

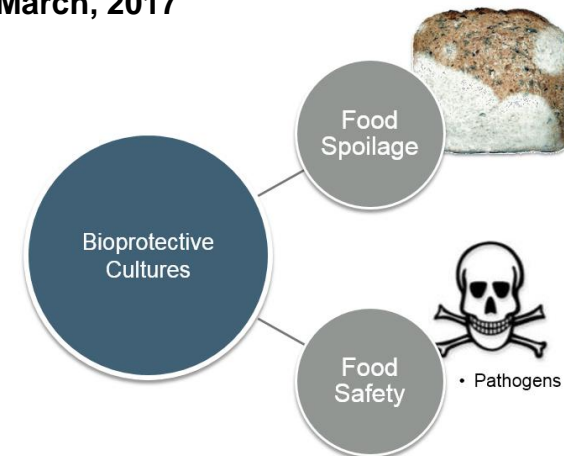


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# Bioprotective cultures – From an industry point of view

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Mejeriforskningens Dag, Billund, 2<sup>nd</sup> of March, 2017

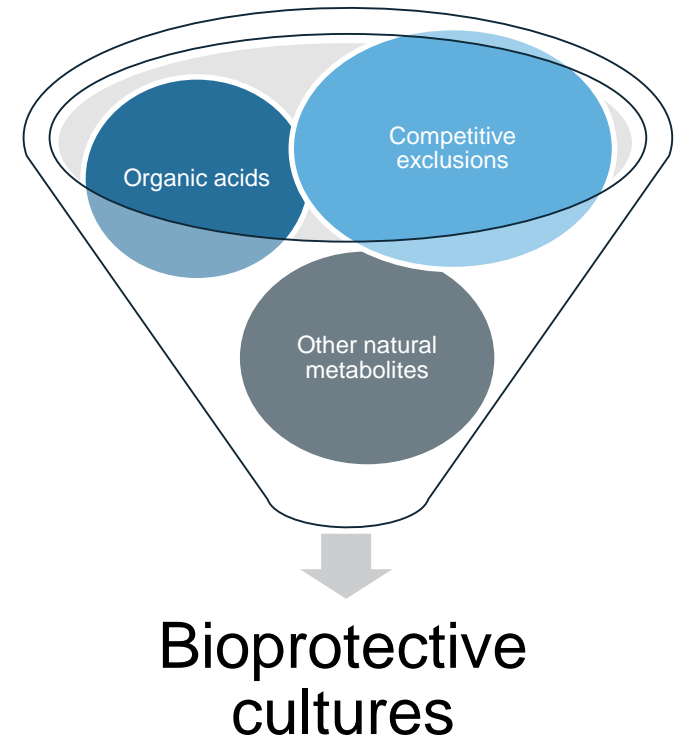


# AGENDA

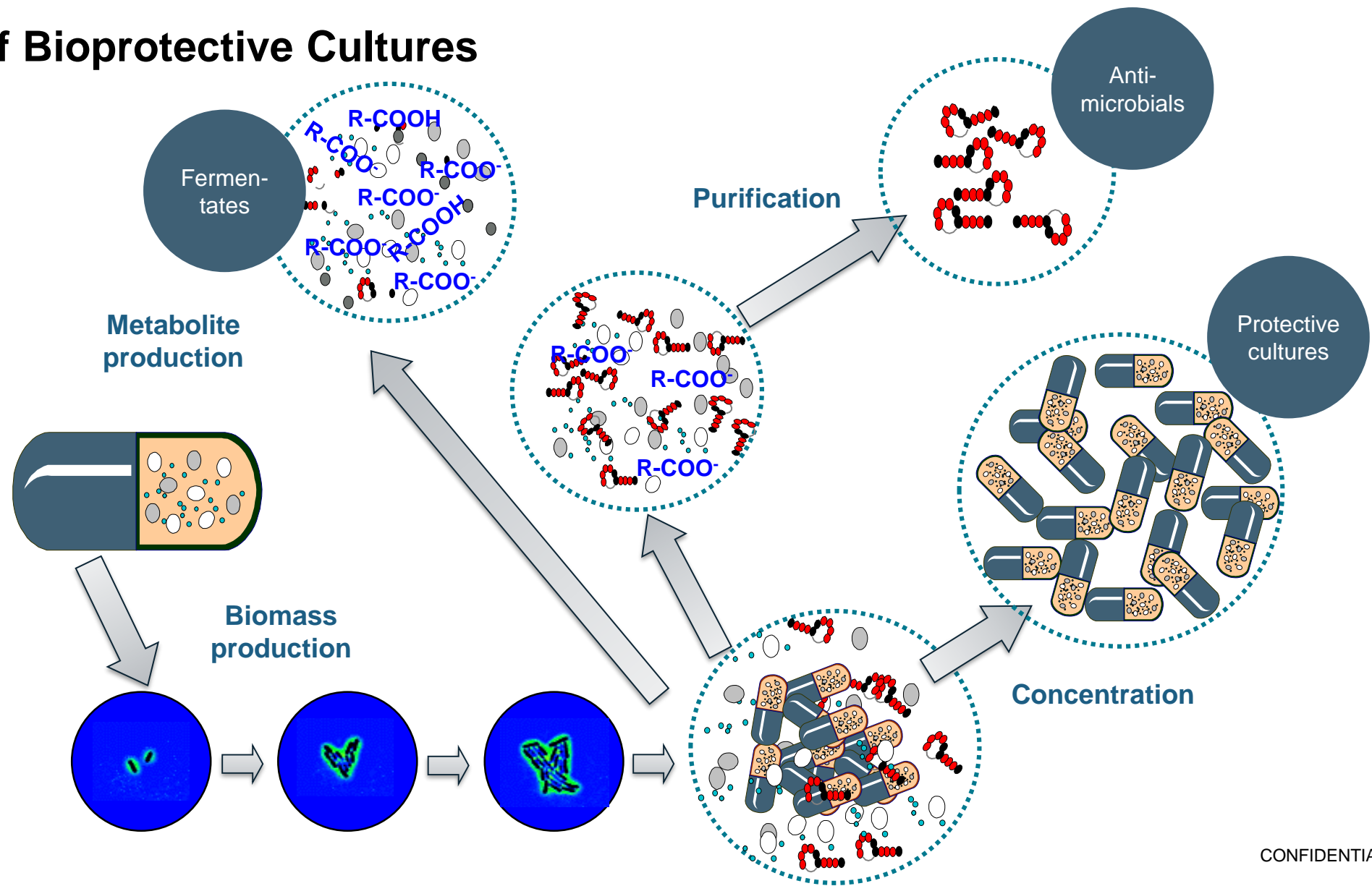
- Bioprotective cultures – background
- Application areas and examples
- Dairy industry relevance – natural, shelf life extension and sustainability

## Bioprotective Cultures

- Live cultures - isolated from food (GRAS/QPS)
- Unique properties - control unwanted microorganisms
- Reducing returns and preventing **waste**
- Helping you to **expand** geographically
- Longer **shelf life**
- No negative effect on product properties
- Keeping your process simple and efficient
  - **Clean label** (no E-number)
  - **Natural**
- Fermentation process is required



# Use of Bioprotective Cultures



# Bioprotective Cultures - Dairy

## The "Wisby" Pioneers

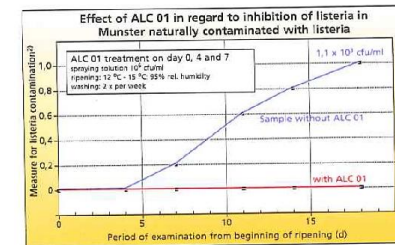
Wisby → Danisco (1999) → DuPont (2011)

First half of 1990's → 2 products for Dairy & Meat – licence + innovation

- ALC 01 (Anti Listeria Culture)
- BIO PROFIT (yeast mould inhibition)

### Status 2017: Protective cultures:

- 6 for Yeast/Mold control:
  - 2 specialised (mild fermented, cheese),
  - 4 for yeast & mold
- 1 for Listeria control
- 1 for spore control
- All { combinations of Lb.strains +/- Prop.strains }

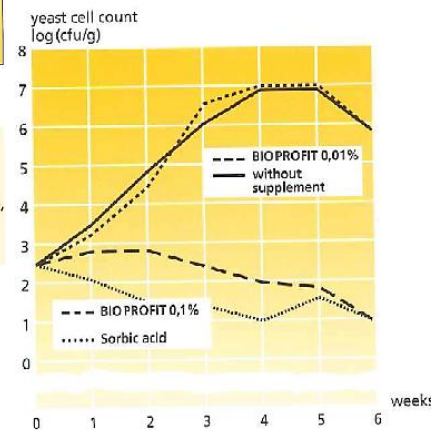


#### What is ALC01?

ALC 01 (antilisterial culture) represents a single-strain culture of the *Lb. plantarum* type, which has been isolated from a smeared soft cheese of raw milk

#### BIO PROFIT

*Inhibition of Rhodotorula sp. in quark by BIO PROFIT*



#### Which microorganisms are inhibited by BIO PROFIT?

- yeasts
- heterofermentative lactobacilli
- moulds
- spore formers (bacilli, clostridia)

# Applications for Bioprotective Cultures



**Yogurt/Quark**  
**Fermented milks & creams**

**Butter**



**White cheese**



**Cottage cheese**



**Yellow cheese**

**Cream cheese**



**Sour cream**

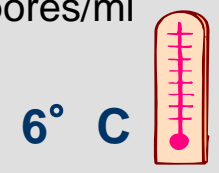


**Fermented sausages**

# Bioprotective Cultures & Mold – example 1 - Yogurt

Reference:  
YO-MIX™  
Yogurt Culture

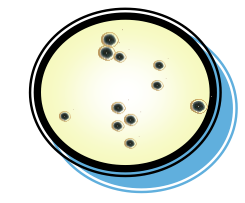
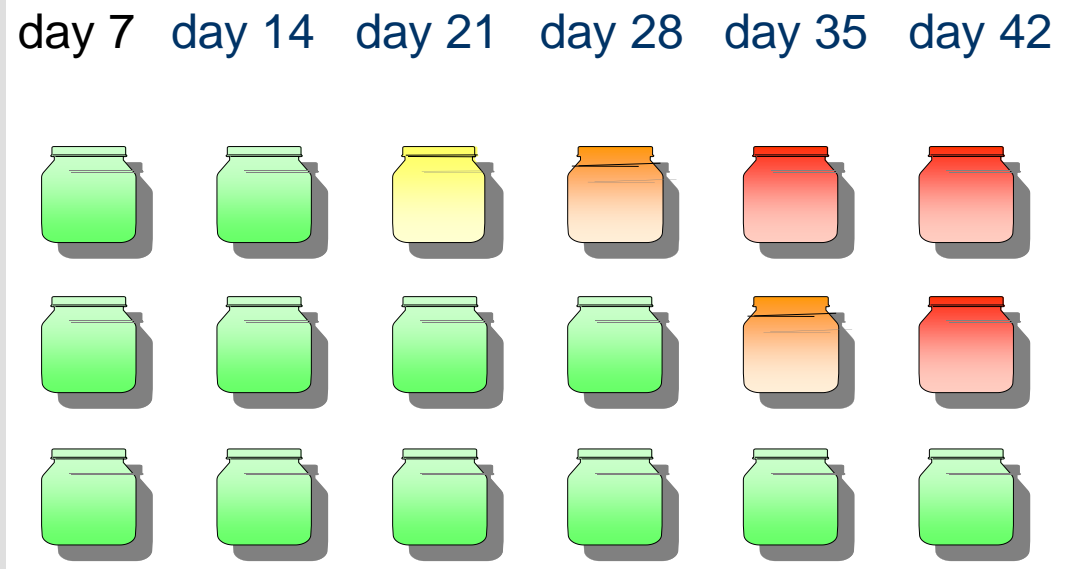
Challenge test with  
mold pool (4  
strains)  
inoculated at  
12 spores/ml



Reference

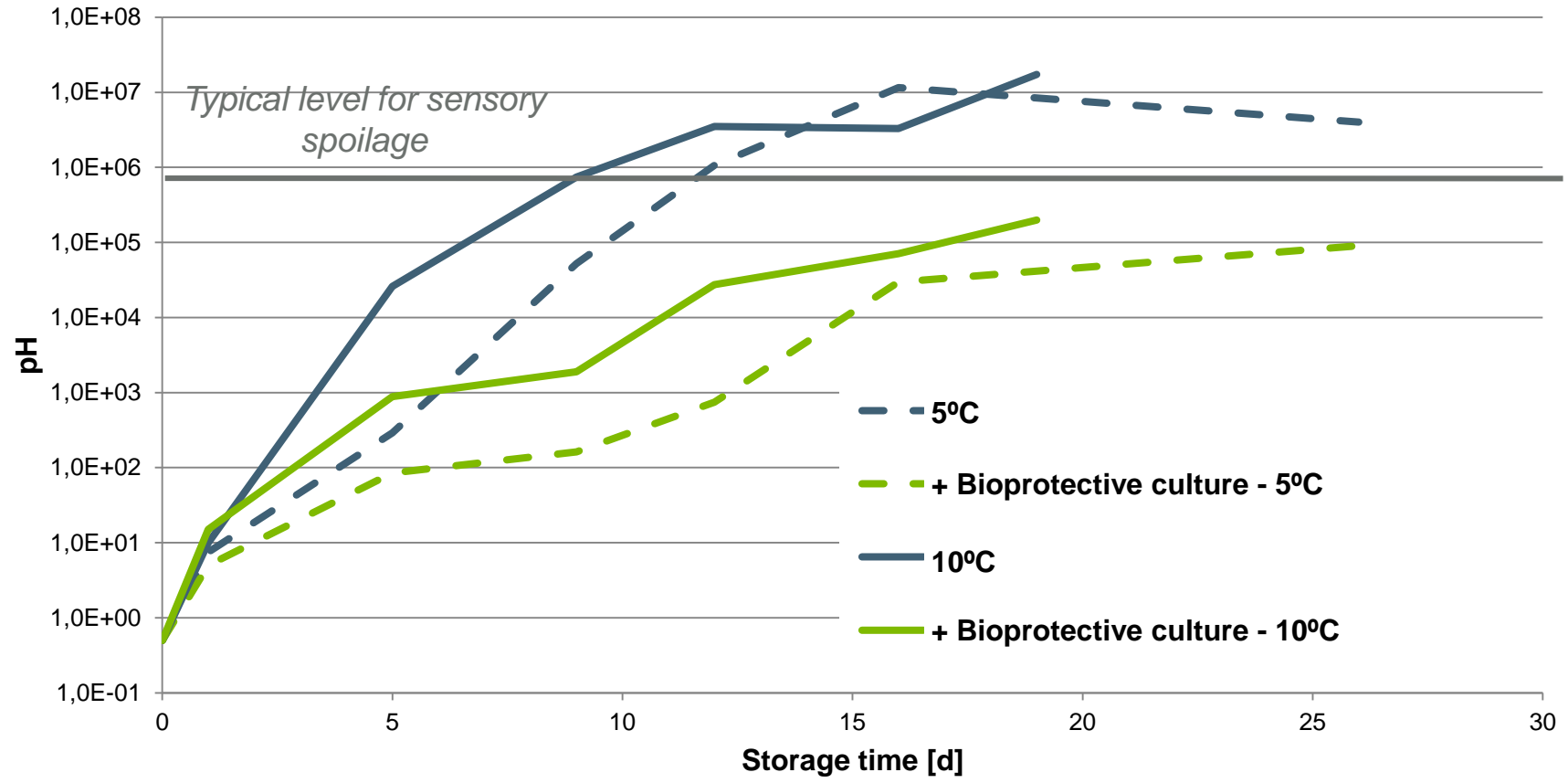
Protective Culture 1

Protective Culture 2



- No spoilage detectable
- 1–19 colonies
- 20–50 colonies
- >50 mold colonies on the surface

# Bioprotective Cultures: Yeast – example 2 - Yogurt

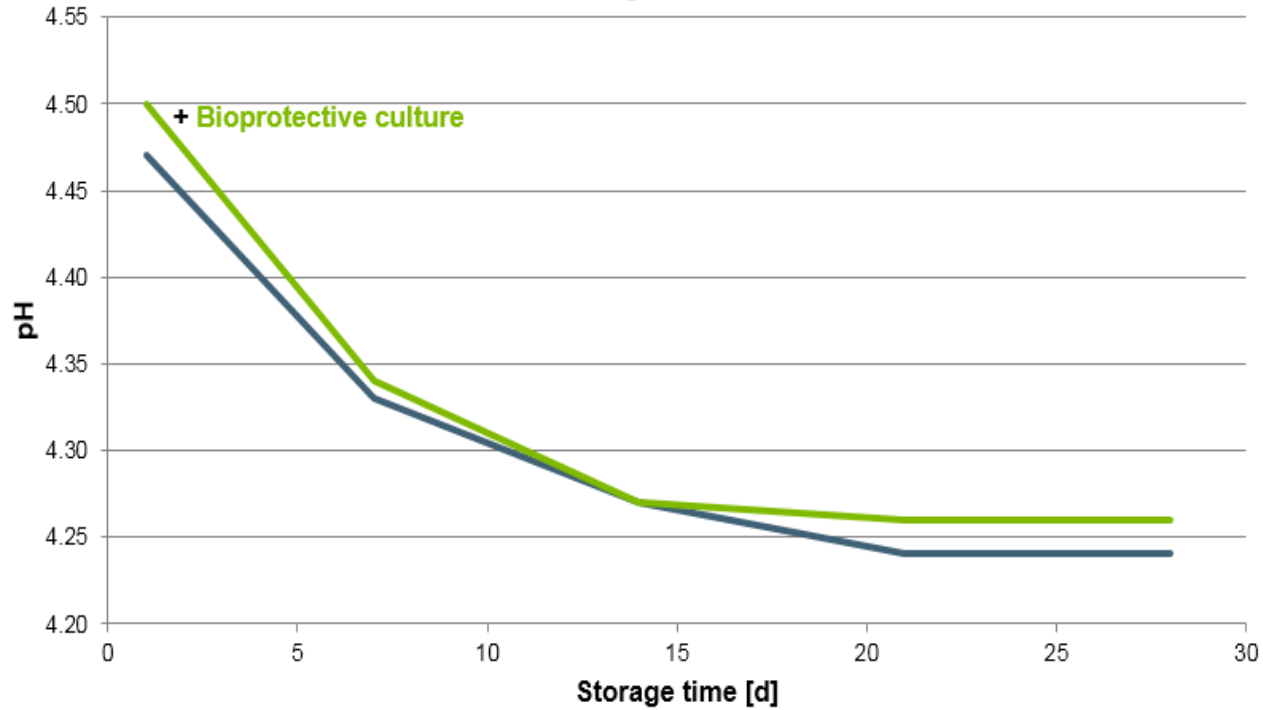


<b>Dosage</b>	Bioprotective culture at 10 DCU / 100l milk
<b>Yeast challenge</b>	Pool of 2 yeasts added at 18 CFU/10g
<b>Yogurt culture</b>	YO-MIX® 495
<b>Test conditions</b>	Stored at 5°C or 10°C

Source: Study conducted internally

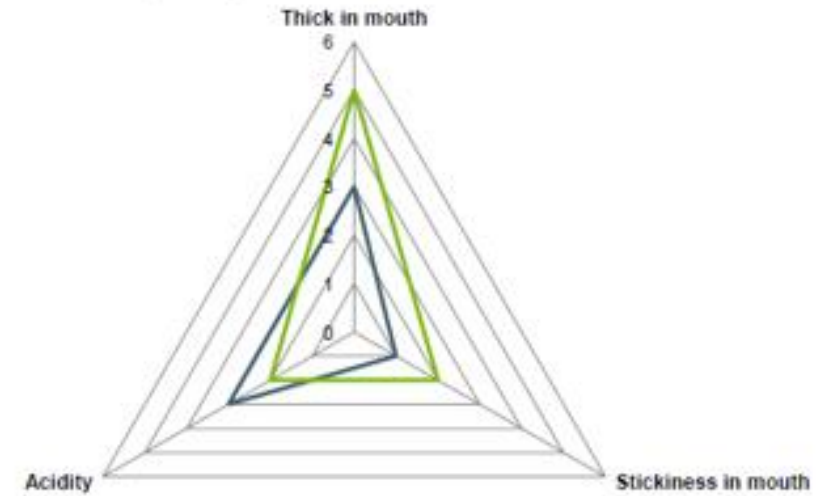


# Bioprotective Cultures: Post Acidification & Sensory – example 3 - Yogurt



<b>Dosage</b>	Bioprotective culture at 10 DCU / 100l milk
<b>Test conditions</b>	Stored at 6°C for 28 days

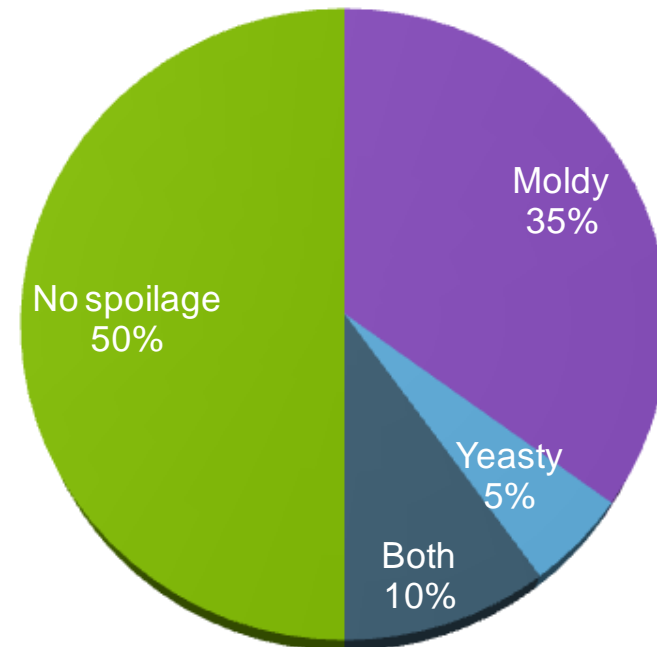
Improved texture and prolonged fresh and mild acidic taste



<b>Dosage</b>	Bioprotective culture at 10 DCU / 100l milk
<b>Test conditions</b>	Stored at 6°C for 14 days

## Consumer Insight - base: 50% of consumers experience spoiled dairy products

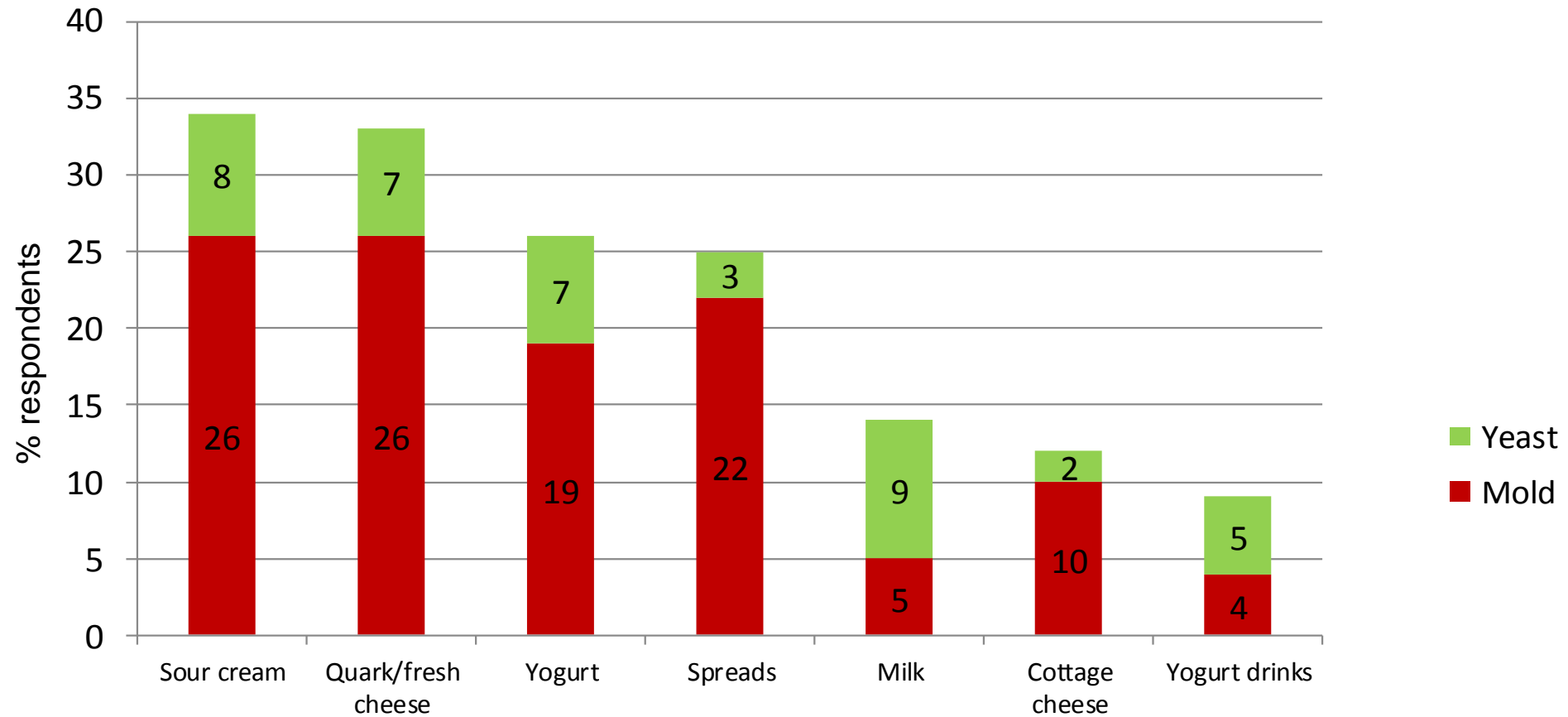
- Dairy waste is an increasing cause of concern to both manufacturers and consumers



Half of the consumers declare they experienced spoilage in their dairy products at home

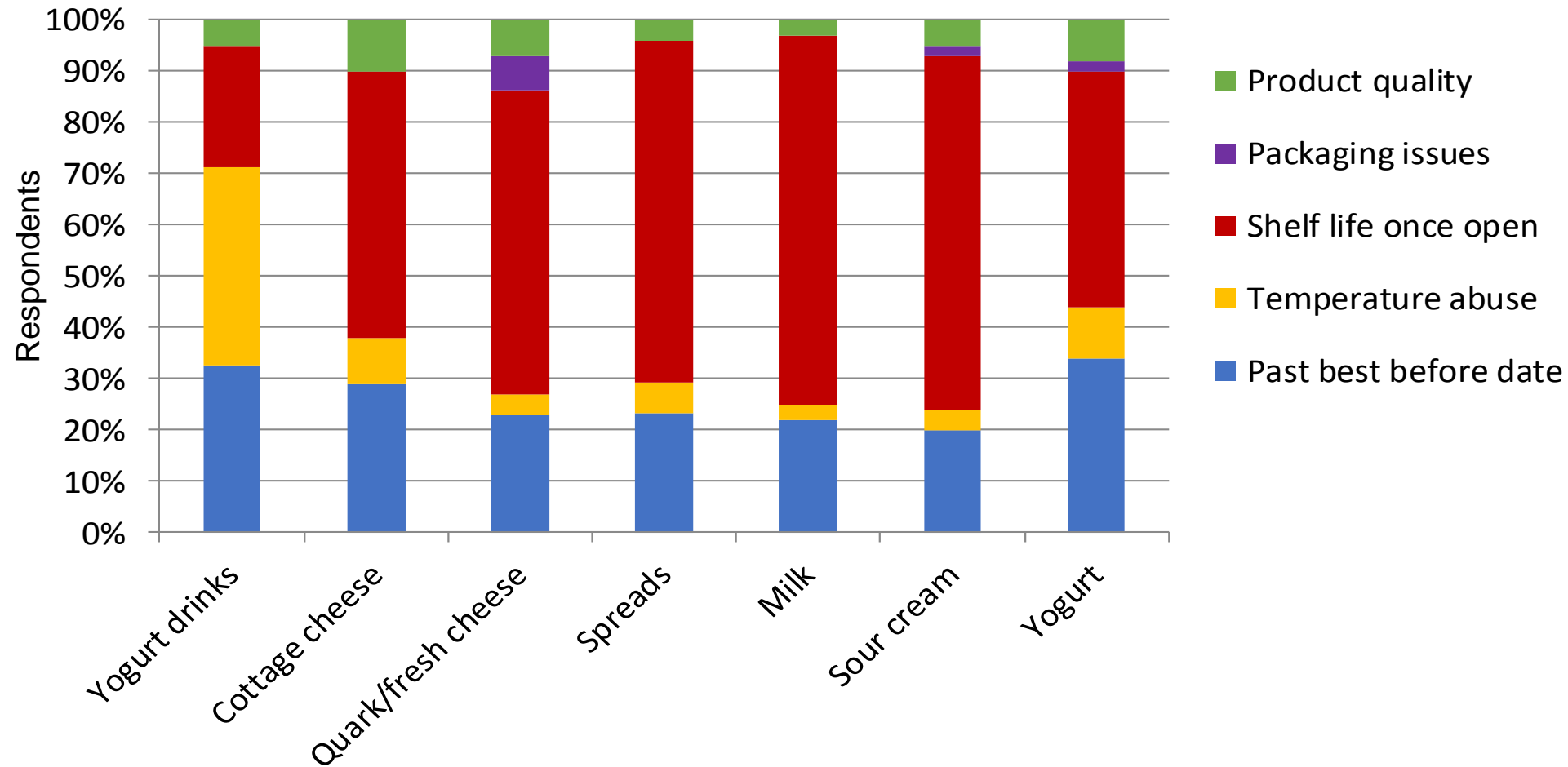
# Consumer Insight 1:

## Mold is the primary concern in sour cream, fresh cheese and yogurt



Source: Danisco global survey 2011  
 Base: 210 respondents

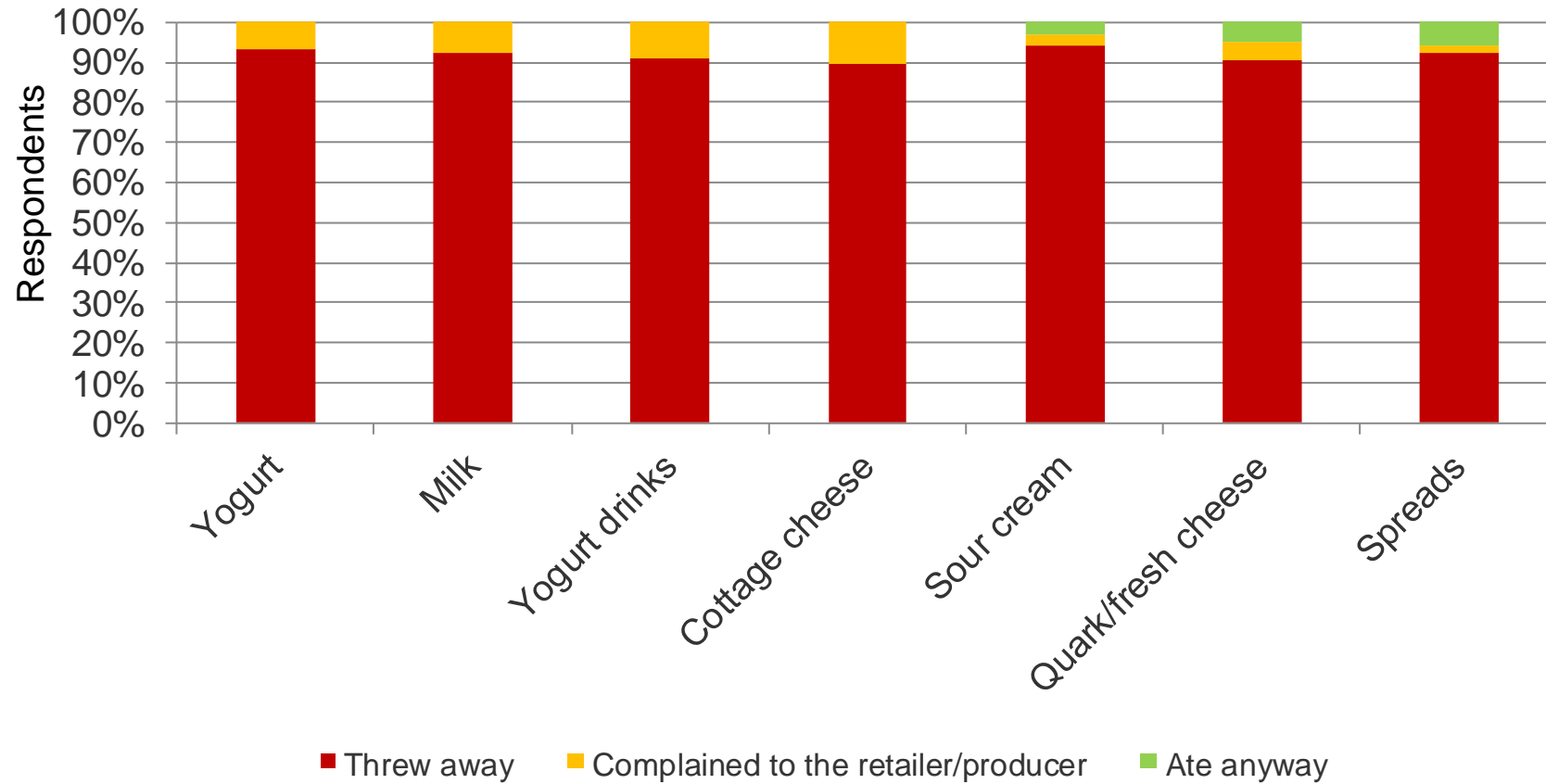
## Consumer Insight 2: Open shelf life is the main reason stated for spoilage



Source: Danisco survey 2011

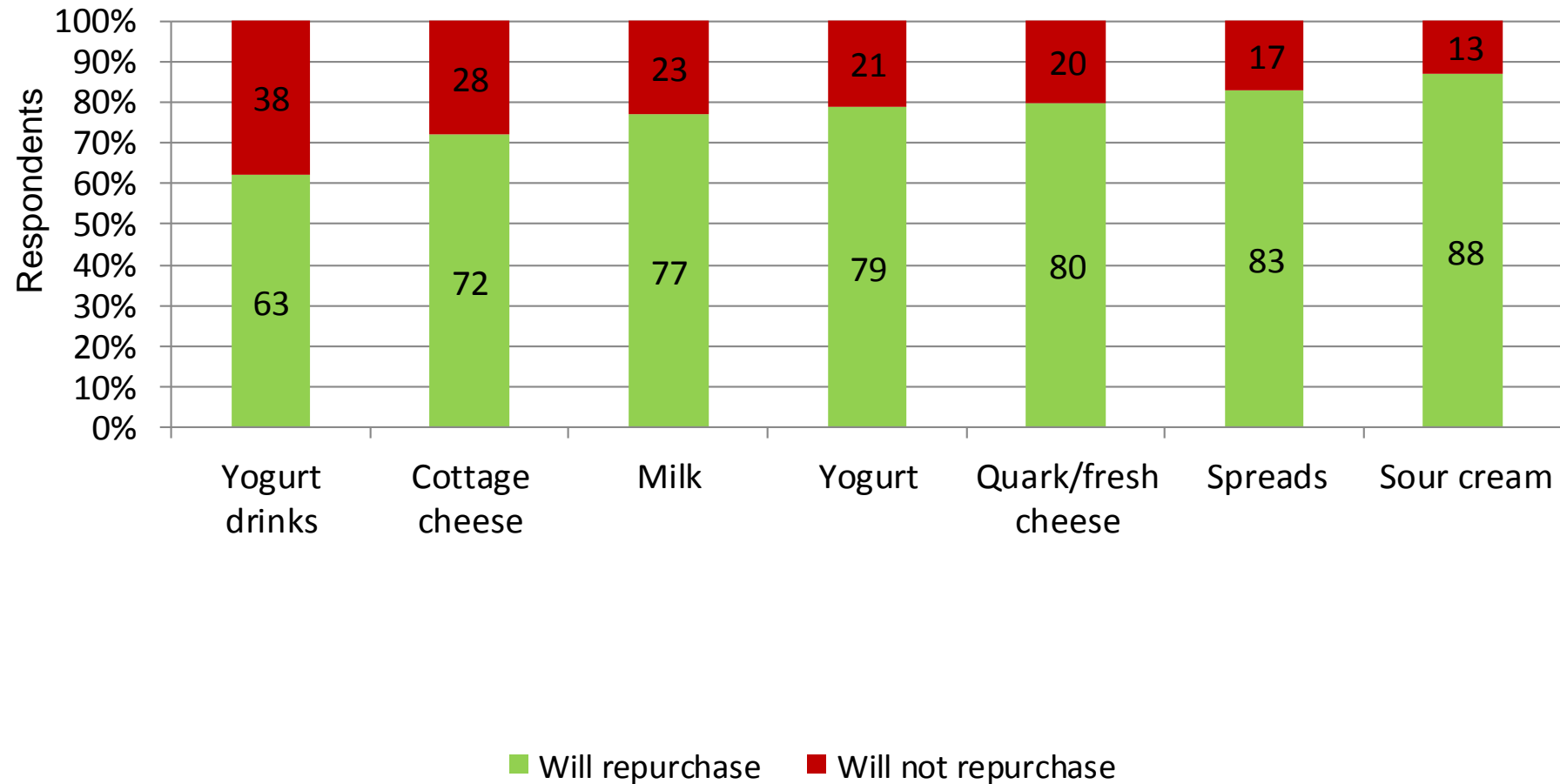


## Consumer Insight 3: A majority of consumers throw the spoiled products away



Source: Danisco survey 2011

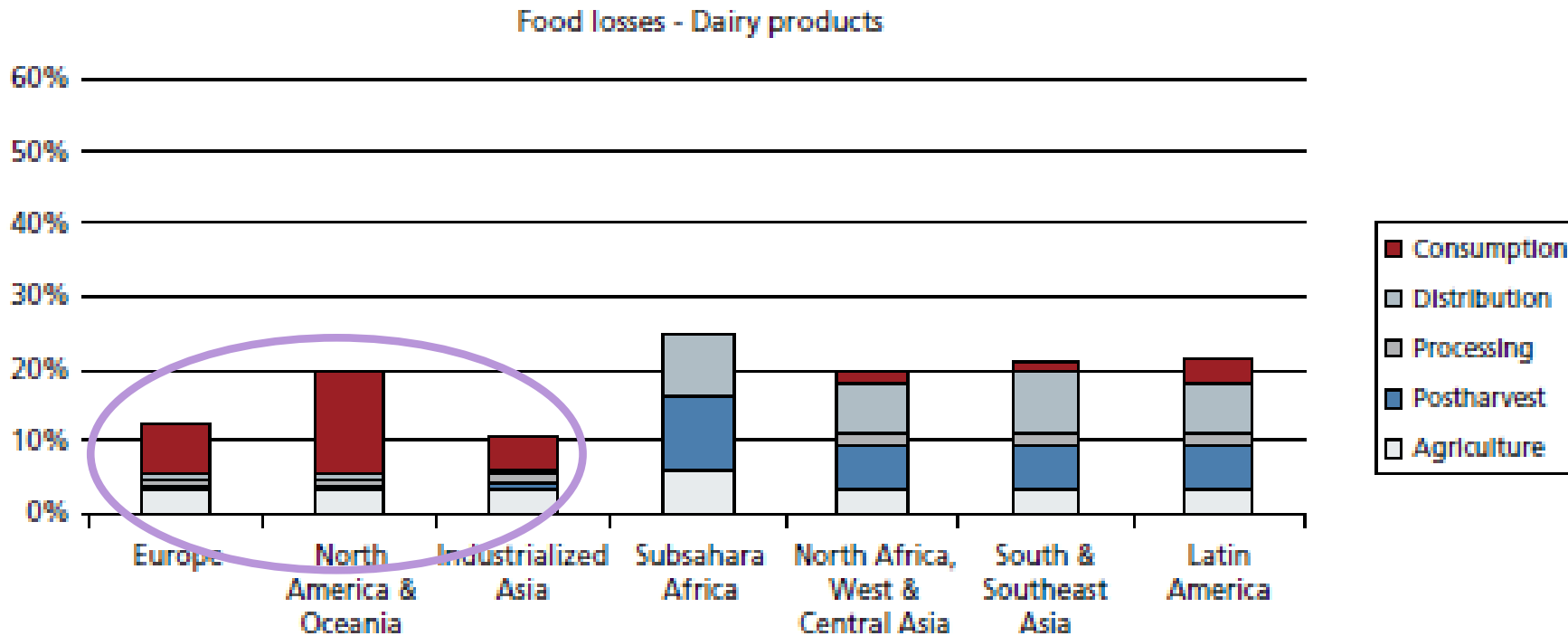
## Consumer Insight 4: Impact on repurchase rate



Source: Danisco survey 2011

# Sustainability – an industry challenge

40 to 65% of dairy waste is generated by households in industrialized regions



Source: Global food losses and food waste - FAO 2011

## Reducing Waste of White Cheese

By adding Protective Cultures

- About **15%** of white cheese is **wasted** in retail and households.
- Global production is estimated at **900,000** metric tons annually
- Studies suggest that **90%** of cheese waste occurs because it is **not used in time**
- A significant part of this waste could be avoided by **increasing shelf life** using Protective Cultures




## Sustainability example: White Cheese

Extending the shelf life of white cheese with 200% - real life experience

Milk →  
Rennet and salt →  
selected bioprotective culture →



This is roughly  
equivalent to  
taking  
**85,000**  
  
off the streets

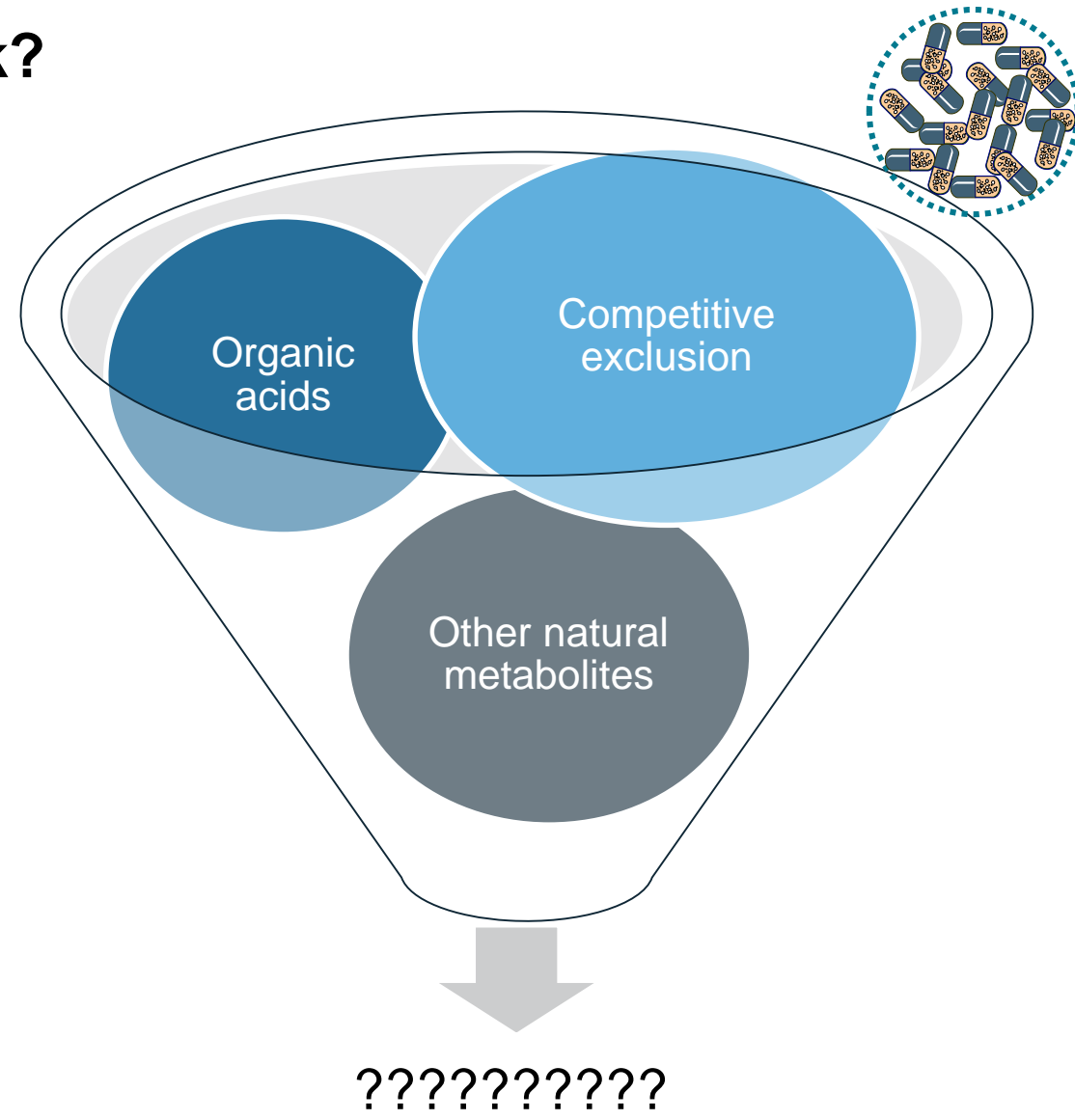
Has the potential  
to reduce waste  
by

**60%**

saving more than  
400,000 tons  
of CO<sub>2</sub> if applied  
to white cheese  
globally



# How & Why Do They Work?



Thank you!

DuPont Nutrition & Health combines in-depth knowledge of food and nutrition with current research and expert science to deliver unmatched value to the food, beverage and dietary supplement industries. We are innovative solvers, drawing on deep consumer insights and a broad product portfolio to help our customers turn challenges into high-value business opportunities.



  
**DANISCO.**