



**GHENT  
UNIVERSITY**

# PROCESSED FOODS: FRIENDS & FOES

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# A COMPLEX MULTIFACETED CONTEXT



# FOOD PROCESSING

- Health effects
- Shelf life and stability =
- Food safety

$\phi$

- Definition of processing
- Degree of food processing
- Classification of food products

# NOVA OR *NOT* SO NOVA

## Group 1: unprocessed or minimally processed foods

e.g. fresh fish, meat, pasteurized milk, milk powder

- Allows processes such as drying, grinding, fractionating, roasting, boiling
- No addition of salt, sugar, oils or fats

## Group 2: processed culinary ingredients

e.g. salt, sugar, butter, refined oils,

- Obtained from group 1 by pressing, refining, grinding, milling and spray drying.

## Group 3: processed foods

e.g. unpacked bread, canned vegetables, salted nuts

- Made by adding group 2 substances to group 1 foods. Have mostly 2 or 3 ingredients. Processes include various preservation or cooking methods.

## Group 4: ultra-processed foods

e.g. ice-cream, margarines, burgers

- Not modified foods, but formulations made mostly or entirely from substances derived from foods and additives. Typically include many ingredients.

# GOOD REASONS FOR FOOD PROCESSING

- Preserve food and increase food safety
- Reduce food waste
- Change flavor, texture, aroma, color or form
- Align with the rest of the requirements of (modern) life
- Business model
- Innovation, creation

# FOOD PROCESSING

## Thermal processing:

- To inactivate pathogens and spoilage organisms
- Increase bioavailability

## Packaging:

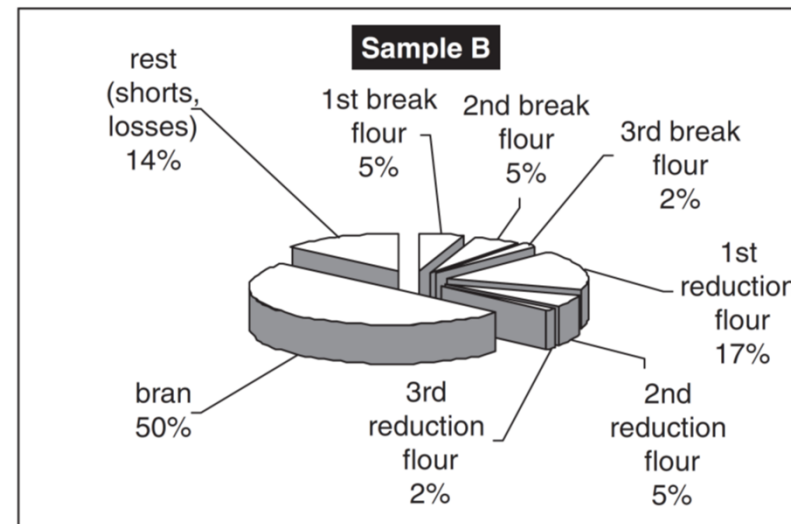
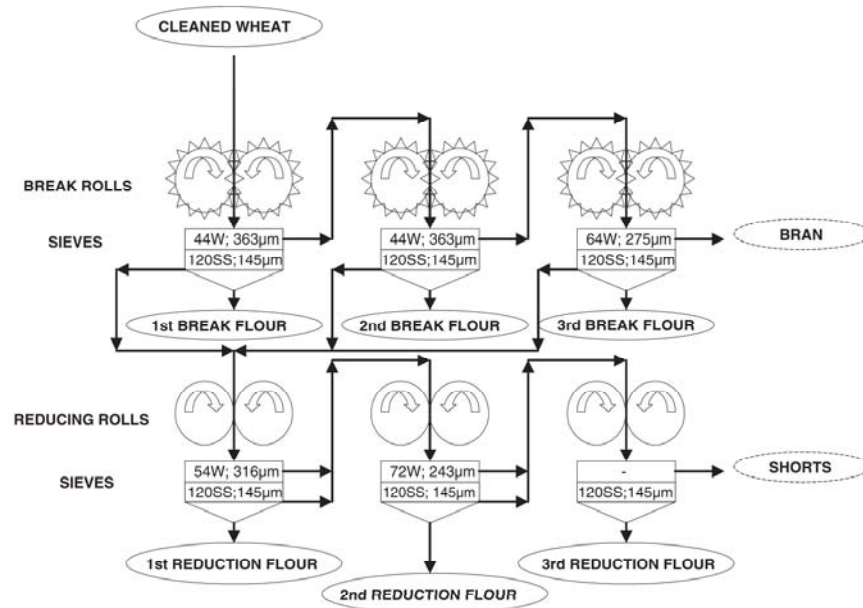
- To avoid post contamination
- To inhibit microbial and chemical changes

**Freezing:** to inhibit microbial, enzymatical and chemical spoilage

**Novel:** HHP, ILP, Cold plasma, ...

# MILLING IMPACT ON MYCOTOXINS IN CEREALS

Distribution of deoxynivalenol in milling fractions of wheat



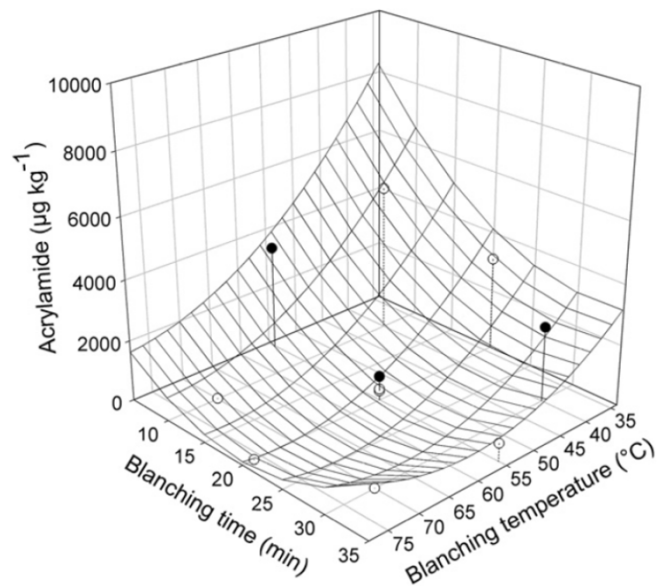
Lancova et al., 2008

Andreja Rajkovic, Department of food technology, safety and health®

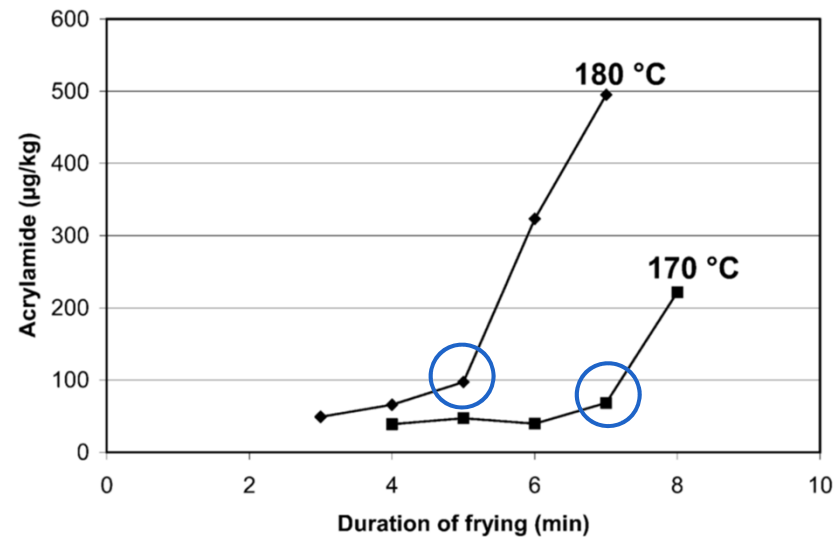


# ACRYLAMIDE FORMATION IN FRENCH FRIES

Impact of blanching prior to frying  
extraction of reducing sugars  
→ reduction of acrylamide



Impact of time and temperature  
during frying



○ sensorial optima

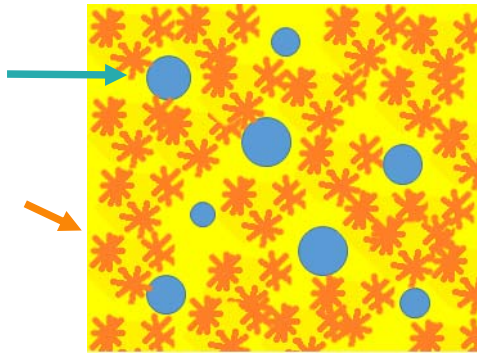
# FAT REDUCTION OF FATTY SPREADS



**Butter (80% fat):**  
737 kcal

Water droplet

Crystalline milk fat  
(mainly saturated)

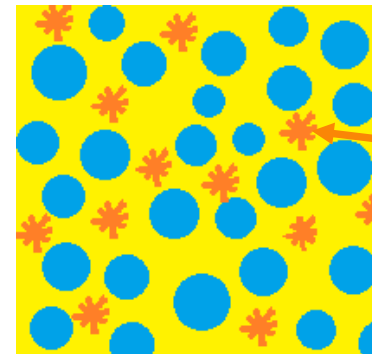


Desired **textural stability** can only be achieved with:

- Suitable emulsifiers
- Gelling of water droplets with hydrocolloids

= **additives**

**Low-fat (35%) spread:**  
325 kcal



Gelled water droplet

Reduced amount  
of saturated fat

Suitable emulsifiers to  
stabilize emulsion

Desired **microbial stability** can only be achieved with:

- Preservatives

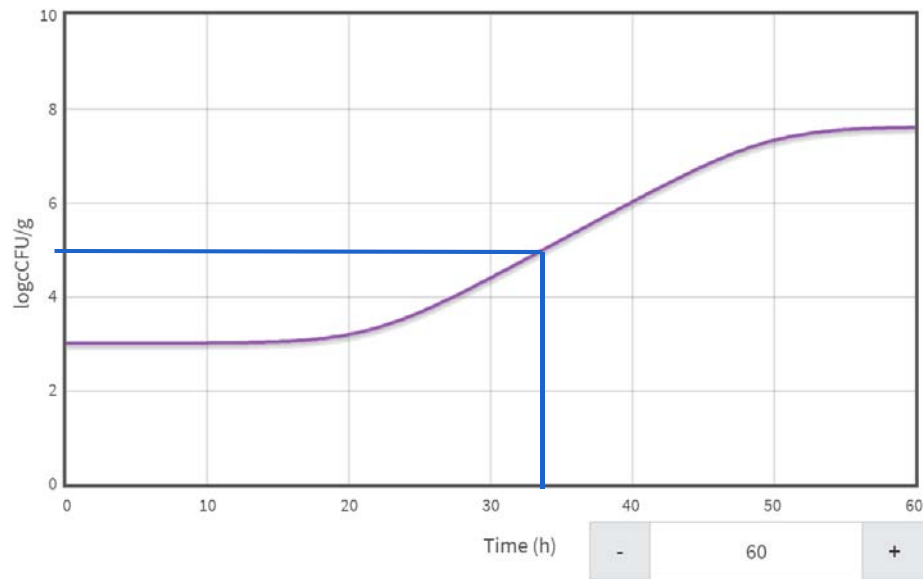
= **additives**

# (GOOD) REASONS FOR ADDITIONS

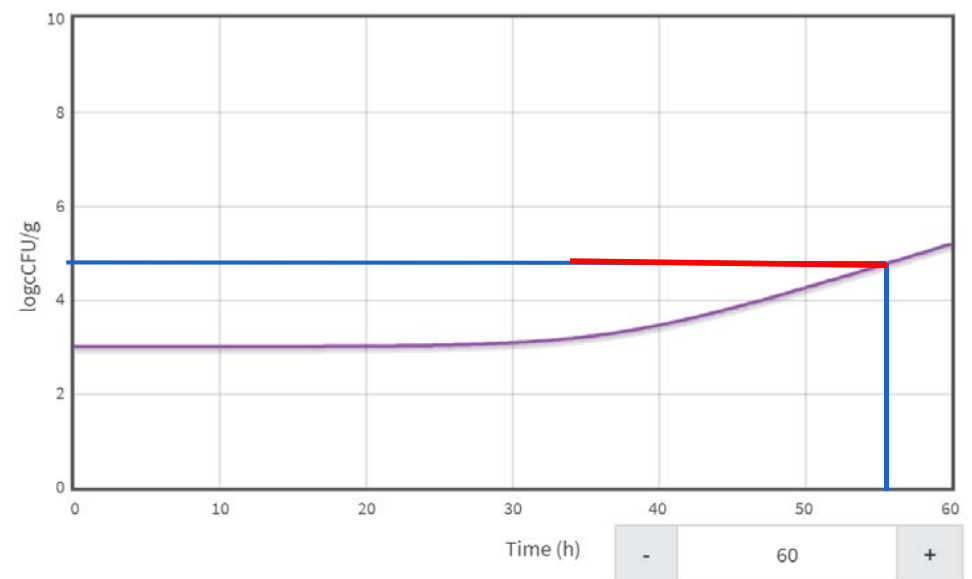
- **Organic acids** to lower pH, but also as an antimicrobial agent.  
e.g. lactic acid, acetic acid, citric acid
- **Food preservatives & anti-oxidants** to inhibit microbial, chemical as well as enzymatical spoilage.  
e.g. sorbic acid, nitrite, ascorbic acid, vitamin E
- **Texturizers** such as thickening agents, emulsifiers: to give and maintain structure during the shelf-life.  
e.g. carragene, modified starch, monoglycerides
- **Fortifiers** to restore and/or raise nutrient levels in food.

# (GOOD) REASONS FOR ADDITIONS

*Bacillus cereus* in 0% added salt salt environment



*Bacillus cereus* in 3% added salt salt environment



# MESSAGES

- Food processing and responsible food additions  $\neq$  stuffing food with sugars
- No processing & no (some of the) additives = no today's food choices and way of living
- Risk/benefit assessment  $\rightarrow$  not to be ignored
- Better food  $\rightarrow$  asks more time
- **Consumer needs:**
  - clear information
  - policy that is protective & based on scientific evidence
  - respect for food, health and environment: food waste!
  - holistic thought (eg life style, ...)



# MESSAGES

Energy dense,  
**high** in salt, sugar (known and hidden), saturated fats,  
**low** in micro-nutrients and dietary fiber  
and not processing *sensu stricto*  
is linked with overweight, obesity, increase risk of cardio-vascular disease,  
type II diabetes, NAFLD, NASH and cancer.

My choice:  
minimally processed, clean label,  
OMAD, lifestyle,  
freedom to eat healthy  $\neq$  eating *ad libitum*

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