

New Technologies for Food Processing

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Challenges for food processing



Consumer needs

- Healthy & Tasty
- Convenience
- Tailored functionality
- Personalised products

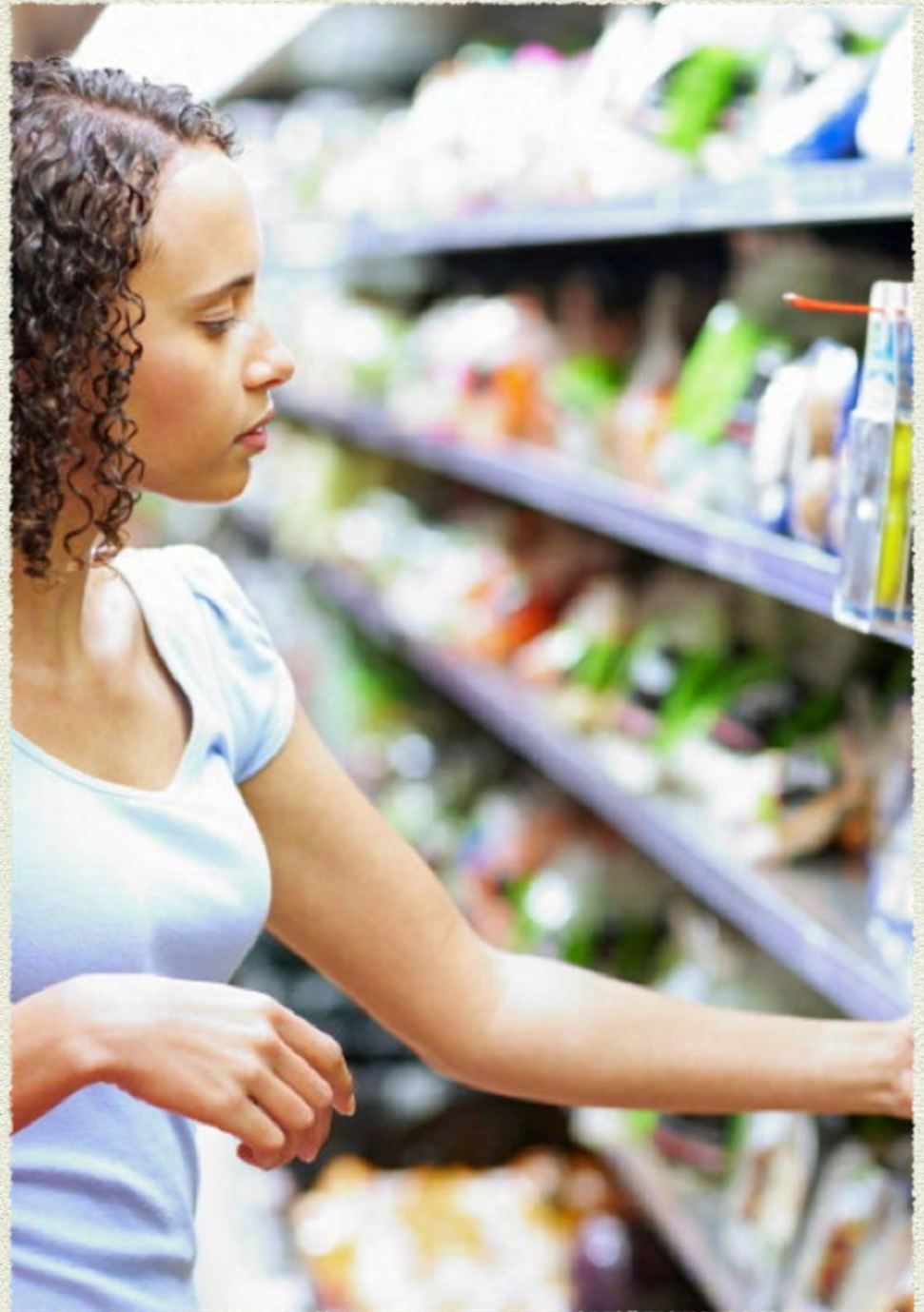


Sustainability/ economy

- Resource Effective Processes (Water, Energy, Waste)
- Shorter and tailored processes
- Circular economy
- Shorter food chains

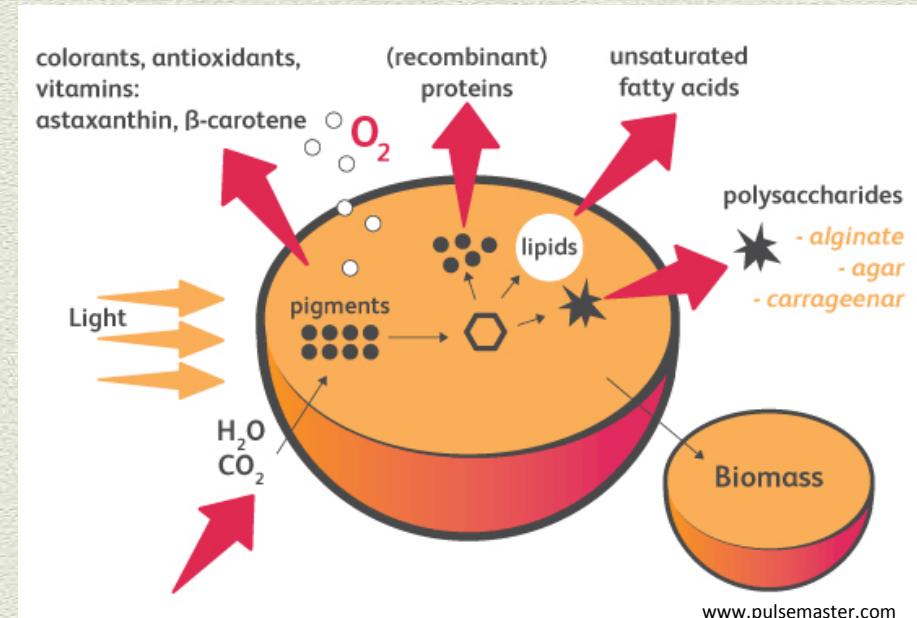
Consumer needs Technologies

- ◆ Non - thermal processing
- ◆ Structure processing
- ◆ Powder formulations
- ◆ smart combinations of processing and packaging

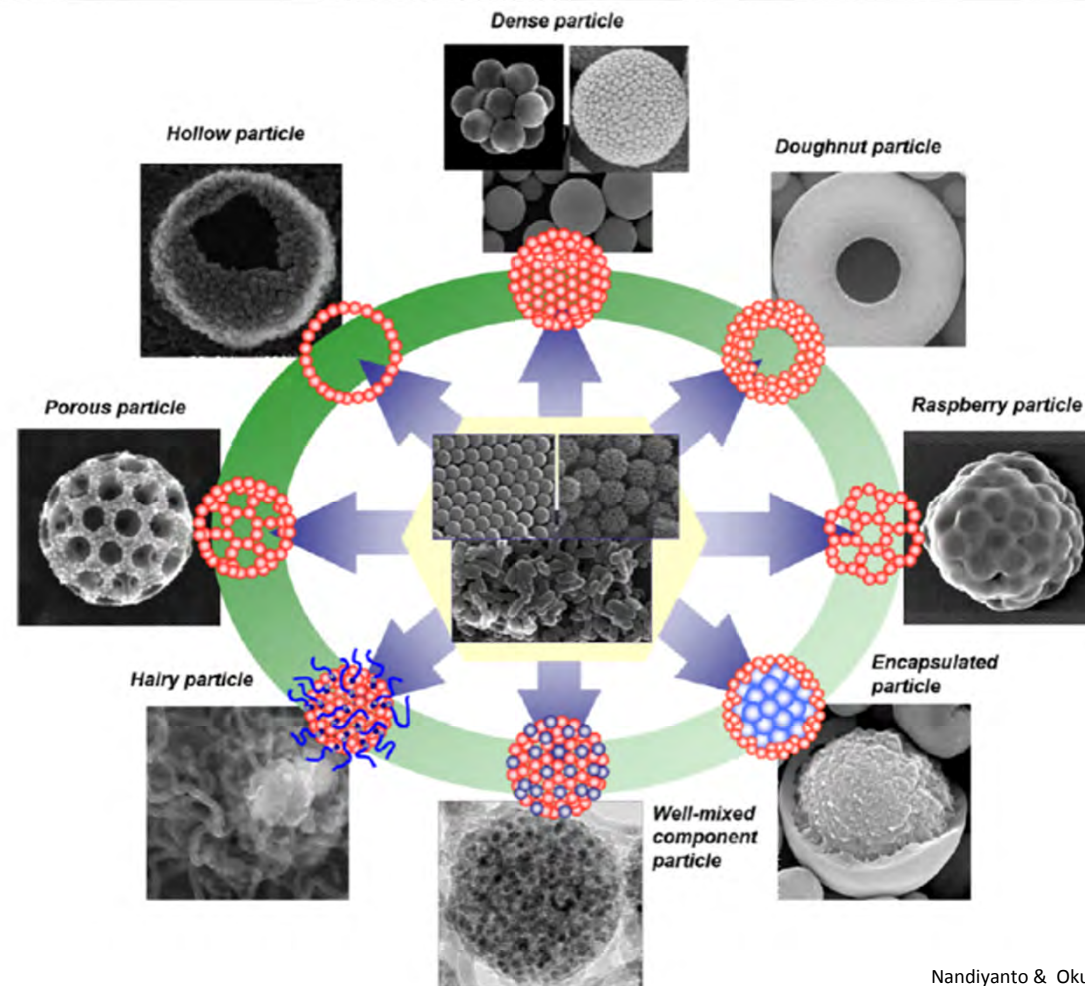


Non-thermal processing

- ◆ Plasma
- ◆ Ultrasounds
- ◆ Pulsed Electric Fields
- ◆ High pressure processing
- ◆ Membrane processing

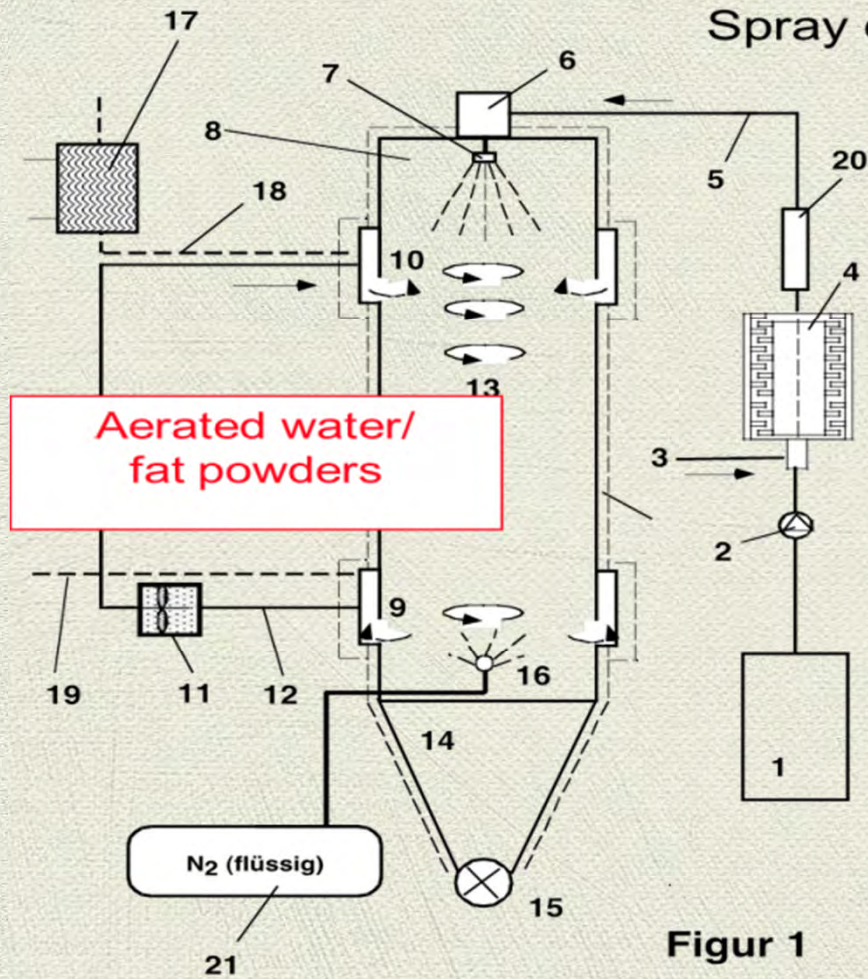


Powder formulations

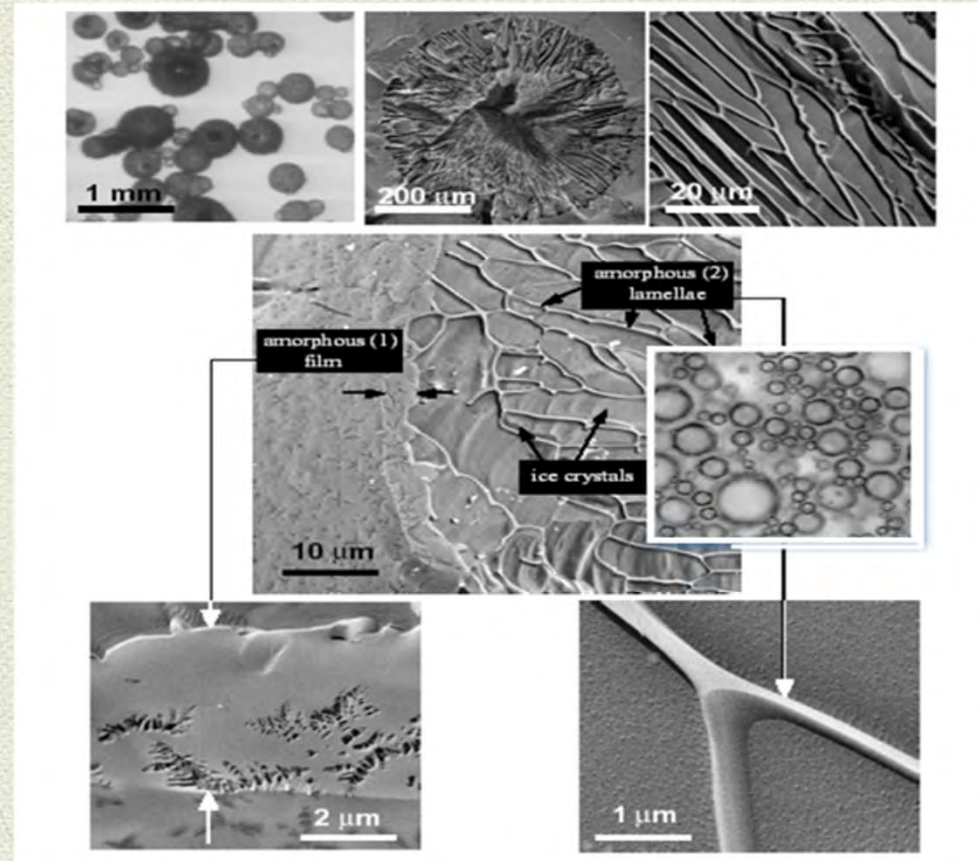


Spray chilling

Food composite structures with low water or fat

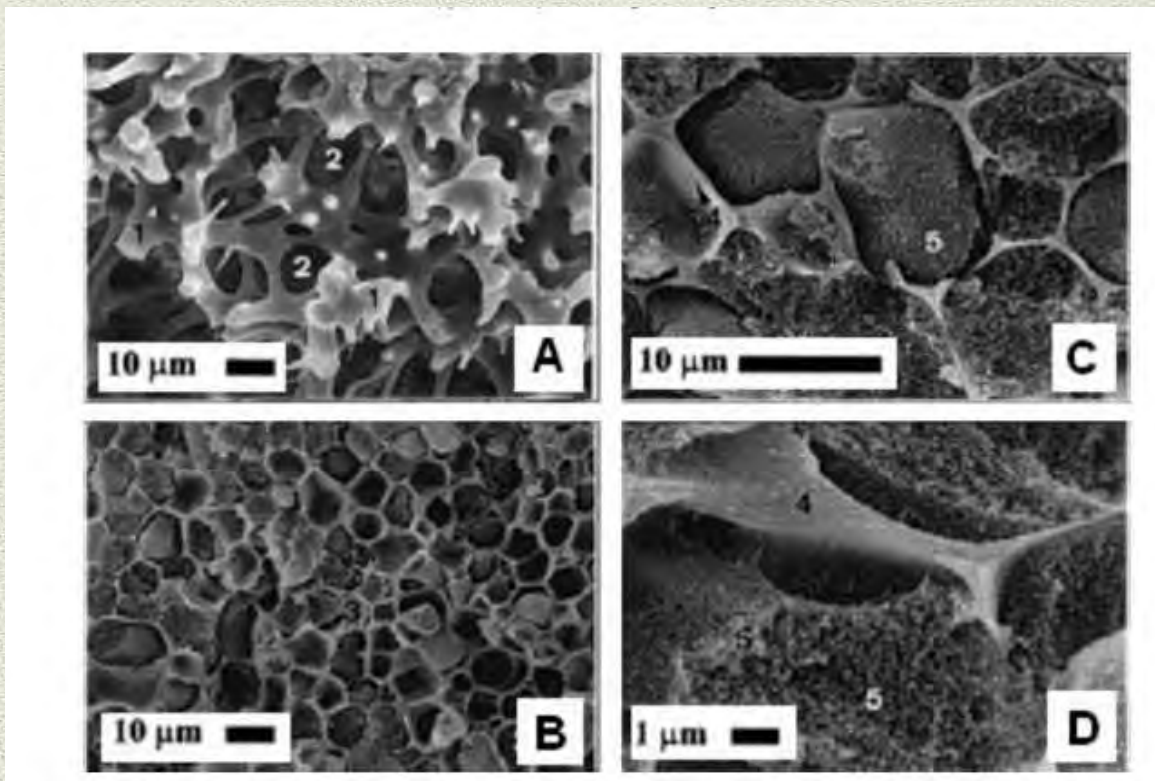


Spray chilling of "foamed glassy water powders"



Structure Processing

High Pressure Processing



Pressure induced (450 Mpa and 25C ; 30 min) gels of β -lactoglobulin

3D printing



Smart combinations of processing and packaging



Right and Simple



Sustainability Technologies

- ◆ Improving processing efficiency
- ◆ Extraction/fractionation (Circular economy)
- ◆ Process intensification
- ◆ small scale processing units



Improving process efficiency

- ✦ In a non optimised process there is a potential to reduce energy consumption by 50%
- ✦ In a optimised process there is a potential of reduce further 10% the energy consumption

Holistic approaches

Technology
shift

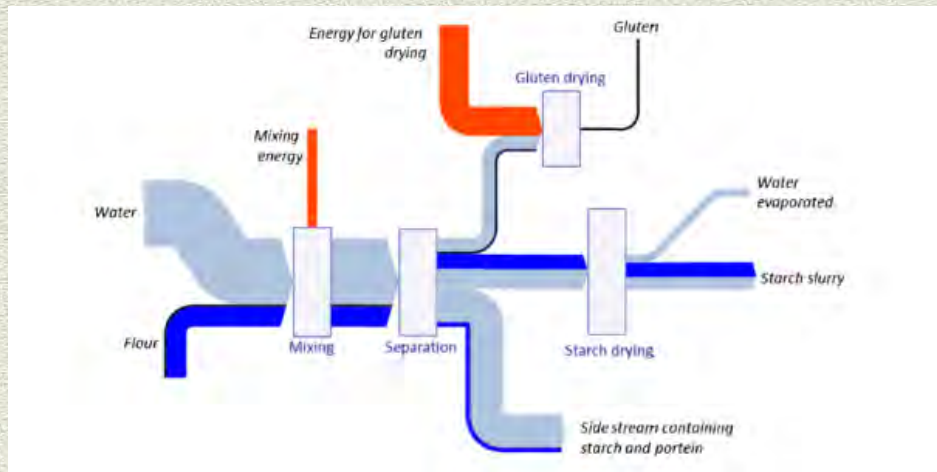
Reuse
of energy

Optimise the process

Process Intensification

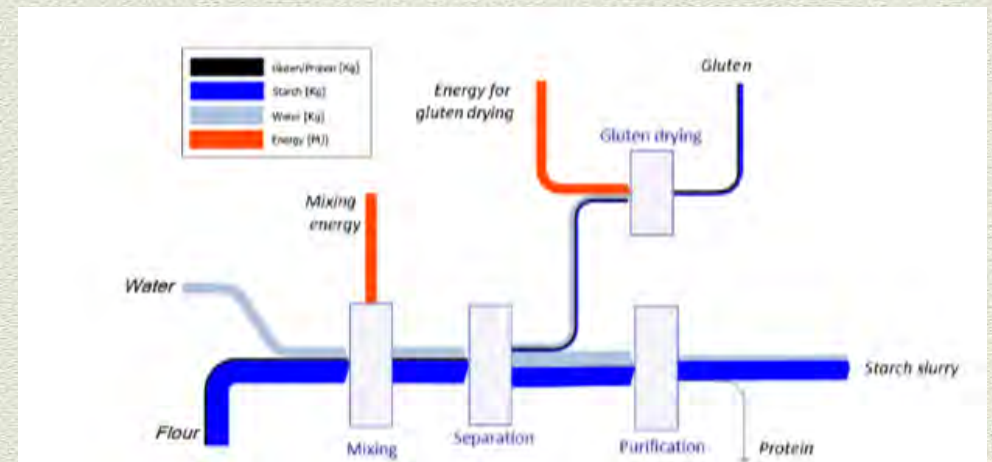
Separation of wheat flour in starch and gluten

Conventional process



vrs

Concentrated process



Powder – liquid mixing

Conventional mixing

vs.

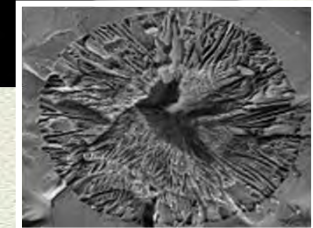
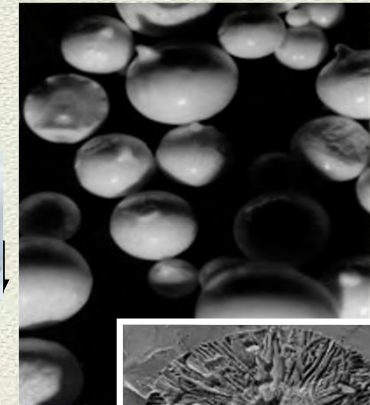
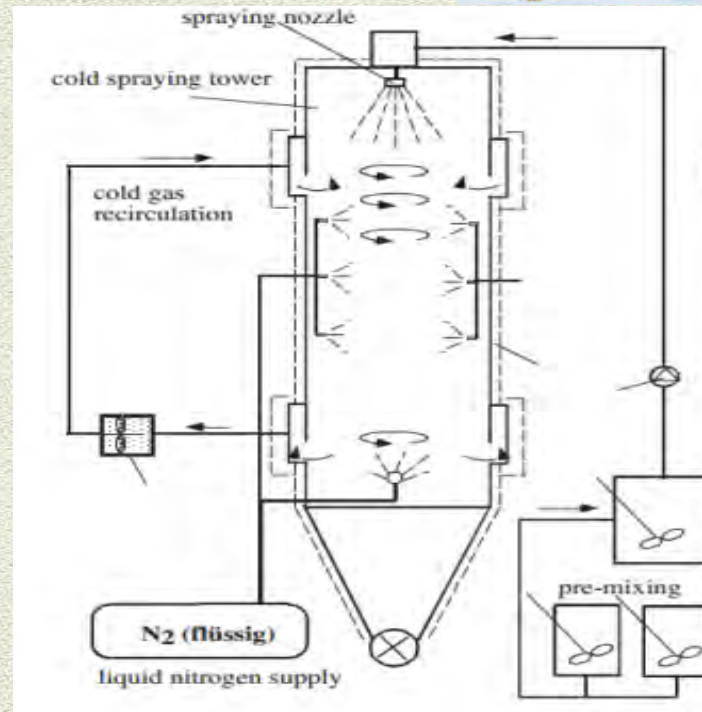
Powder-powder mixing

- a. Pouring
- b. Spraying
- c. Vapor



Powder

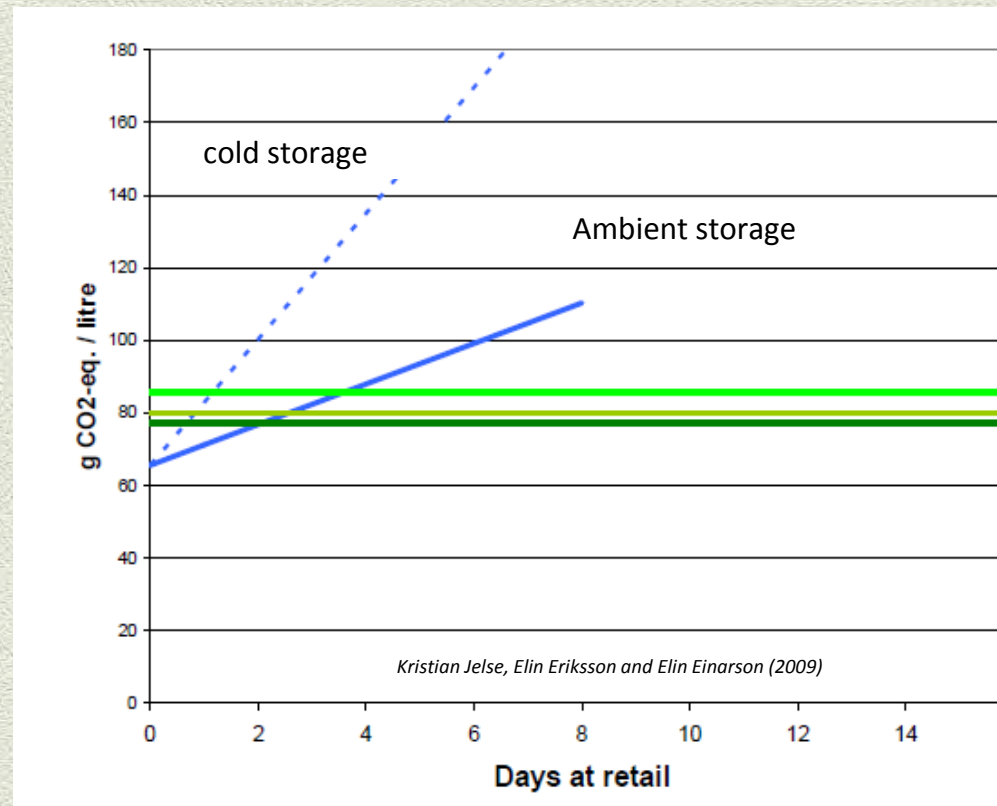
- ⑨ Often **non-even liquid distribution** due to agglomerates (a, b)



Powder

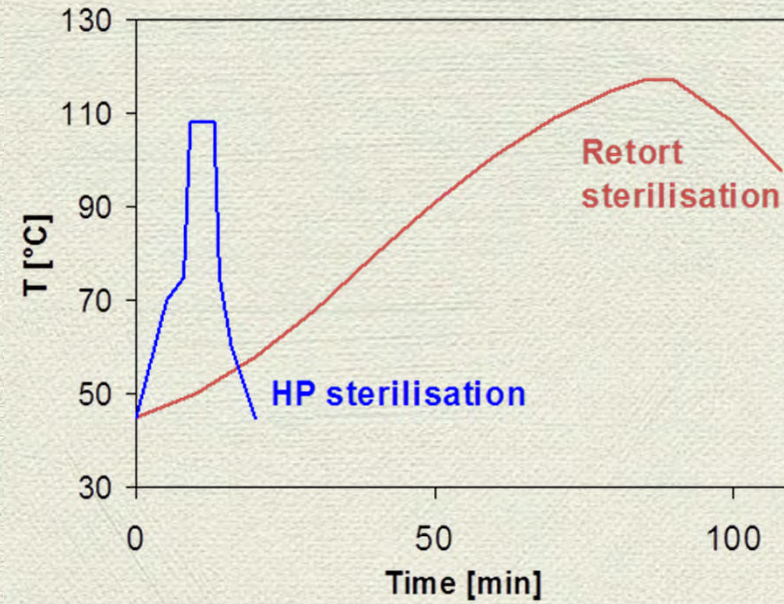
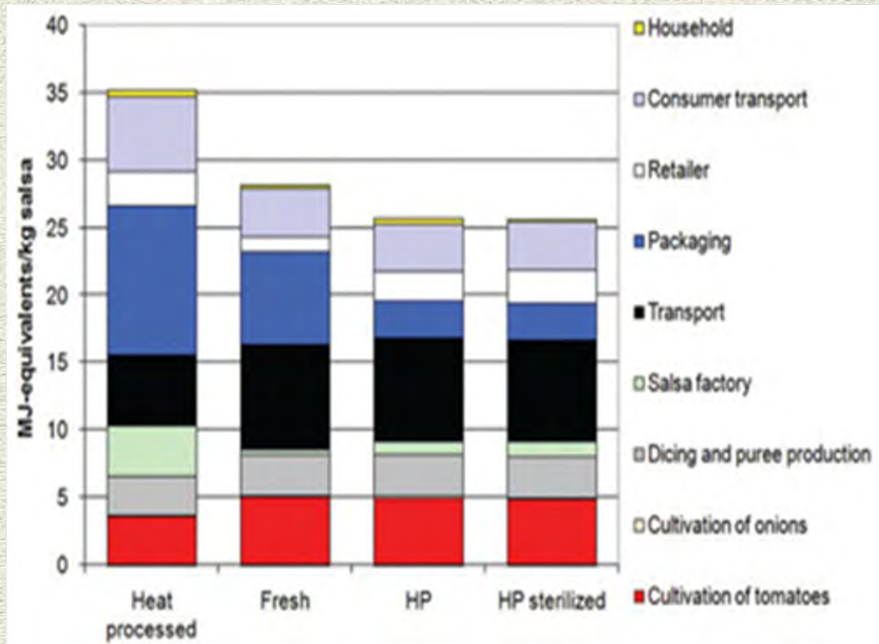
+ heat

High quality products for ambient storage



Ambient stored milk will be the better choice already after 1–2 days in this case with Swedish average electricity mix.

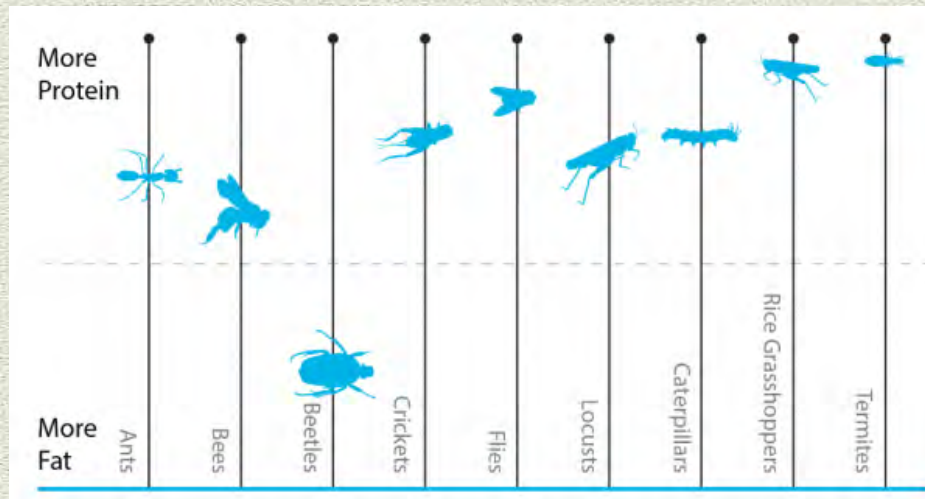
High Pressure Processing



Shorter time/ Improved quality

Safe extraction/fractionation

Insects, pulses, food from the forest, food from the sea.....



protein-rich micro-algae



Wood chips into edible starch

Sustainable chains need to be developed!

Short food chains





GRACIAS

ARIGATO

SHUKURIA

GOZAMASHITA

EPCHARISTO

JUSPAXAR

DANKSCHEEN

TASHAKKUR ATU

YAQHANYELAY

SUKSAMA

DOBBAY

GRAZIE

MEHRBANI

PALNES

KOMAJD-SUMIDA

HAJAKE

THANK

YOU

BOLZIN MERCI

TINGKI

BIYAN

SHUKRIA