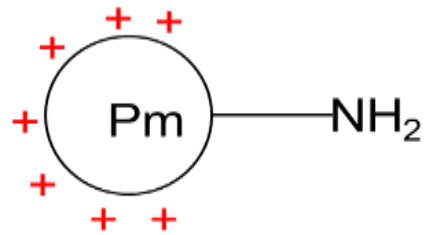
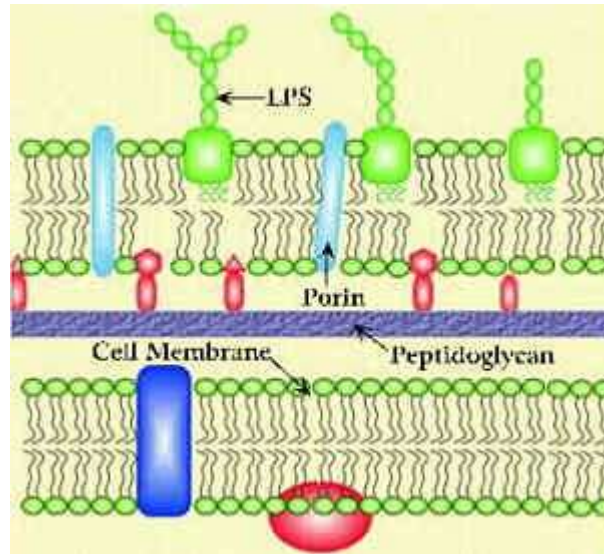


How Does Protamine kill Gram-Negative Bacteria?



Protamine



http://homepage.ntlworld.com/diamonddove/04a_Gram/Gram.htm

Please visit the English and Paulson Poster to find out how we plan to answer this question.

Spin-echo small-angle neutron scattering for the study of food systems

Wim G. Bouwman¹, Jeroen Plomp¹, Chris P. Duif¹, Franck P. Duval², Arjen Bot²

¹Delft University of Technology, Faculty of Applied Sciences, Mekelweg 15, NL-2629 JB Delft, the Netherlands;

²Unilever Research & Development Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen, The Netherlands

Structure of food is relevant for eating experience and life time product

Fresh cheese-type products (Homogenised (heated) acidified protein-stabilised o/w emulsions) have a complex microstructure, built from elements of quite different size and properties:



Fat droplets, stabilised by protein
Fat droplet aggregates
Protein aggregates

Fresh cheese-type emulsions, like **crystalline fat** - heated - acidified o/w emulsions behave quite differently from **liquid oil** - native - neutral systems. They show more complex behaviour, but are hard to study in terms of microstructure.

We study a model emulsion of 30% partly crystalline vegetable fat, 4% whey protein, (acid), 66% water.

Spin-echo small-angle neutron scattering (SESANS) technique

Split wavefunction neutron into two eigenstates by means of tilted magnetic field. Echo of the two states with a reversed field yields the real space correlation function.

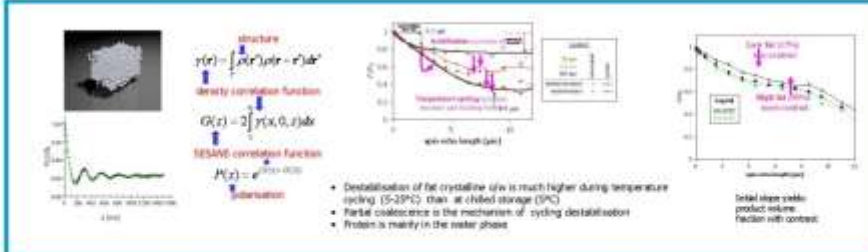
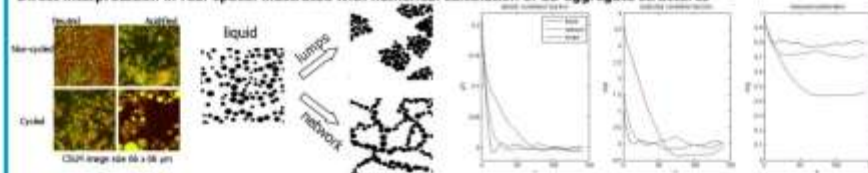
Probe bulk structure

Real space

Sensitive between 30 nm and 20 μm



Direct interpretation in real-space: illustrated with numerical calculation of 2D aggregate structures



Conclusions

SESANS as developed and built in Delft is a new technique to investigate food materials. It yields quantitative information on the bulk structure of complex emulsions. For example the scattering length density correlation function in real space.



Unilever

More information: <http://mr.tnw.tudelft.nl/npm2>

Effect of processing on droplet cluster structure in emulsion gels
A. Bot, F.P. Duval, and W.G. Bouwman
Food Hydrocolloids **21**, 844-854 (2007)

Analysis of spin-echo small-angle neutron scattering
R. Andersson, L.F. van Heijkamp, I.M. de Schepper, W.G. Bouwman
J. Appl. Cryst. **41**, 868-885 (2008)



Delft University of Technology

Faculty of Applied Sciences, the Netherlands

OYSTERS first instrument:

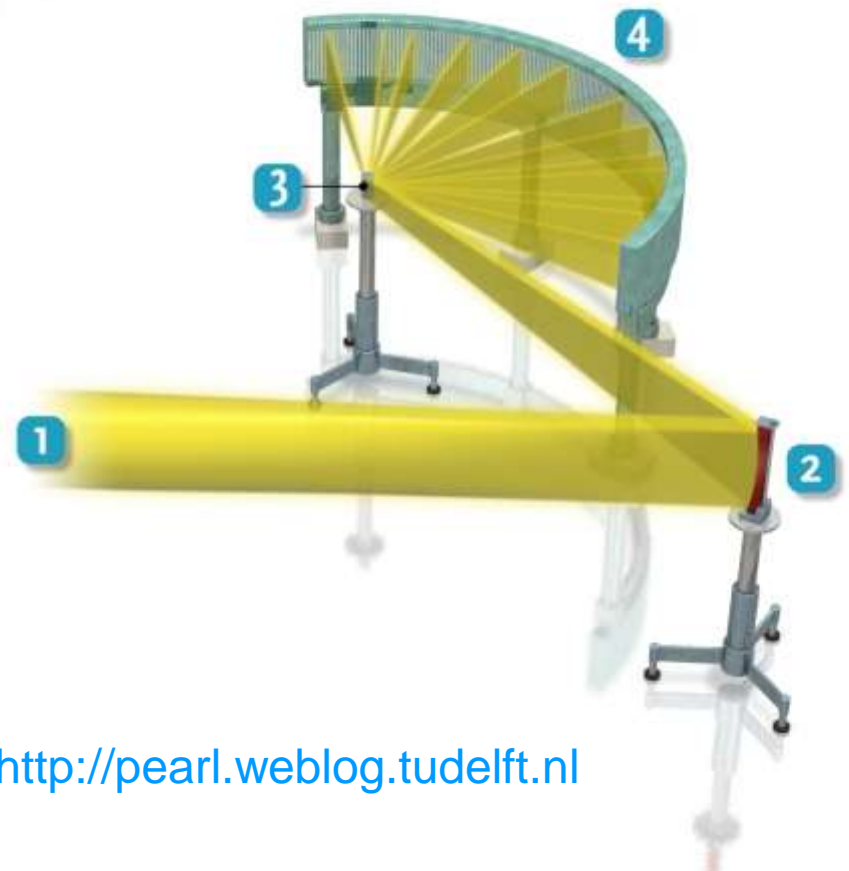


PEARL

neutron powder diffractometer

- new hydrogen storage materials
- better batteries
- smart cooling (with magnets)

but also:
tracking the
crystallisation of soft
matter



follow us: <http://pearl.weblog.tudelft.nl>



Could this be the future?



Origin of wheat dough viscoelastic properties



B. Schiedt^{1*}, A. Baumann², J. Mann¹, B. Conde-Petit², T. Vilgis¹

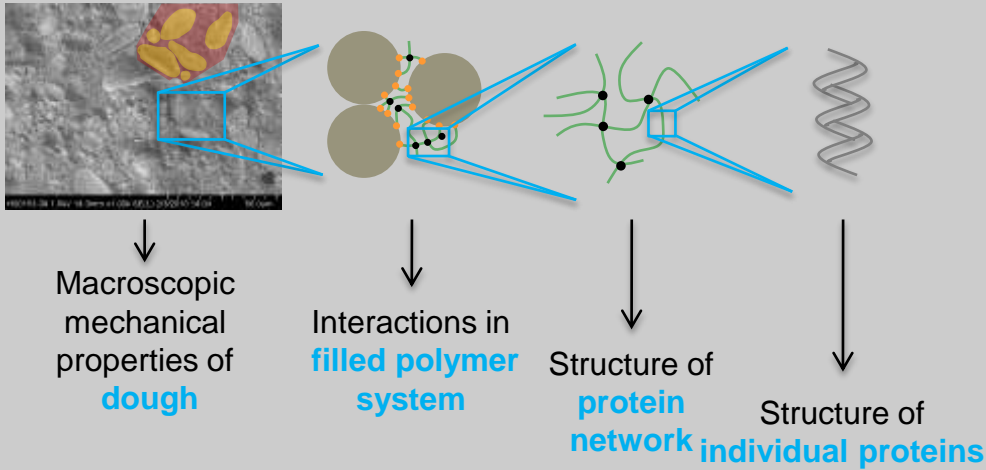
¹Max-Planck-Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany

²Bühler AG, Corporate Technology, 9240 Uzwil, Switzerland

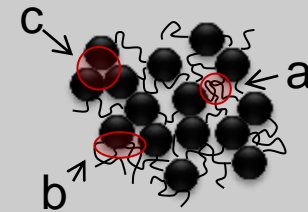
*e-mail: schiedt@mpip-mainz.mpg.de



Dough – a complex multiscale problem



Schematic view



Interactions

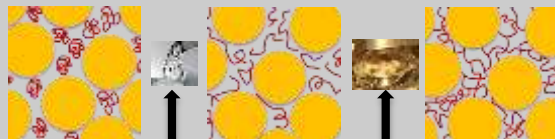
- a: Protein/ Protein (P)
- b: Starch/ Protein (SP)
- c: Starch/ Starch (S)

Composite system:
matrix – protein; filler – starch granules

Macroscopic mechanical properties

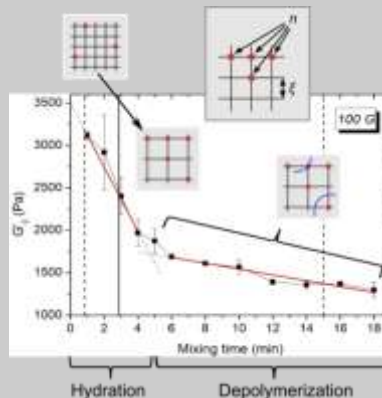
↓
Molecular structure

Dough formation



Hydration Network formation

Change of rheological properties



- Hydration state of protein
- Number and type of crosslinks
- Microstructure
- ...

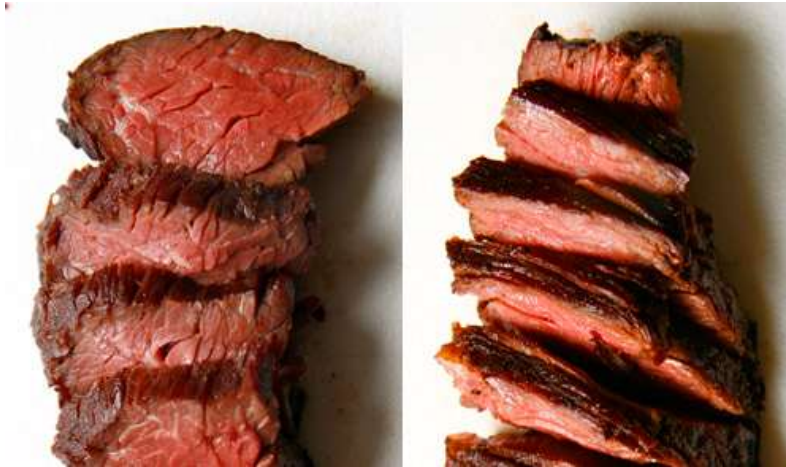


Polyelectrolyte/protein complexes

Fabrice Cousin

Intensified Protein Structuring for More Sustainable Food (IPS) - Development of a continuous process

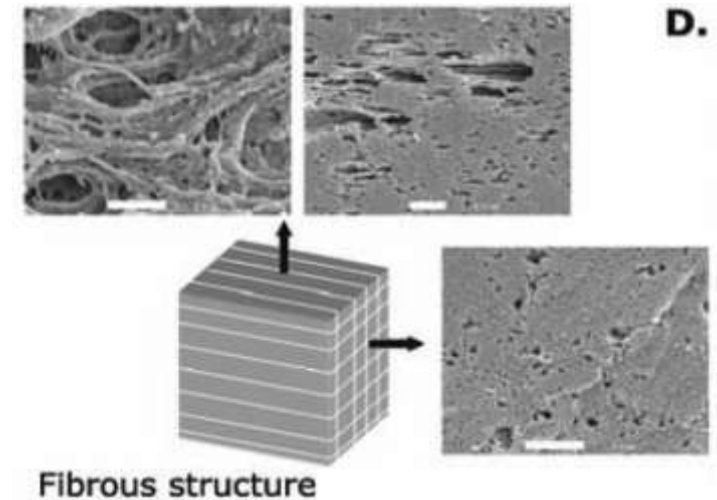
- Meat



- Meat Replacer??



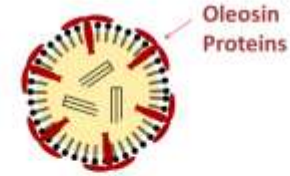
- High quality product
- High protein content (25-45%)
- Anisotropic – fibrous structure





P8.

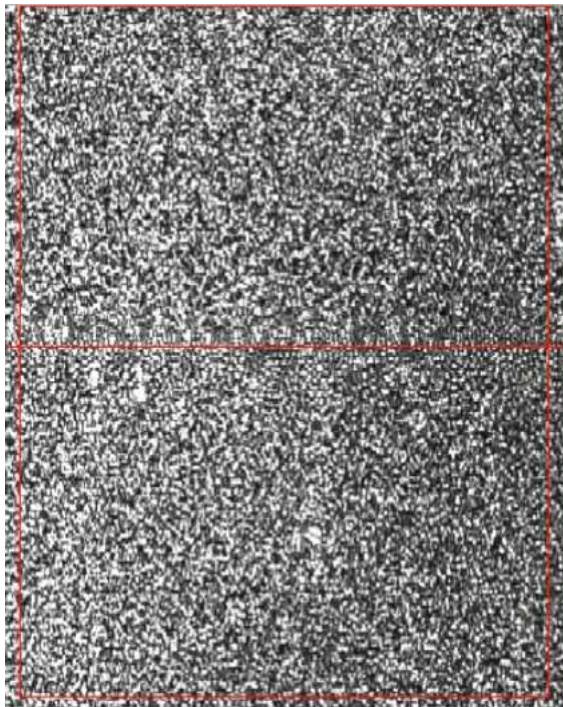
Soybean Oleosomes



Gustav Waschatko ^{1*}, A. Junghans ¹, S. Maurer ¹, B. Schiedt ¹, T. A. Vilgis ¹

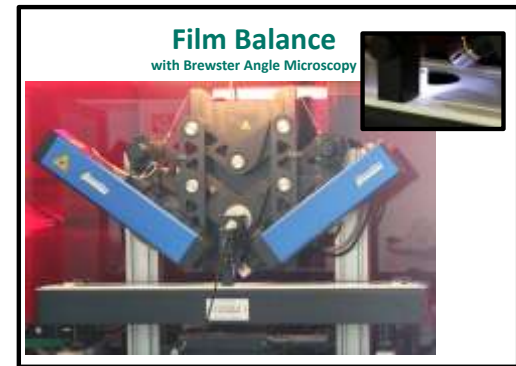
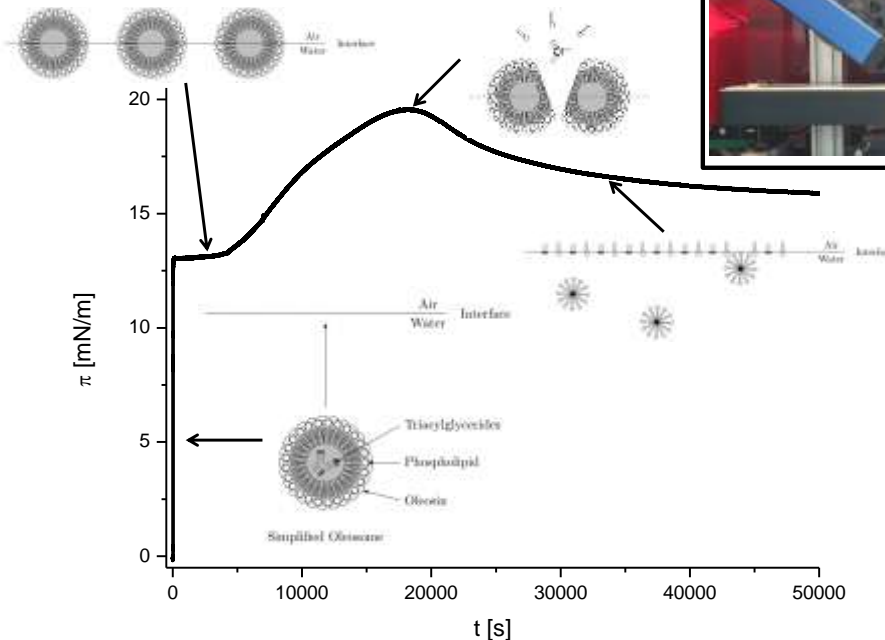
¹Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany

*e-mail: waschatko@mpip-mainz.mpg.de

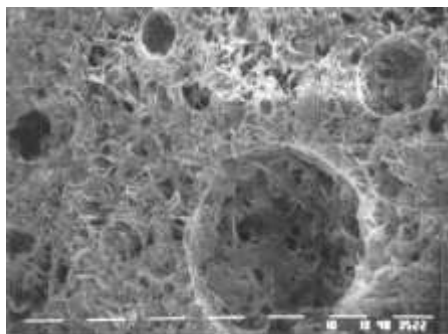


Oleosins

Umbrella shaped amphiphilic proteins against coalescence!



The quest to reduce saturated fats



Margarine

- Water in oil (w/o) emulsion
- Fat crystal network provides firmness to product

↓
Small crystallites of triglycerides containing major amounts of saturated fatty acids

↓
Is considered to be unhealthy; occurrence correlates with cardio-vascular risk factors



Small angle X-ray scattering (SAXS) was performed at the ID02 beamline of the ESRF, Grenoble

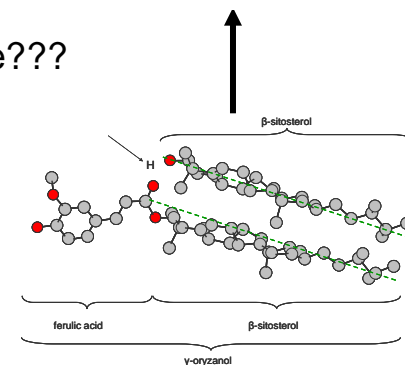


Small angle neutron scattering (SANS) was performed on the 40m Quokka instrument at the OPAL reactor (ANSTO, Sydney)

Is there an alternative???

Yes!

Mixtures of β -Sitosterol and γ -oryzanol



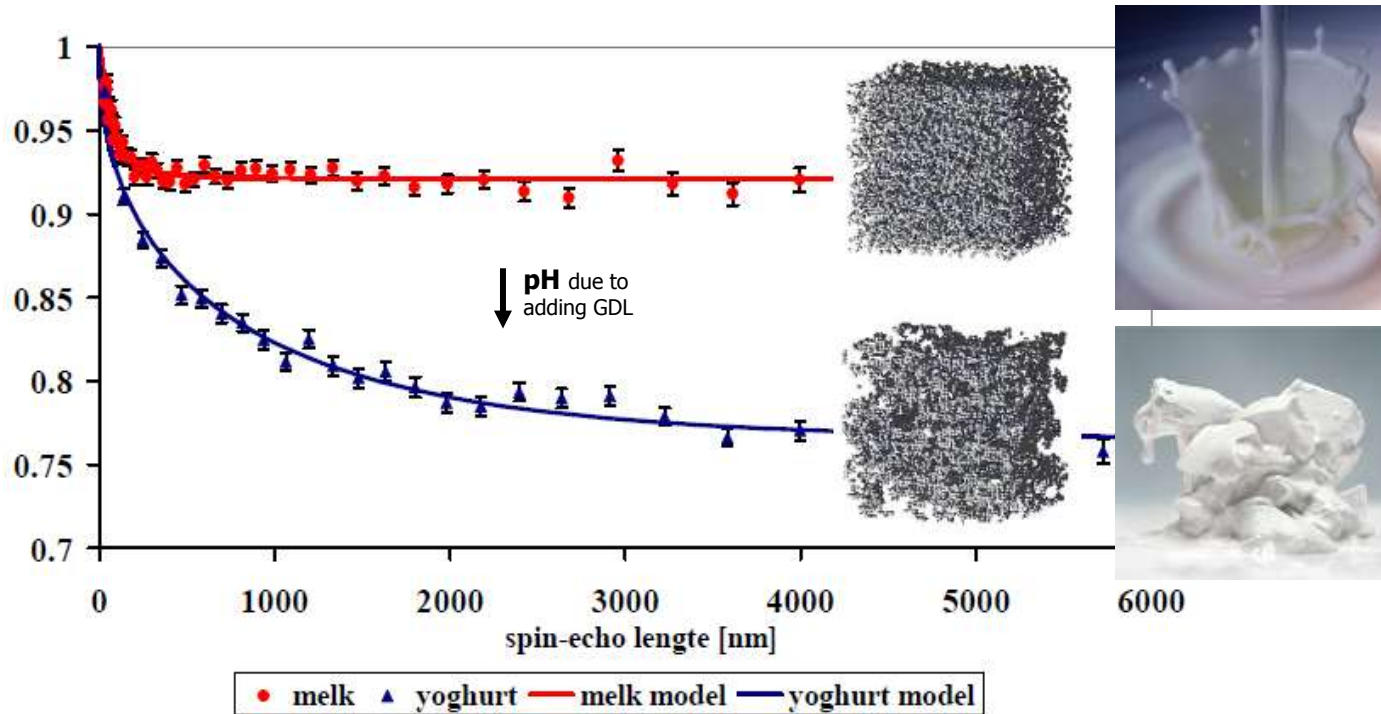
Visit the poster titled Non-triglyceride structuring of edible oils and emulsions (R. den Adel)
Join the lecture Wall structure of self-assembled sitosterol + oryzanol tubules (A. Bot)

Neutrons for Mars

Marika Kok

- Main components are chocolate, caramel and nougat.
- Proteins important for taste and texture
- **Neutron scattering for structure of components?**
- **Possible to discriminate between different proteins?**

Yoghurt aggregation, shaken not stirred



van Heijkamp, et al., Journal of Physical Chemistry A, (2010) 114 2412-2426