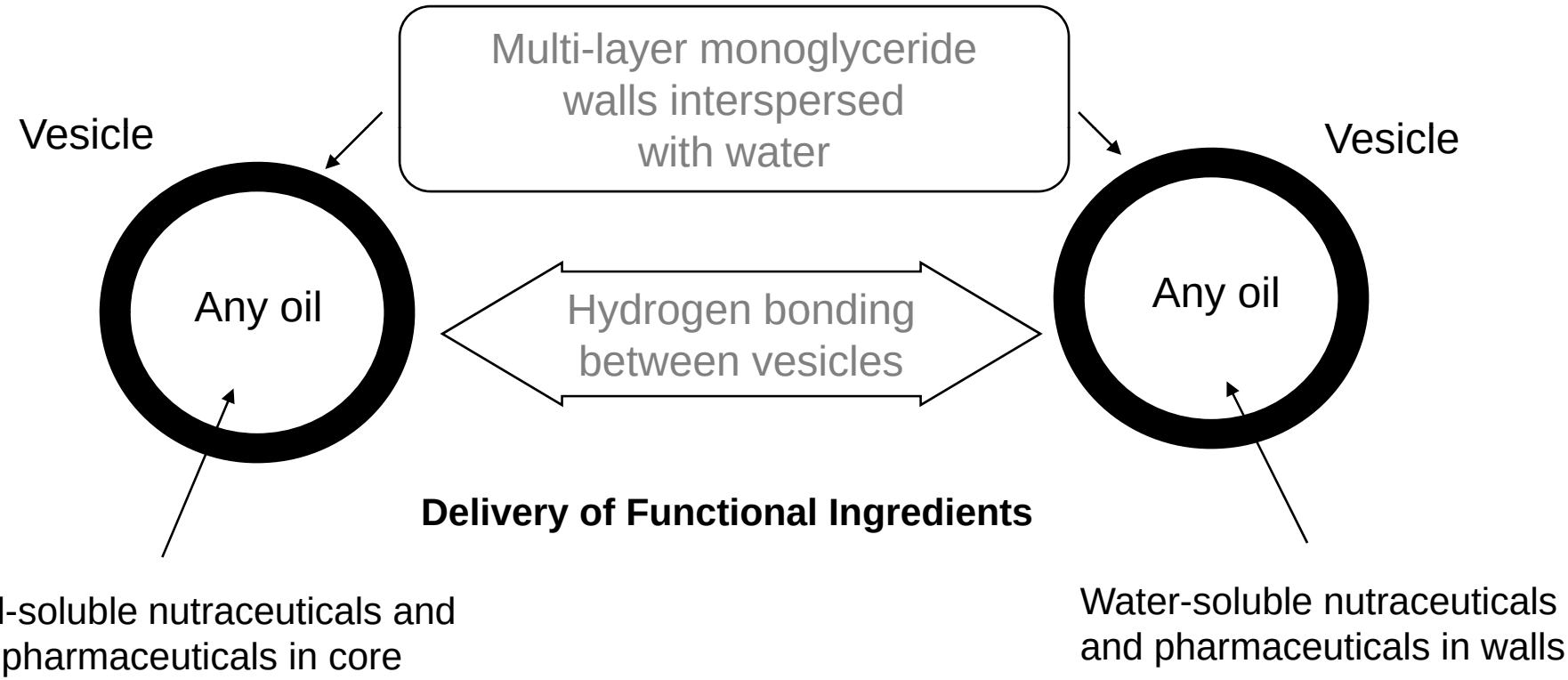
Sagalowicz, Leser, Watzke and Michel, TIFS 17: 204-214 (2006)

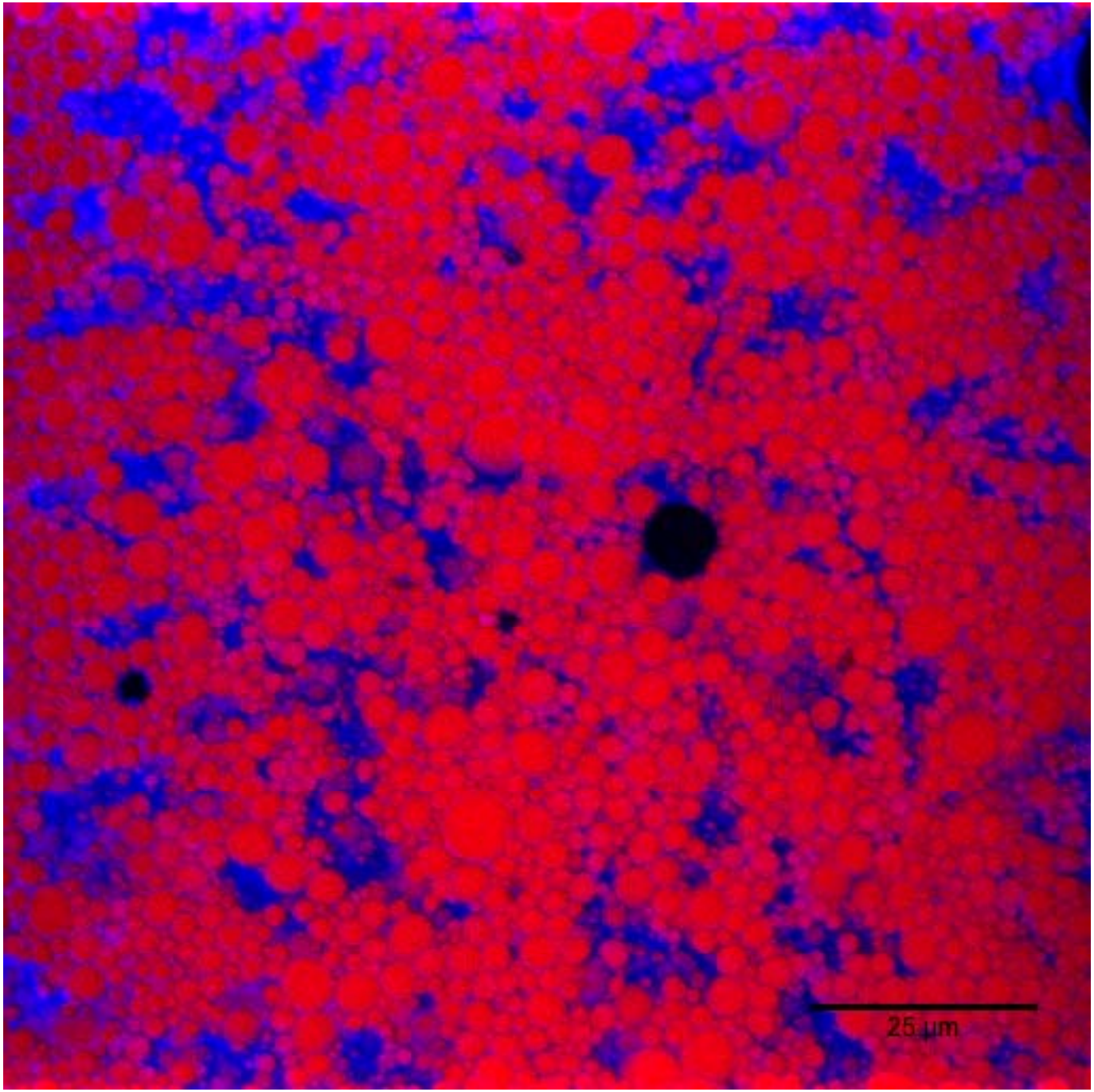

HSKA in Oil Phase (%)
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90
100
Water in Sample (%)
2 Phase
Curdled
White Gel

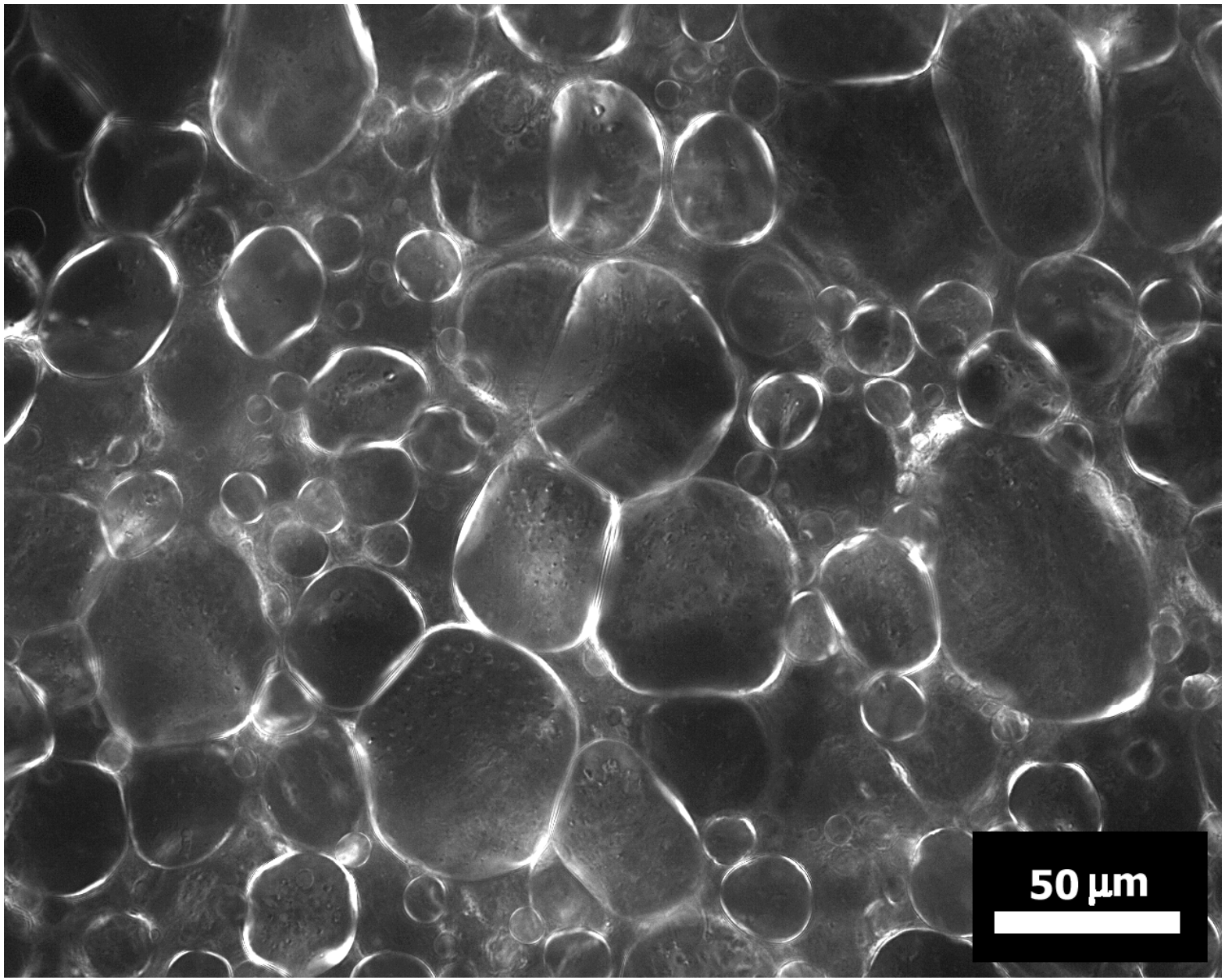
COASUN

Patented technology - *U.S. Patent 7357597*

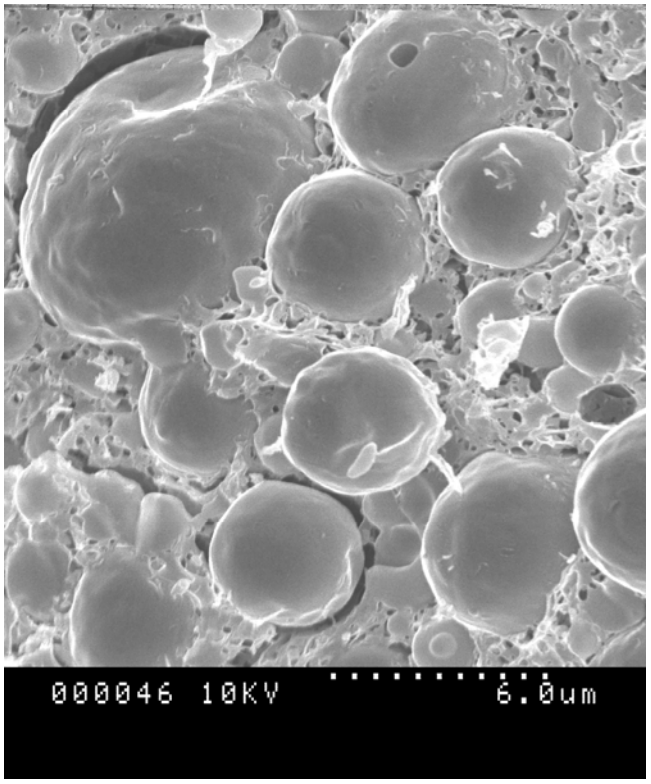
Patent Priority date: May 7, 2004

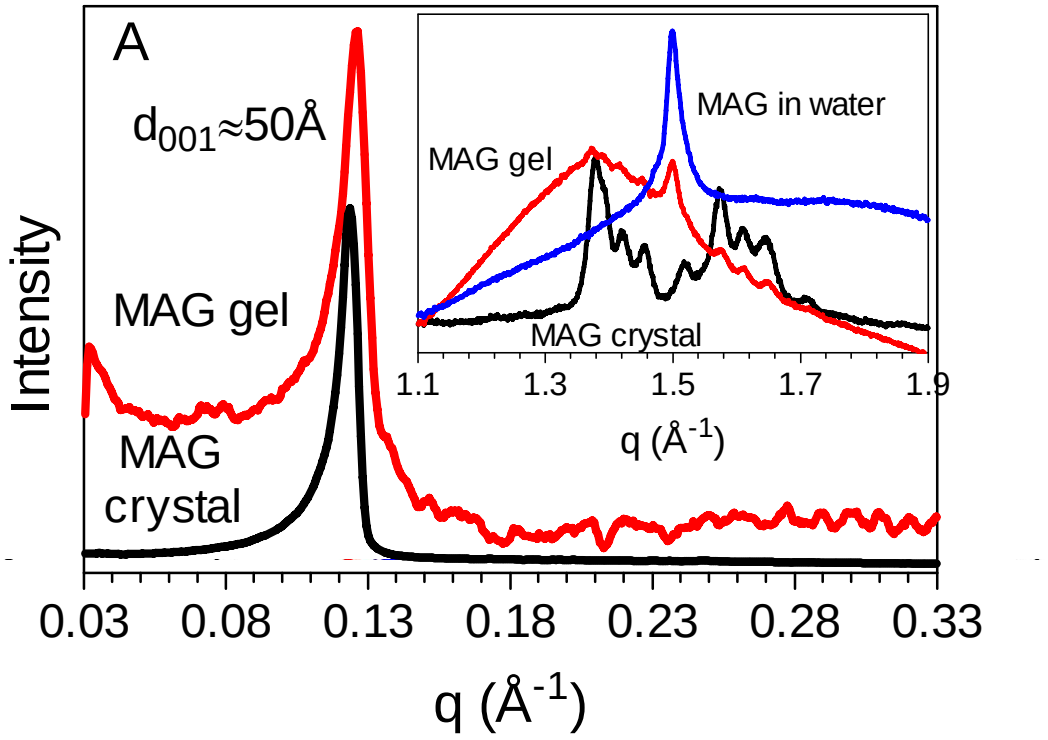


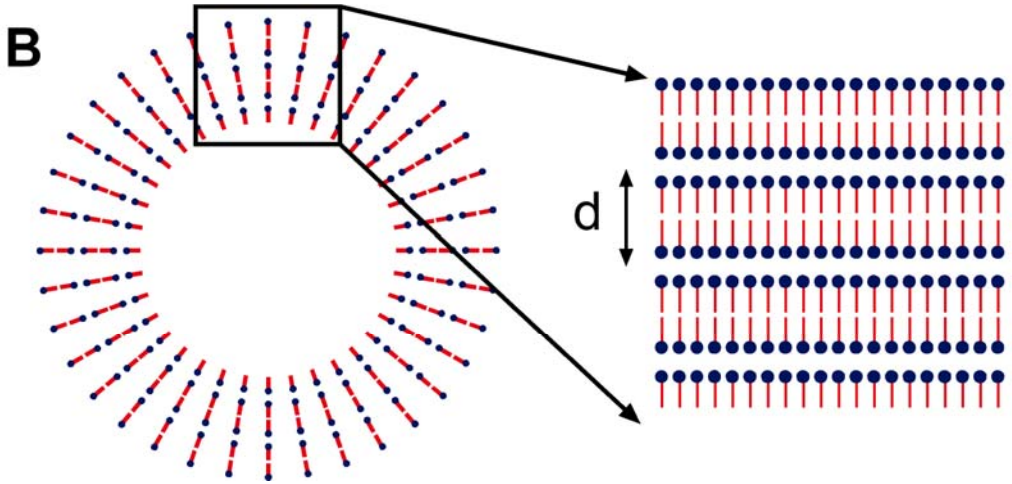

25 µm


50 µm

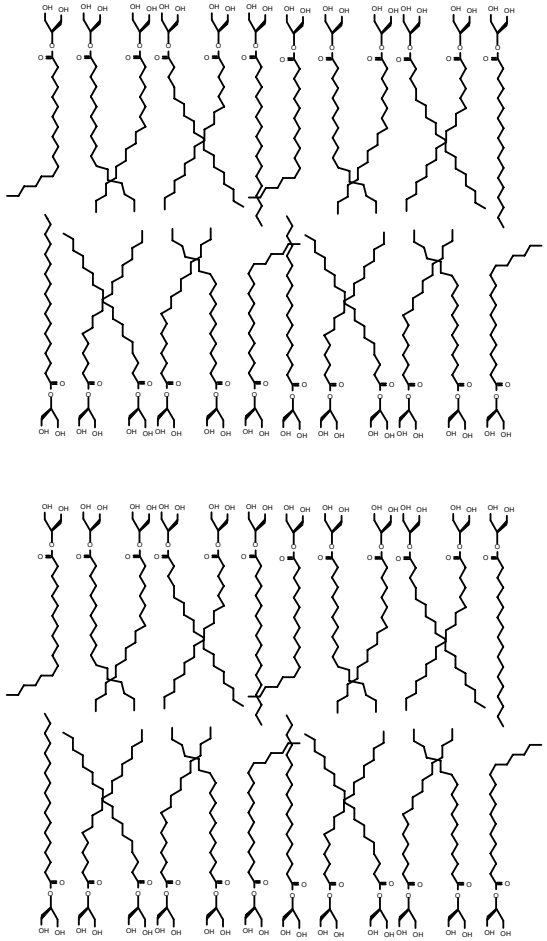
Monglyceride multilayers surrounding oil droplets



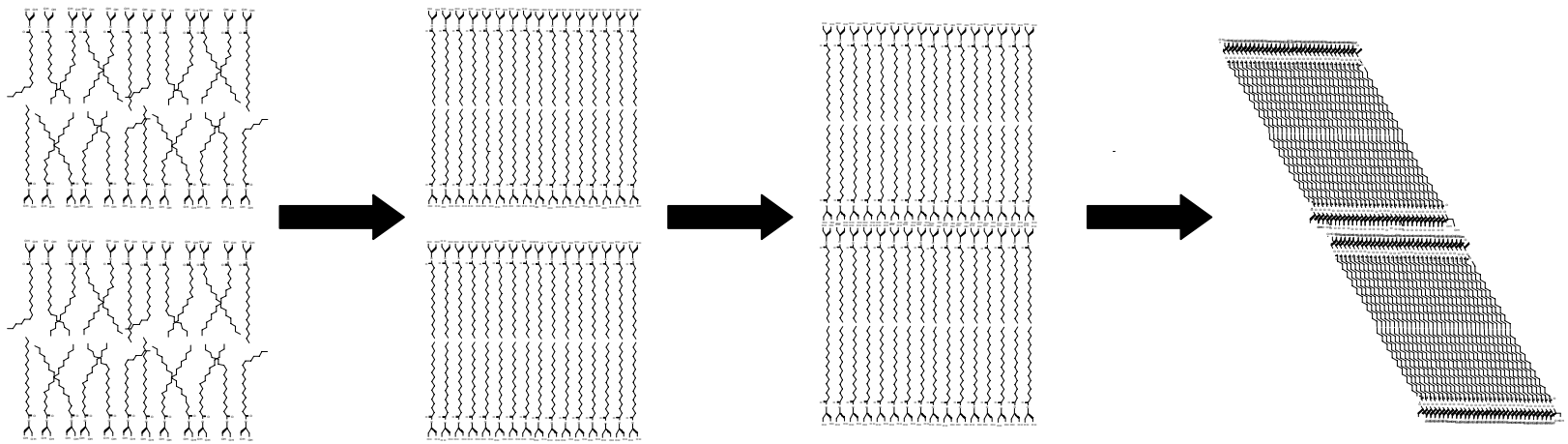




Presence of liquid crystalline phases of monoglycerides are necessary for structure formation

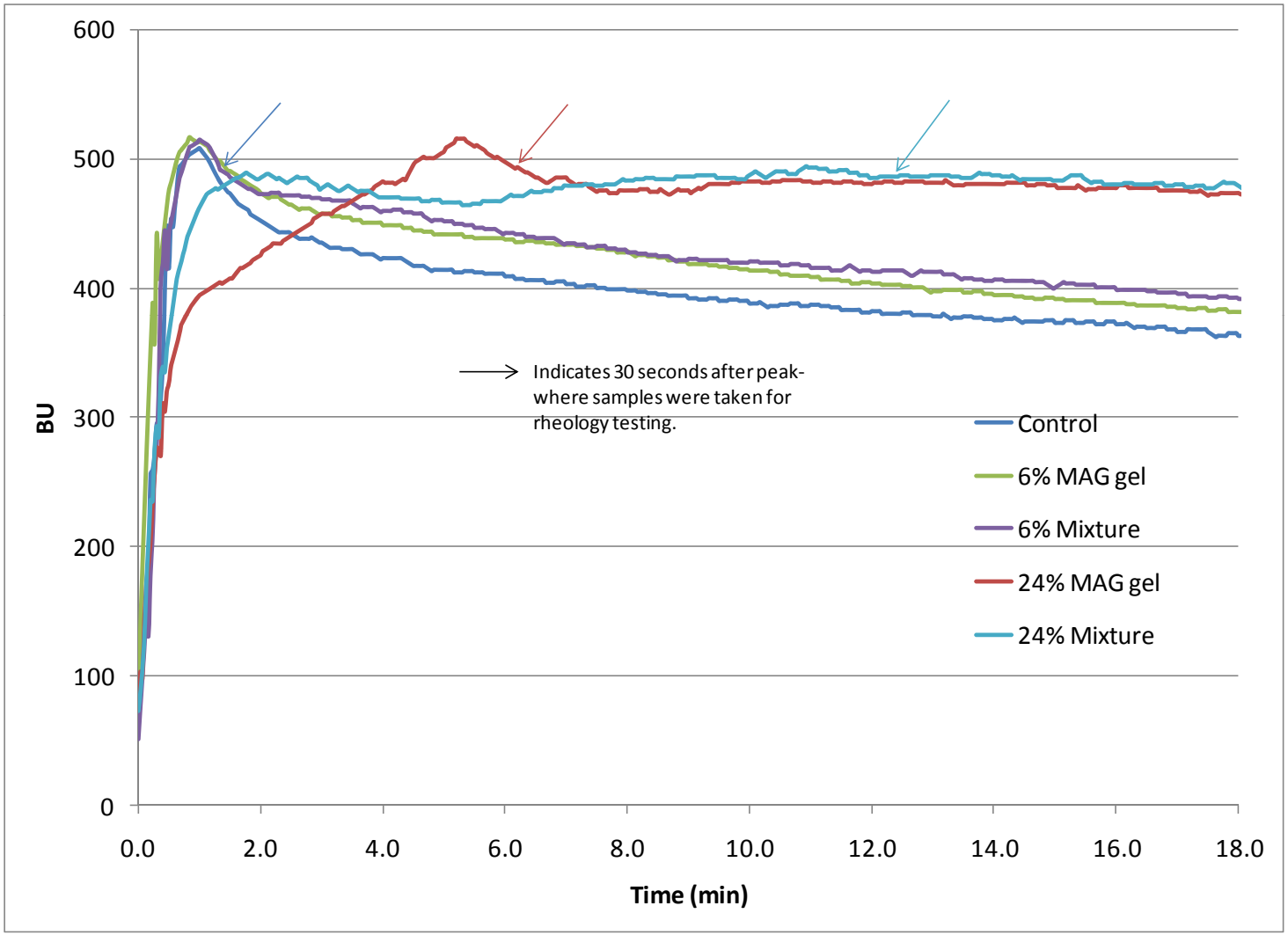


L_α

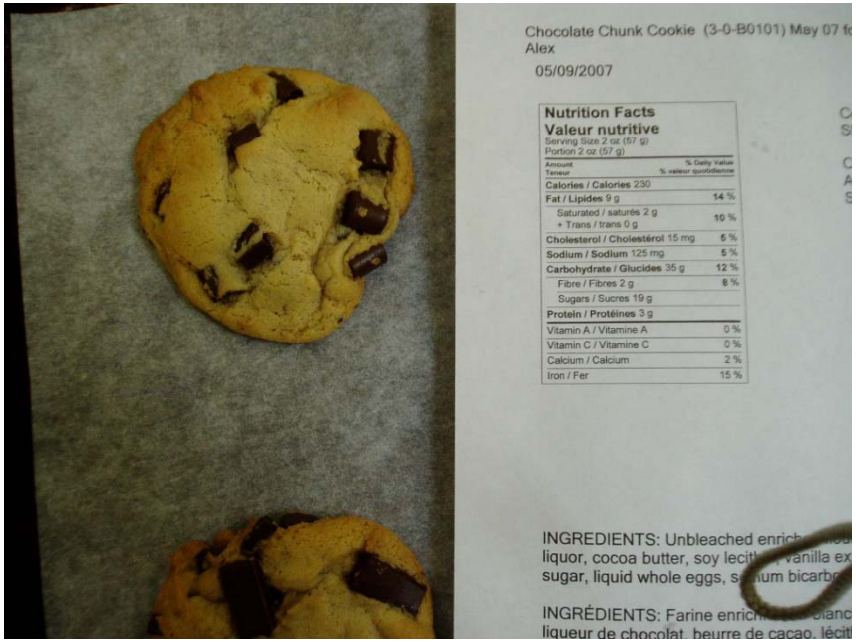

L_α
L_β (α-gel)
β-gel
(coagel)

So, does it work as a shortening?

Farinogram Curves – Delayed development in SWF



Control
CoaGel


Chocolate Chunk Cookie (3-0-B0101) May 07 fo
Alex
05/09/2007
Nutrition Facts
Valeur nutritive
Serving Size 2 oz (57 g)
Portion 2 oz (57 g)
Amount / Teneur
% Daily Value / % valeur quotidienne
Calories / Calories 230
Fat / Lipides 9 g 14 %
Saturated / saturés 2 g + Trans / trans 0 g 10 %
Cholesterol / Cholestérol 15 mg 5 %
Sodium / Sodium 125 mg 5 %
Carbohydrate / Glucides 35 g 12 %
Fibre / Fibres 2 g 8 %
Sugars / Sucres 19 g
Protein / Protéines 3 g
Vitamin A / Vitamine A 0 %
Vitamin C / Vitamine C 0 %
Calcium / Calcium 2 %
Iron / Fer 15 %
INGREDIENTS: Unbleached enrich
liquor, cocoa butter, soy lecit
sugar, liquid whole eggs,
INGRÉDIENTS: Farine enrich
liqueur de chocolat, beurre de cacao, léciti

Herb

Bread Test on Shortening

Sample
Fractec S1119
Prod: 18/1/07

Control

Date of Experiment: 24 Jan 2007

Testing of Shortening

Control

Sample
Fractec S1119
Prod: 18/1/07

Results: Testings were conducted on egg tart shell.
Taste of sample is comparable to control.

Date of Experiment: 24 Jan 2007

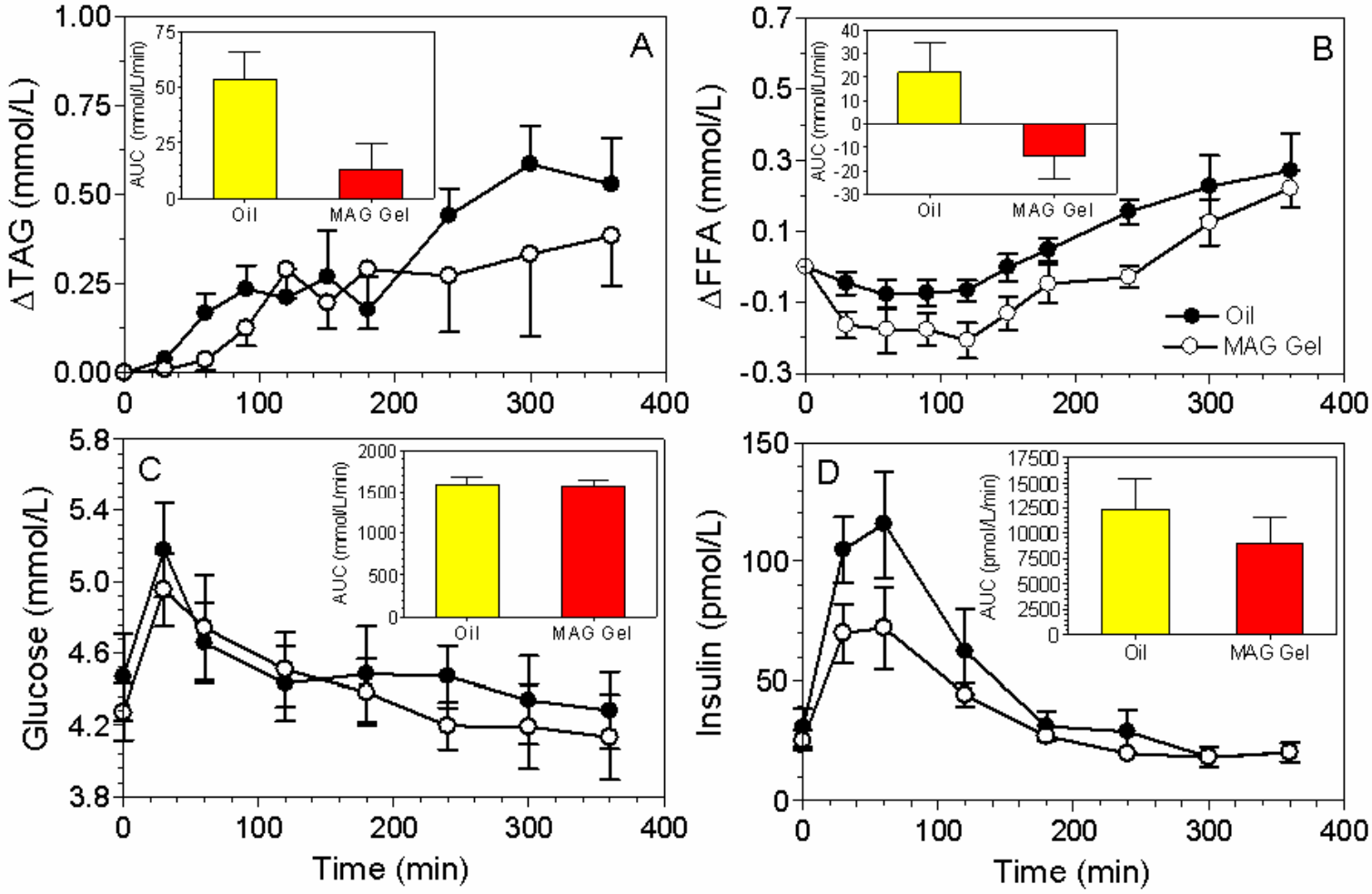
Chocolate Chip Cookie – 50% Reduction in Sat Fats

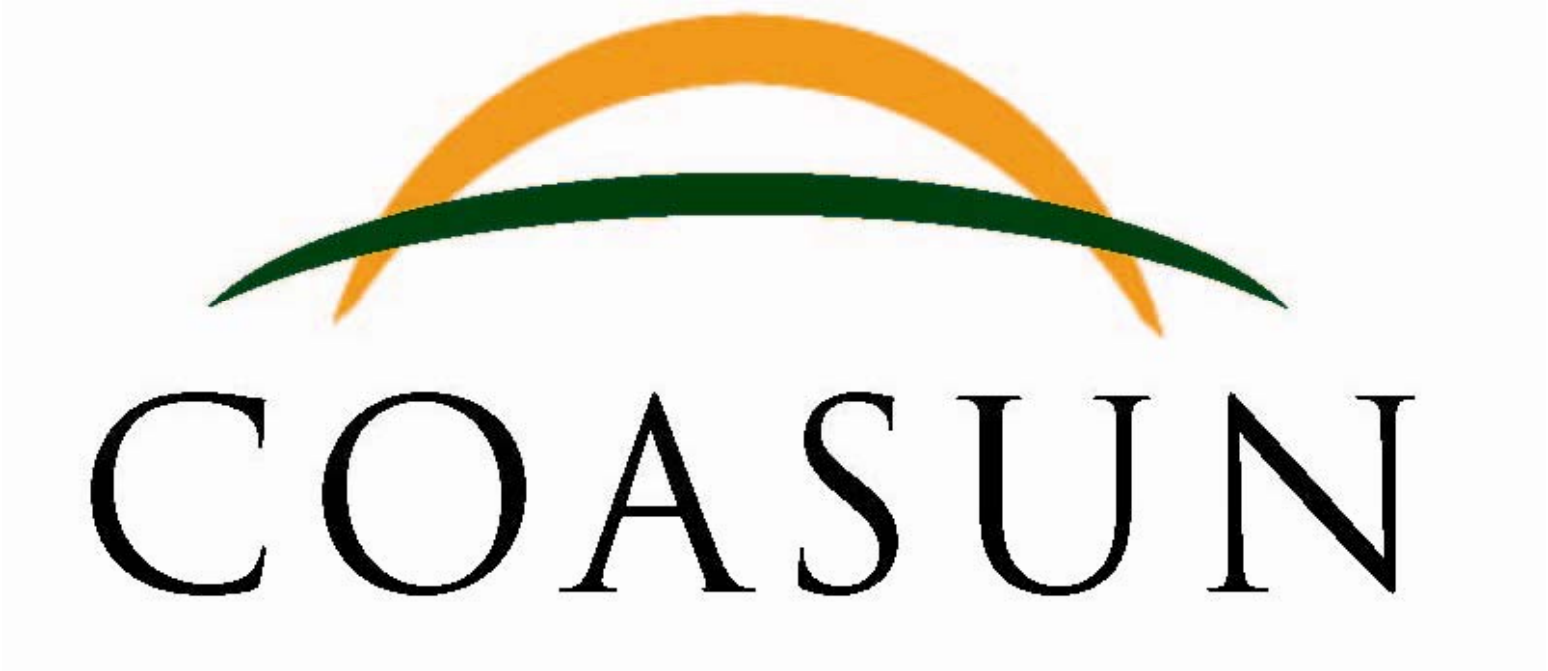
Nutrition Facts

Serving Size Servings Per Container	Chocolate Chip Cookie- Control (52 g)		Chocolate Chip Cookie- Coavel "Classic" (52 g)	
	Amount	% DV*	Amount	% DV*
Calories	250		220	
Fat	14 g	**22** %	10 g	**15** %
Saturated + Trans	4 g 0 g	**20** %	2 g 0 g	**10** %
Cholesterol	20 mg	**7** %	10 mg	**3** %
Sodium	170 mg	**7** %	180 mg	**8** %
Carbohydrate	30 g	**10** %	31 g	**10** %
Fibre	1 g	**4** %	1 g	**4** %
Sugars	20 g		21 g	
Protein	2 g		2 g	
Vitamin A		2 %		0 %
Vitamin C		0 %		0 %
Calcium		2 %		2 %
Iron		8 %		8 %

* DV = Daily Value

Structure influences physiological response!





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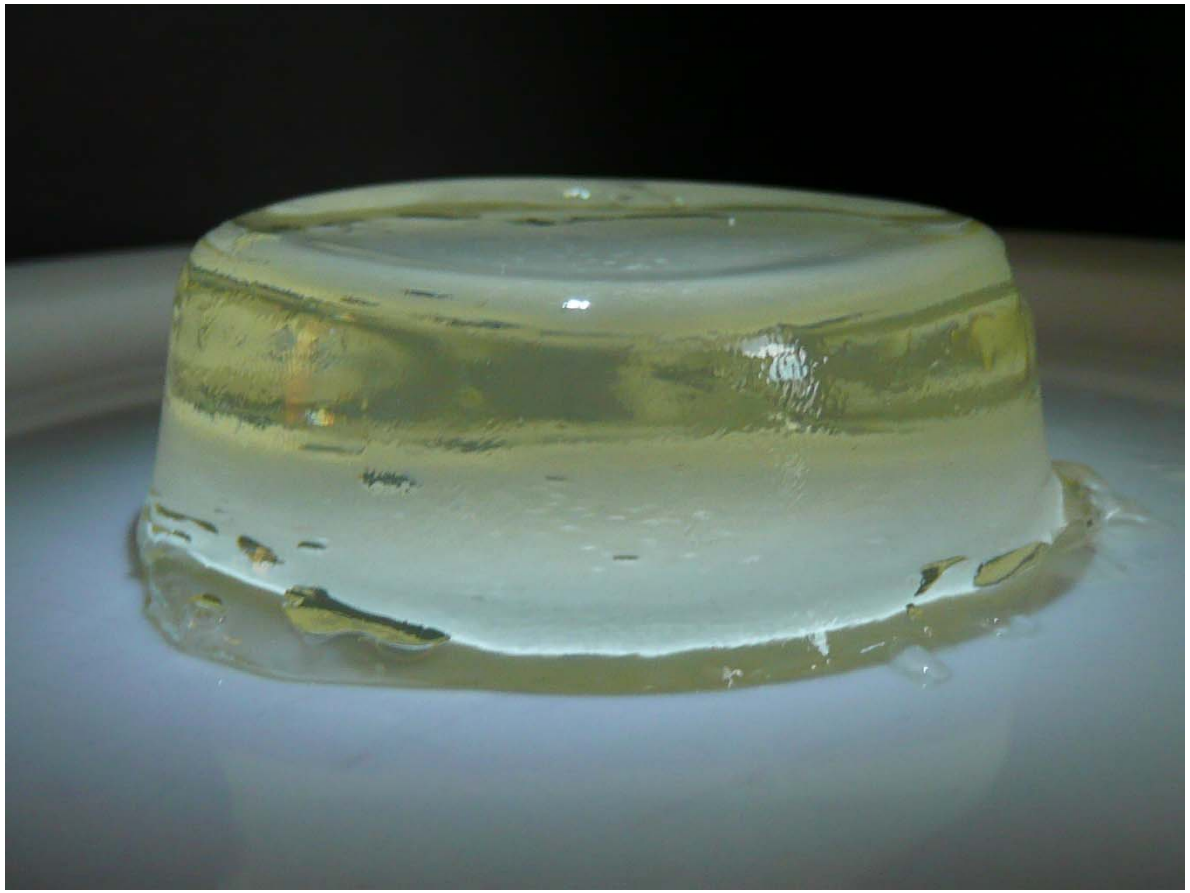
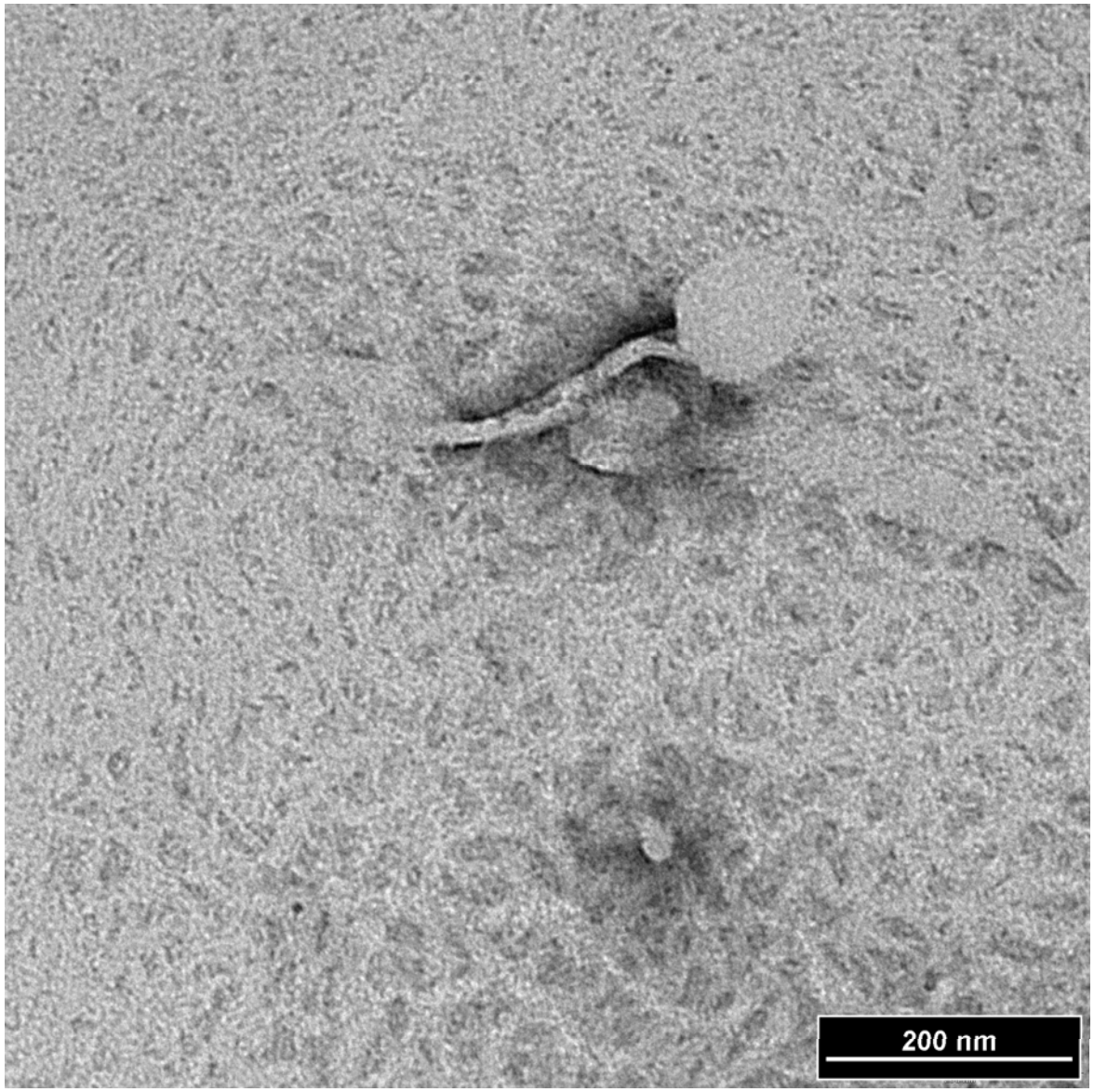
Polymer Organogels

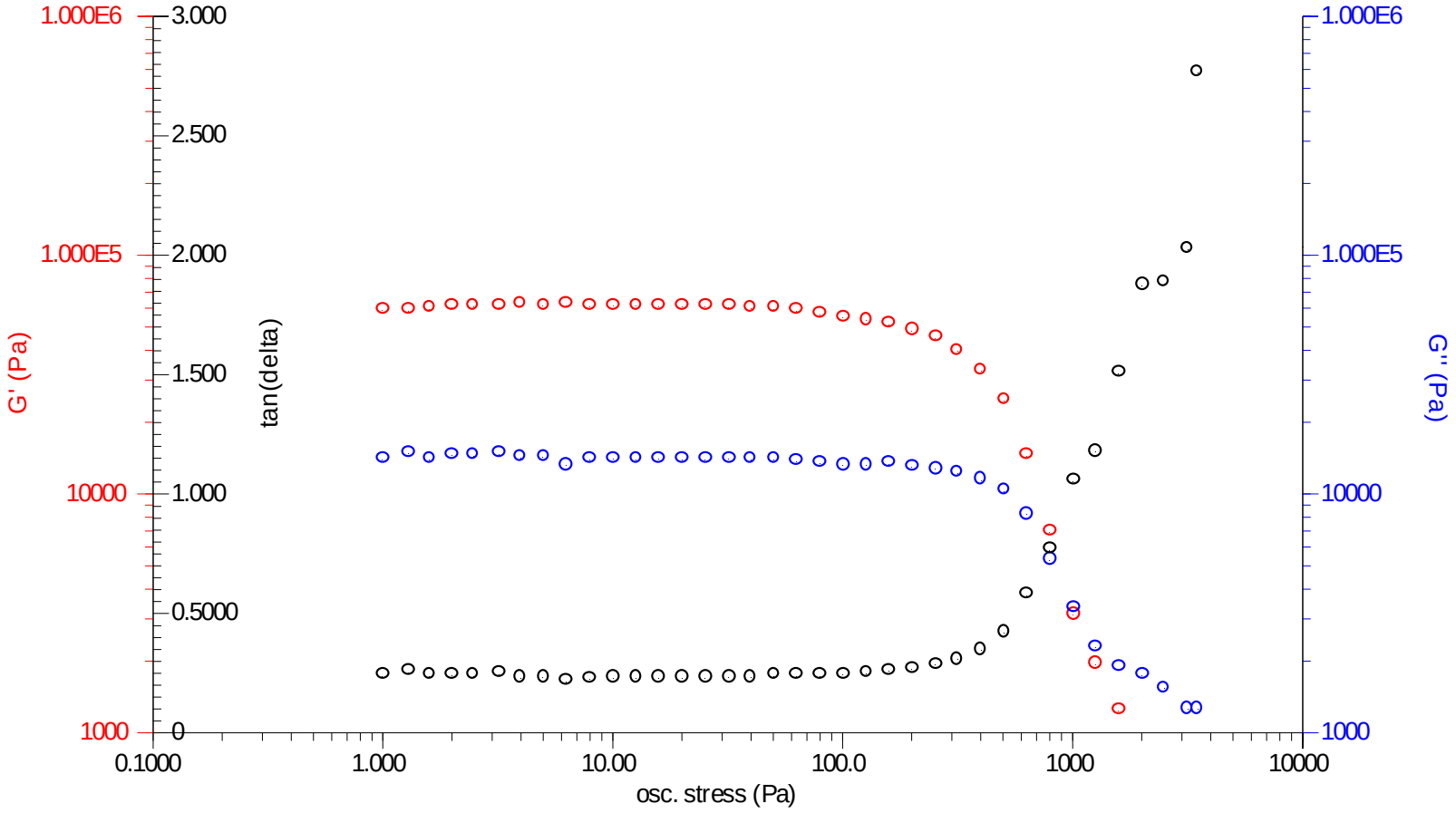


2-10% w/w useful range



Matthew Rietberg, Dr. Nuria Acevedo

Rheological properties characteristic of a polymer organogel



Dr. Tania Dey

Some interesting facts…..

- Strong solvent plasticizer effect (oils)
- Strong surfactant plasticizer effect
- Strong molecular weight effect on gelation process and gel strength
- Thermal and non-thermal processes used to incorporate polymer in food matrix
- Available food-grade polymers
- Stable for months at room temperature

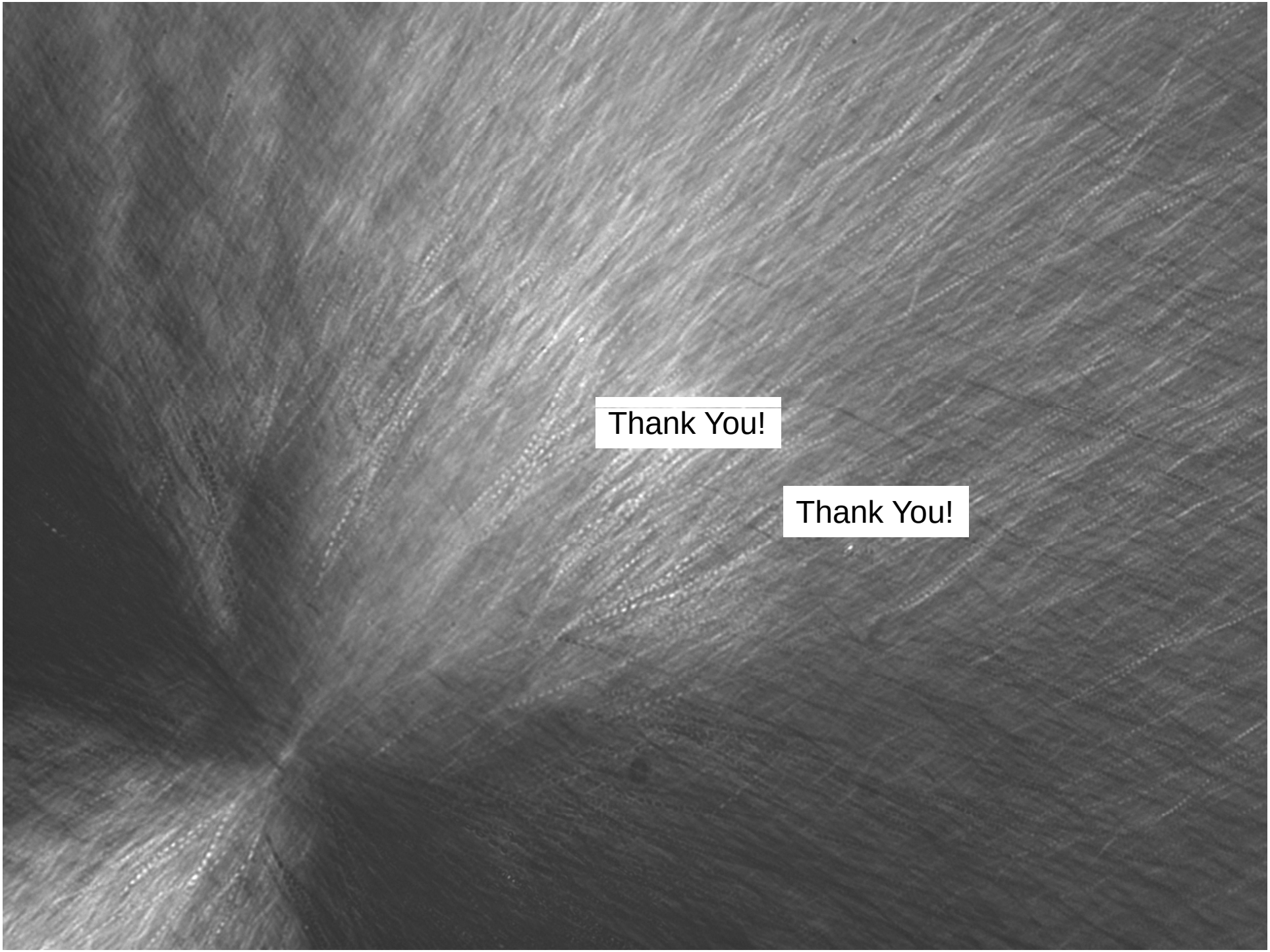
Acknowledgements

- Natural Sciences and Engineering Research Council
- Canada Research Chairs Program
- Ontario Ministry of Agriculture and Food
- Coasun Inc.

Ontario

COASUN

NSERC CRSNG


Thank You!
Thank You!