Importance of fat crystallization

Crystallization and Physical Properties of Fats - from Molecules to Market

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18 – 19 June 2008, SCI Oils and Fats group and Ghent University
Mission of FTE

Designing foods on a nano- and microscale which is the answer to the consumer demand for new products that are tasty, satisfying, healthful, convenient, and inexpensive. Moreover it may create added value to by-products and contribute to overall socio-economic welfare.

‘Sustainable Creation of Tasty and Healthy Foods’

scientific staff: 20

techn./adm. staff: 7
Research groups

- Valorization of Bioactives and Micronutrients
  - Animal products
  - Vegetable products
  - Authenticity

- Structure – Function relations of Food Components
  - Fats and fat-rich products
  - Complex food systems
  - Biopowders
Structure – Function relations of Food Components
Crystallization of fats in food (components)

- Liquid fat (specific chemical composition)
- Crystals
- Crystal clusters
- Crystal network
- Characteristics of end product (plasticity, hardness, …)

Factors:
- Time
- Temperature
- Shear
(MICRO)STRUCTURAL FUNCTIONALITY OF FATS

Chocolate
- continuous fat (cocoa butter)
- cocoa particles
- sugar particles

Margarine
- Crystallized fat
- Water droplet
- Liquid fat

Cream
- continuous water phase
- Fat globules (partially crystallized)
Role of fat crystallization in structure formation of whipped (ice) cream

Cream = oil-in-water emulsion

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Crystallization of milk fat in oil drops

Agitation

Immobilized air in fat network
Influence of DAG on isothermal crystallization kinetics

- XRD-pattern of 1% DAG palm olein crystallizing at 13°C

One step crystallization
Influence of DAG on isothermal crystallization kinetics

- XRD-pattern of 11% DAG palm olein crystallizing at 13°C

Two step crystallization
**European chocolate manufacture industry**

- 2,000 companies
- over 200,000 employees
- over 3 billion Euros export value

**Producing exclusive niche-oriented composed chocolates**

- technologically more complicated than plain chocolate bars (filling characteristics)
- bloom on pralines is a major issue (quality problem n° 1) leading to shelf life reduction, export hampering, consumer rejection
More than 20 years of chocolate experience…

- Flemish technological Advisory Centre for the Chocolate, Biscuits and Confectionary Industries (VLAZ)
  - Ghent University – Lab Food Technology and Engineering (FTE)
  - Royal Belgian Federation of the Chocolate, Praline, Biscuits and Confectionary Industries – Choprabisco vzw
  - ° 2003, in 2007 approved by I.W.T.-Vlaanderen for funding till 2011

- Since summer of 2005
  - increased consultancy related to chocolate bloom problems
  - pralines, chocolate bars with hazelnuts, chocolate covered biscuits
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