Improving quality and safety and maximizing benefits to consumers and producers

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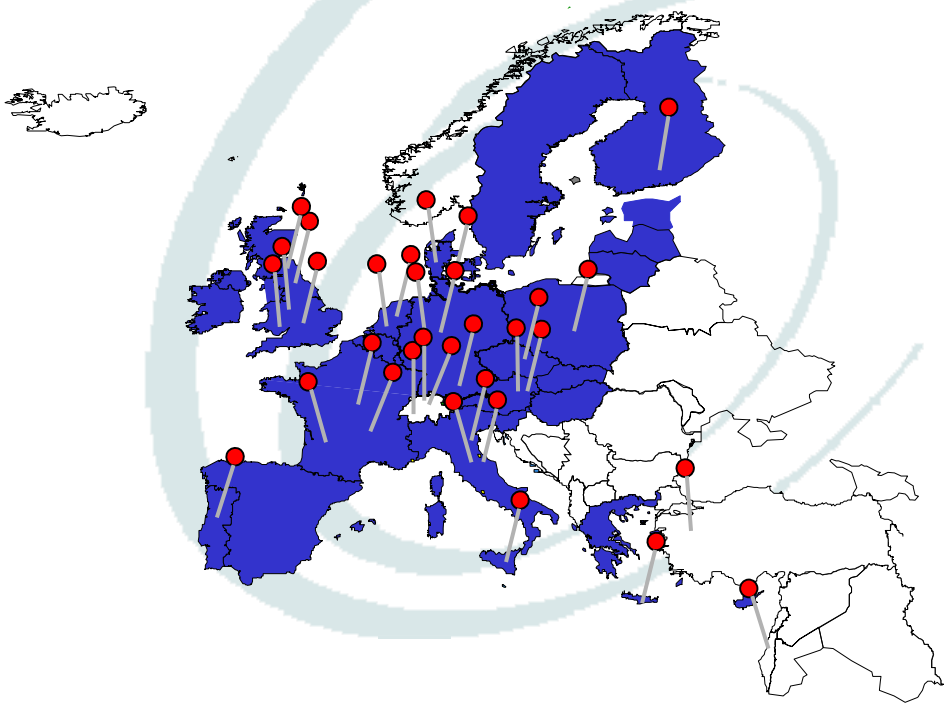

An overall view on the first results of the IP « QualityLowInput Food »

Research DG

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QualityLowInputFood

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- Objectives of the IP *„QualityLowInput Food“.*
- Approach of QLIF to address complex problems.
- First results – in relation to the objectives.
- Conclusions.

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Objectives

- To improve the **quality & nutritional value** of organic and other ”low input” foods in line with **consumer demands** and expectations.
- To **increase the cost-efficiency** all along the organic and other ”low input” food chain, while improving or maintaining its quality.
- To contribute to **minimising food safety risks** all along the food chain (including the stages of production, processing, distribution and consumer food handling).
- To contribute to **reducing environmental impact** and fossil energy use in organic and ”low input” farming.

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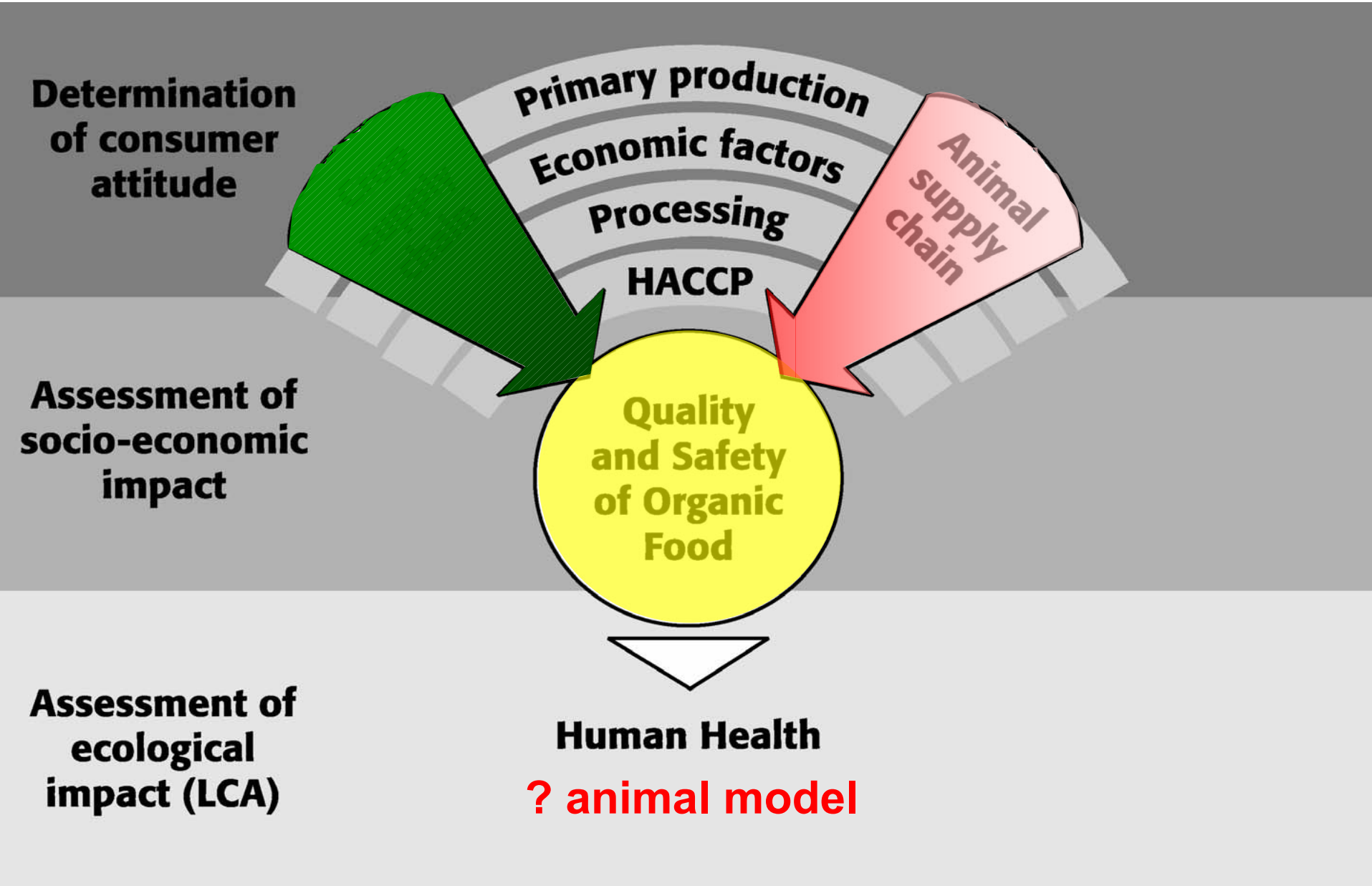
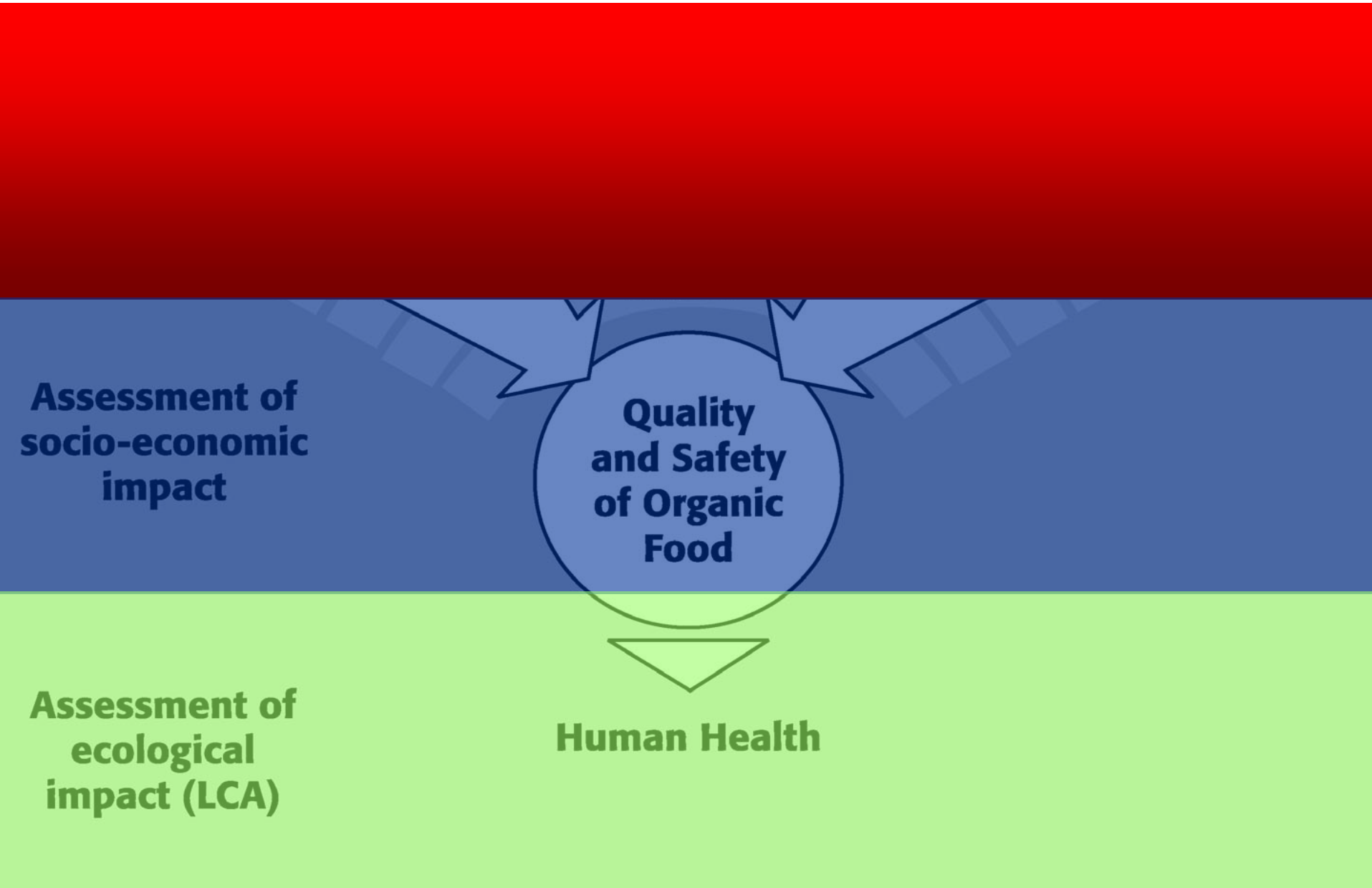
Approach


Determination of consumer attitude
Primary production
Economic factors
Processing
HACCP
Animal supply chain
Assessment of socio-economic impact
Quality and Safety of Organic Food
Assessment of ecological impact (LCA)
Human Health
? animal model

Approach


Assessment of socio-economic impact
Quality and Safety of Organic Food
Assessment of ecological impact (LCA)
Human Health

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Production systems …

Conventional **Low Input** **Organic**

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Production systems …

Conventional Low Input **Organic**

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Production systems …

Low Input

- **Integrated** pest management with action **threshold** (economic, health or aesthetic).
- Low **external** input arable crop production (reduced or no herbicides and pesticides, reduced nitrogen).
- **Pasture-based**, extensive beef rearing.
- Low input dairy systems (**pasture-based, minimum concentrates**).
- Free range egg production.

… and their components

Crop production

1. Fertility management
2. Crop protection
3. Rotational position
4. Variety/Genotype

Animal production

1. Feeding system
2. Health management
3. Husbandry
4. Genotype

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Experimental design at Nafferton farm (Newcastle, UK)

Crop protection	Fertility management: Manure	Fertility management: Mineral NPK
no pesticides no CCC	organic	low input 1
pesticides and CCC	low input 2	conventional

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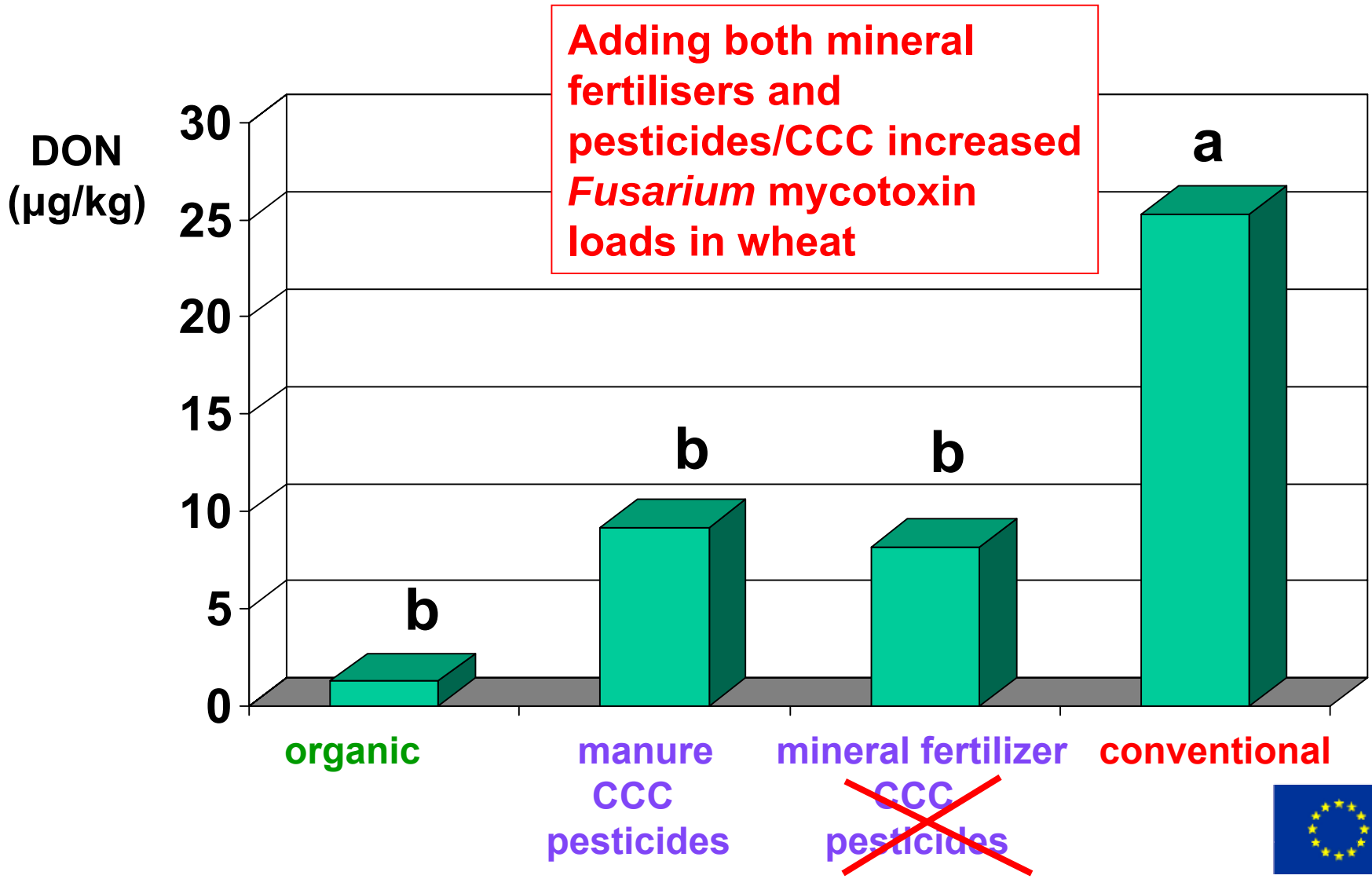
Mycotoxin loads in winter wheat

Mycotoxin loads in winter wheat (2005)



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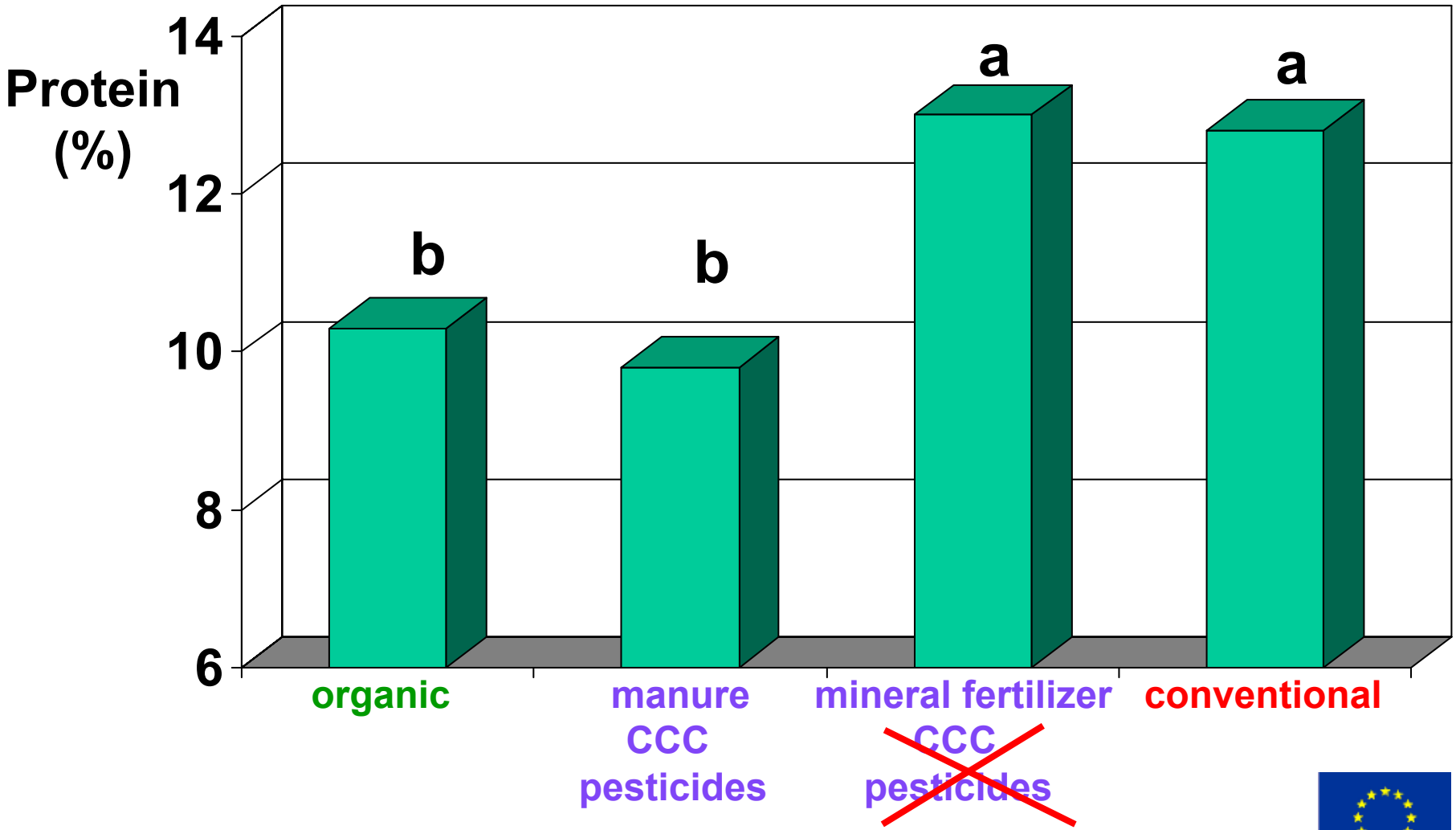
Winter Wheat - Protein Content (2004)



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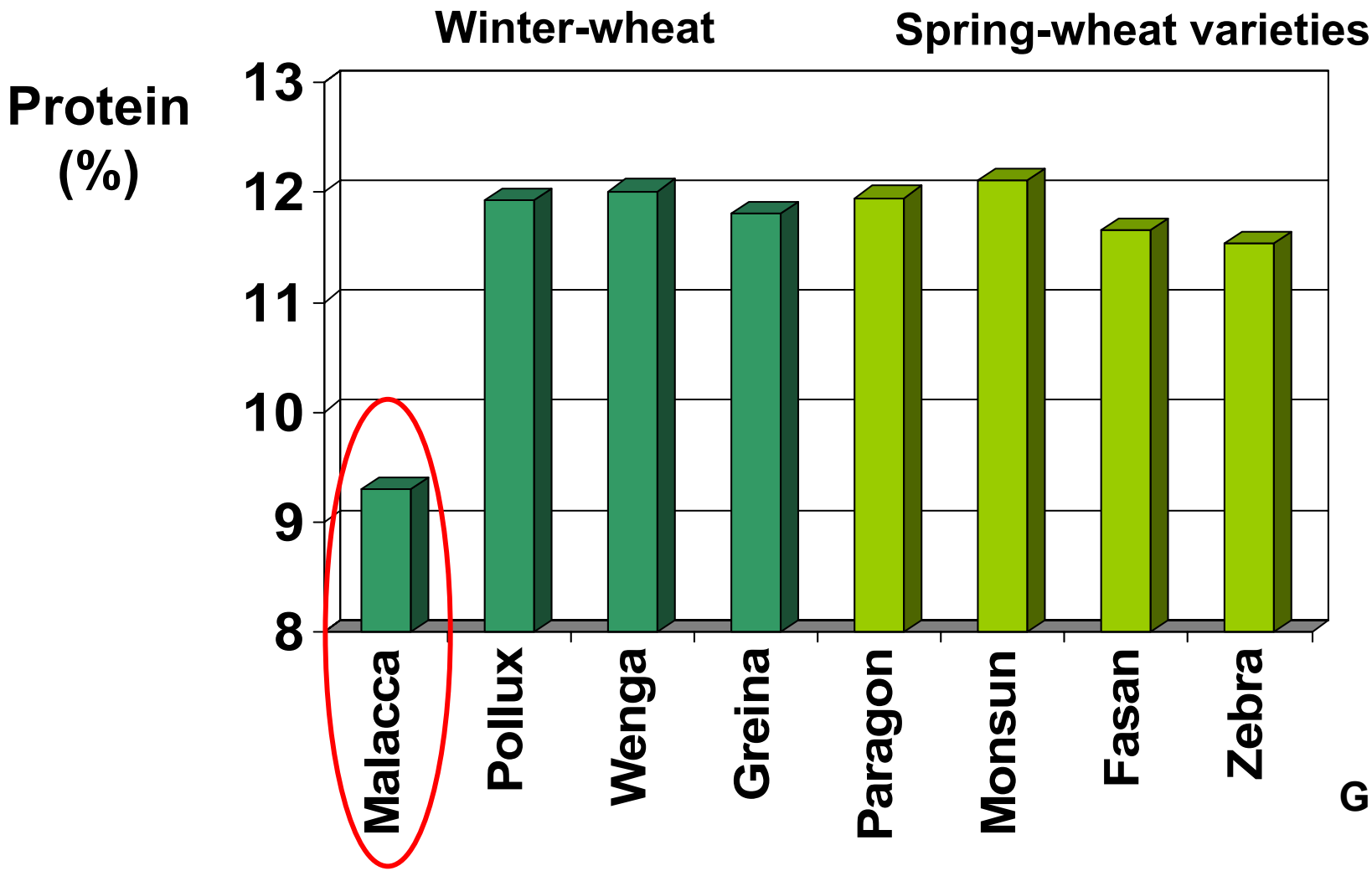
Wheat - Protein content (2005)

Effect of using varieties adapted to organic systems



GO Gilchesters Organics, Stamfordham, UK

Vegetables: Enteric bacteria transfer risks associated with manures?

Lettuce *(Lactuca sativa var. capitata)*

University of Bonn, IOL, Wiesengut farm

Vegetables: Enteric bacteria transfer risks associated with manures?

Parameters analysed:

- Total aerobic bacterial count
- Enterobacteriaceae
- Coliform bacteria
  - *E. coli*
  - *Salmonella enteritidis*

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What is a good apple? And how to produce it organically?

Apple research at DARCOF, **Aarslev**, Denmark.

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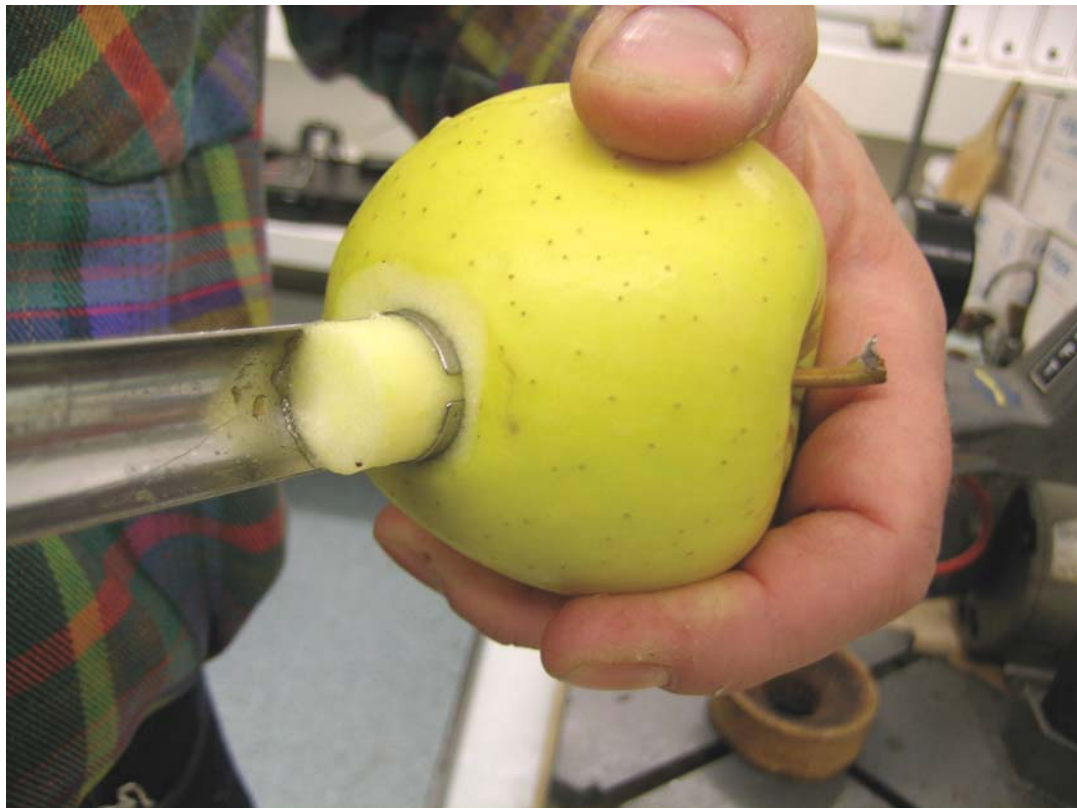
To get to the bottom of things …

- **Impact of fertility managements, planting densities and weed management (soil cover) on:**
- soil and yield parameters.
- apple quality, e.g. disease incidence, mineral contents, technical and sensory quality, aroma analysis (volatiles), mycotoxins (patulin), carotenoids, phenolic compounds.



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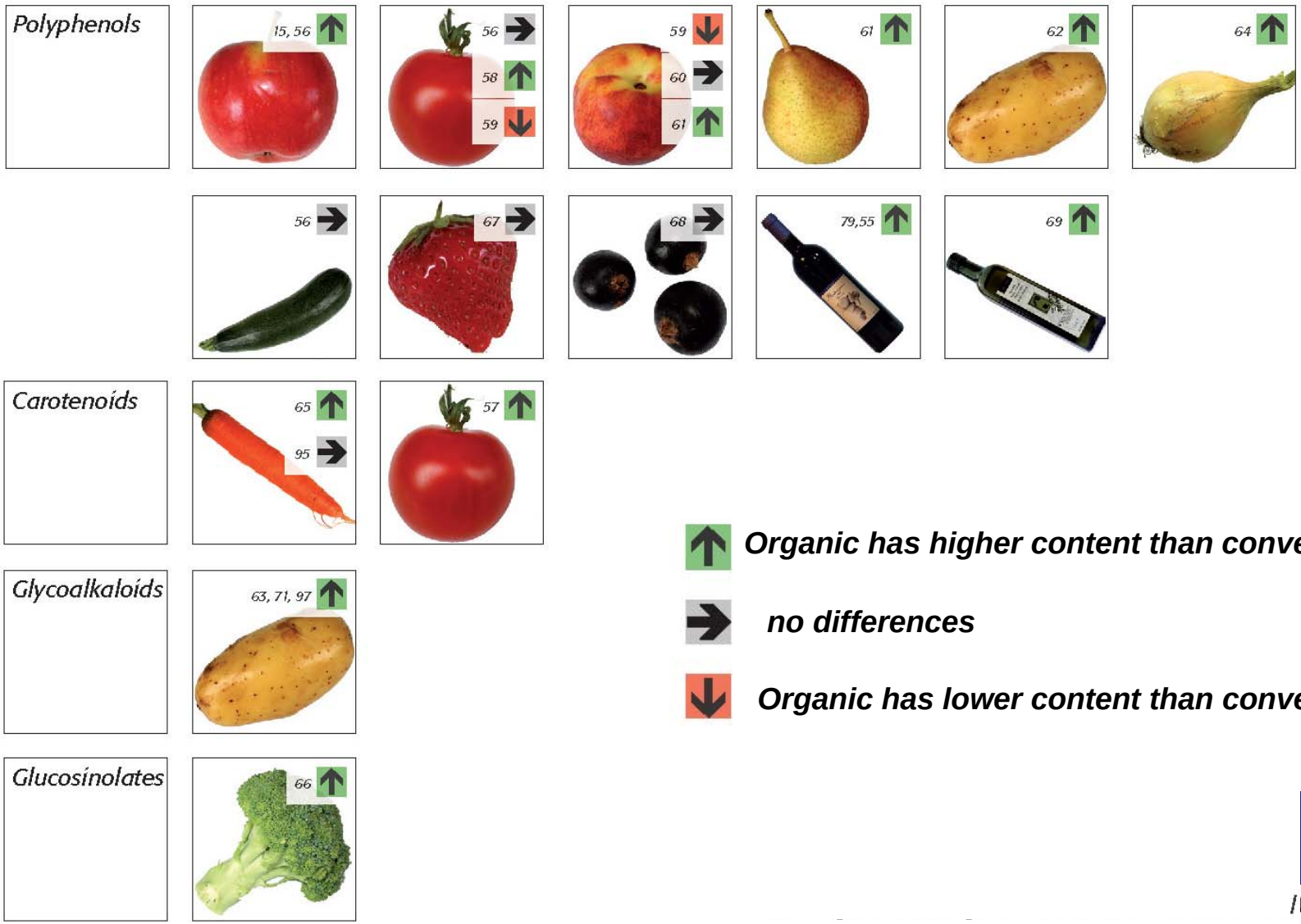
Big potential, but also big variation: e.g. secondary plant metabolites



Organic has higher content than conventional

no differences

Organic has lower content than conventional

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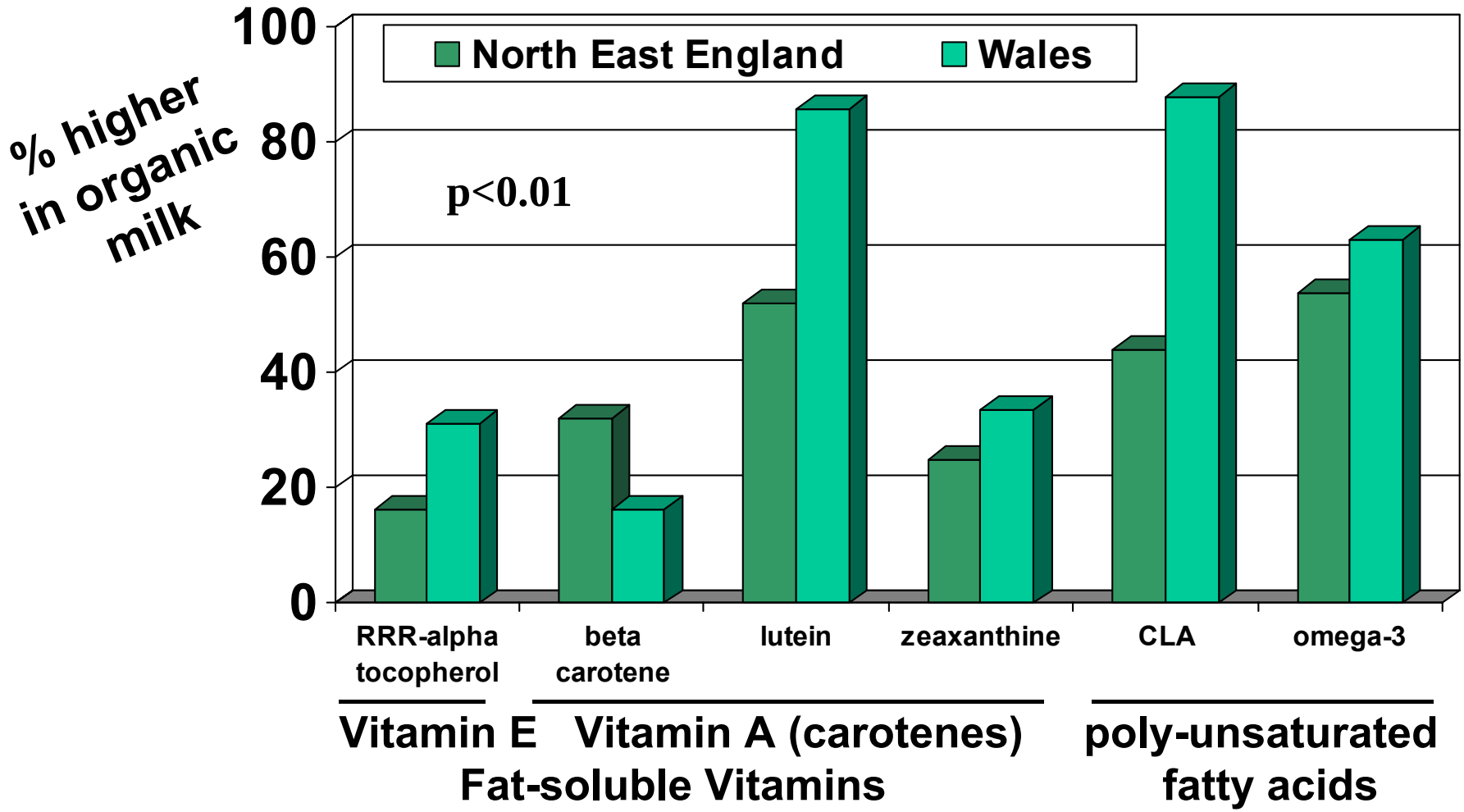
Milk quality (2005/2006)

Effect of organic and conventional production systems



DARCOF (DK), IGER (Wales), University Newcastle, Granolo (I)

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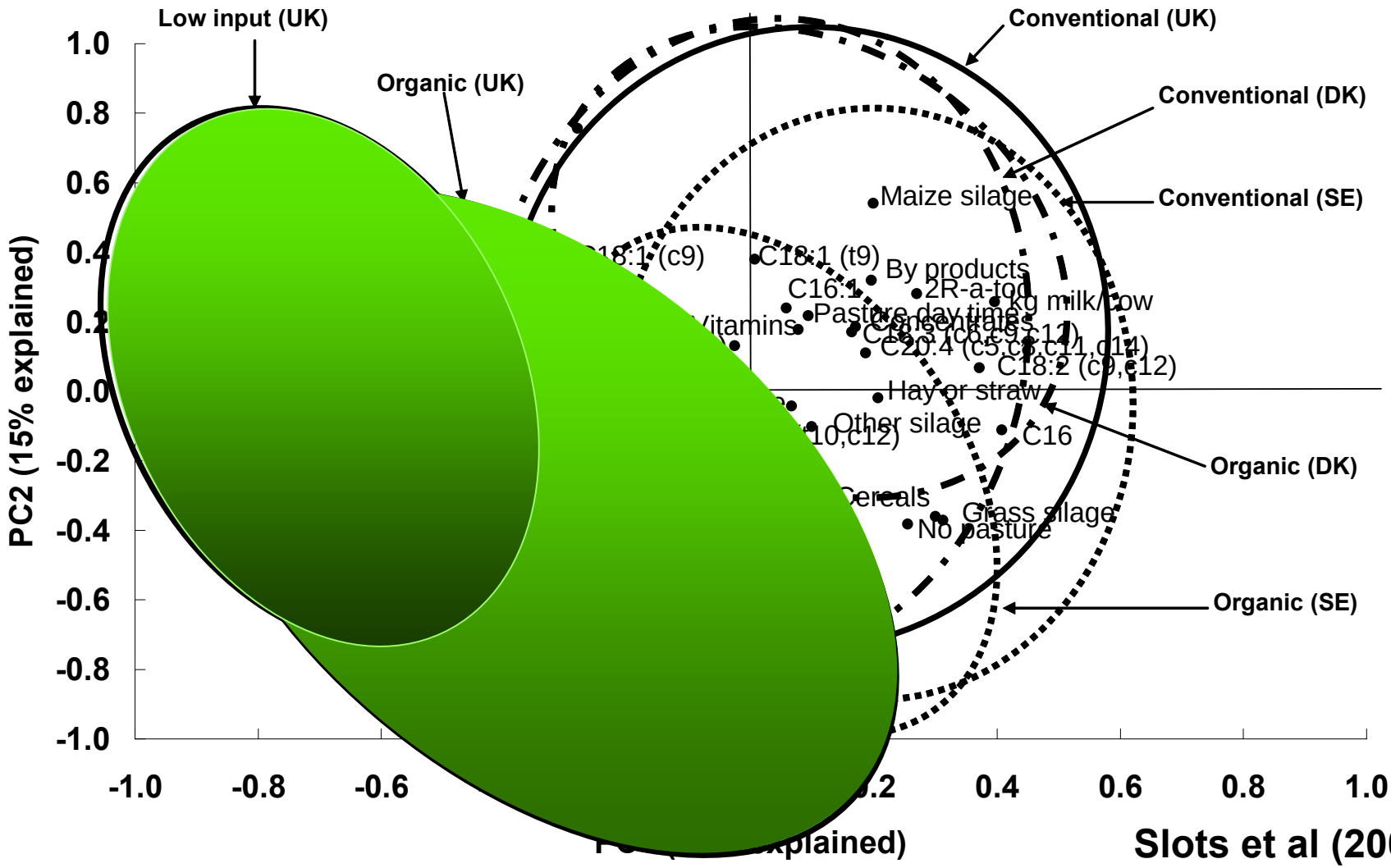
Low input (pasture-based) strategy is equivalent!



Slots et al (2006)
DIAS & University of Newcastle

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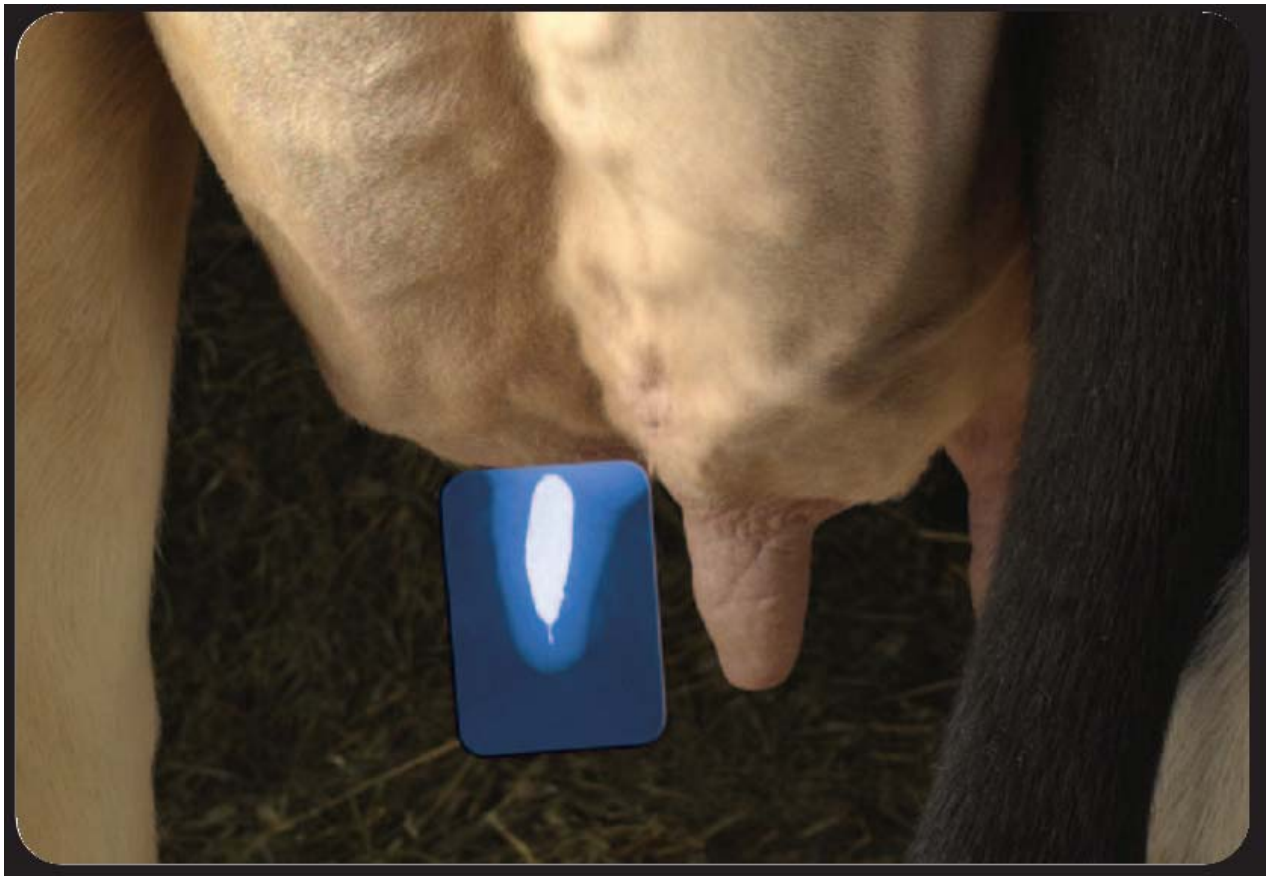
Assessment of processing technologies which may improve the nutritional composition of dairy products

- **Conjugated linoleic acids** (CLA) in dairy products: positive effects on human health (such as anti-mutagenic, anti-carcinogenic, anti-diabetic and anti-atherosclerotic).
- Organic milk higher CLA content (13% to 50%).
- **Preserving or enhancing specific bio-active or functional components** during processing.

First results: Novel processing procedures

- CLA content in processed dairy products (e.g. butter) stable.
- Physical separation processes were successful (CLA enrichment up to 32%)
- Microbiological techniques: *still in investigation*

Innovation: non-antibiotic teat sealer (bismuth)

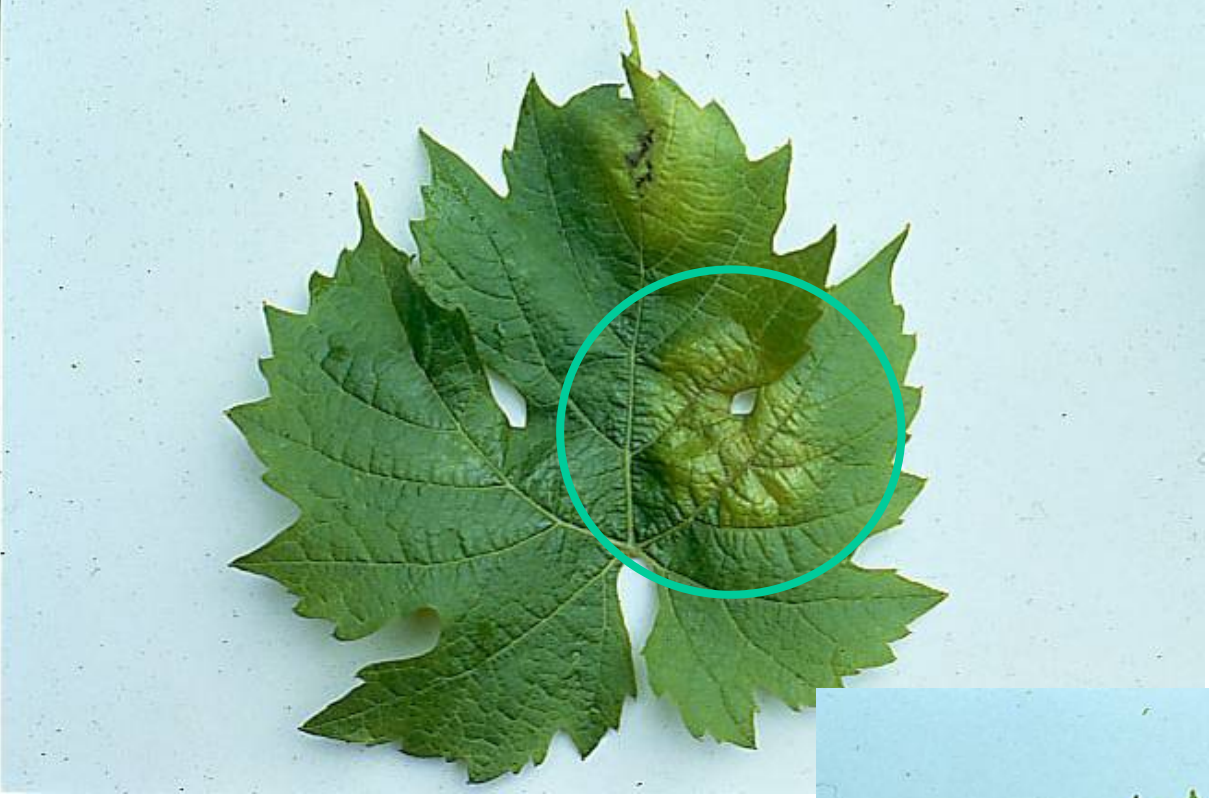


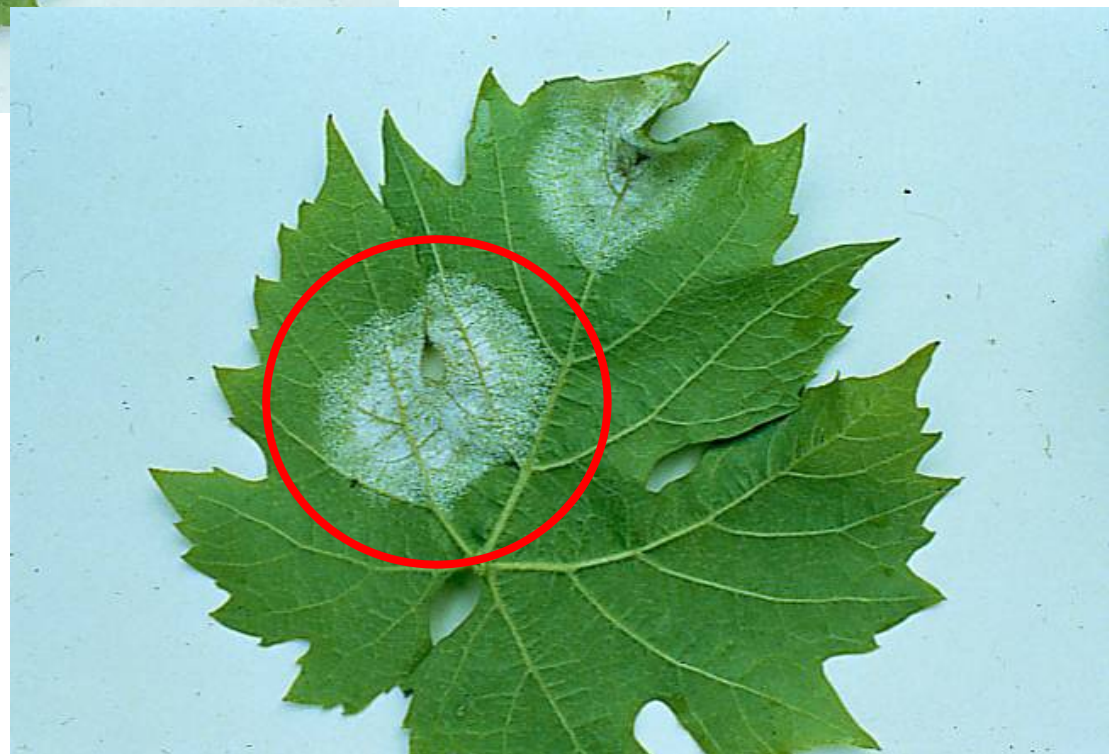
Innovation: probiotics, nutribiotics to reduce risk of gastro-intestinal infections

- Specific strains of Lactic Acid Bacteria (RA 18 *Bifidobacterium animalis* subsp. *Lactis*).
- Addition of oligosacharides or lactose.
- Better formulation by micro-crystals of cellulose.

Induced resistance with naturally occurring elicitors

- BABA (*β-Amino-Butyric Acid):* Bar-Ilan University, Ramat-Gan, Israel.
- Milsana (extract of giant knotweed): Technical Education Institute, Heraklio, Crete.
- Pen (*Penicillium chrysogenum):* Research Institute of Organic Agriculture, FiBL, Switzerland.





Downy Mildew
(Plasmopara viticola)
on vine leaves.

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Subproject 1: Determining consumer expectations and attitudes towards organic and low input food quality and safety

- Analysis of consumer expectations and attitudes.
- Analysis of actual buying behaviour and its evolution.

- University of Newcastle (UK), University of Wales (UK), University of Kassel (D), FiBL (CH), INRA (F), DARCOF (DK), Polytechnical University of Ancona (I), Group de recherche et d'échanges technologiques, Paris (F)

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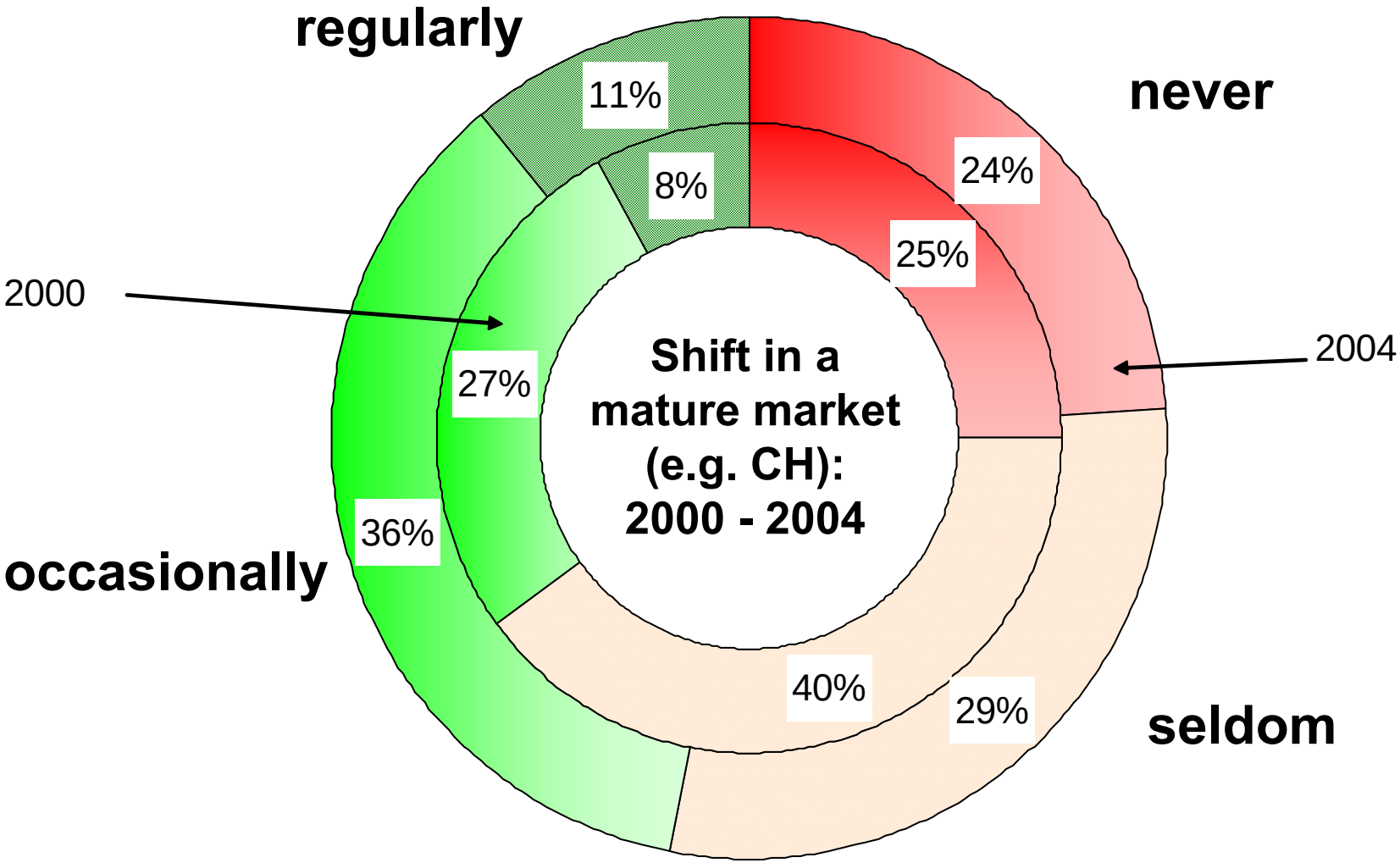
Market research: Target group are occasional buyers



Economic analysis of structures, conduct and performance of supply chains for organic foods in Europe.

Case studies:

	UK	CH	IT	FR	DK	DE	HU	NL
Eggs	X					X		
Milk	X	X			X			
Wheat			X	X			X	
Pork	X							X
Tomatoe			X					X
Apples		X				X		

Additional costs of organic milk

	Farm	Trans-port	Processing	Trans-port	Logistics	Trans-port	shop
DK	20%	20%	0-5%	0	0	0	0
CH	10-20%	30-50%	10%	10%	0	0	5-10%

Conclusions

- Many experimental designs help to explain factors affecting quality, safety and agronomic performance of organic production ➔ a clear and scientific basis for better management on all levels!
- Many extensive surveys of production, consumers, food chains give excellent practical data for a very innovative food sector.

➔ A multifunctional food and farming sector gets more competitive and better manageable!

Outlook

- Organic faming still ‘virginal’ with regard to research innovation.
  ➔ input/output ratio of research excellent.
- Potential of genotype improvements in the context of low input systems not yet exploited (both crops and livestock).
- Organic, local or traditional foods against uniform food: a novel strategiy for private and public health care?

EU-CEE-OFP
European Organic Farming Policy

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organic
Revision

CHANNEL
SIXTH FRAMEWORK PROGRAMME
FOOD-CT-2004-003375