CORE organic

RISKS AND RECOMMENDATIONS REGARDING HUMAN PATHOGENS IN ORGANIC VEGETABLE PRODUCTION CHAINS

PATHORGANIC

BACKGROUND

Increase in outbreaks of human diseases associated with the consumption of vegetables

- September 2006 *E. coli* outbreak related to spinach (USA)
- Two foodborne outbreaks in the EU related to alfalfa sprouts in 2007:
  Outbreak in Sweden: *Salmonella* Stanley
  Outbreak in Norway, Denmark and Finland: *Salmonella* Weltevreden
- STEC 2007 outbreaks in Iceland and Netherlands related to pre-packaged shredded iceberg lettuce

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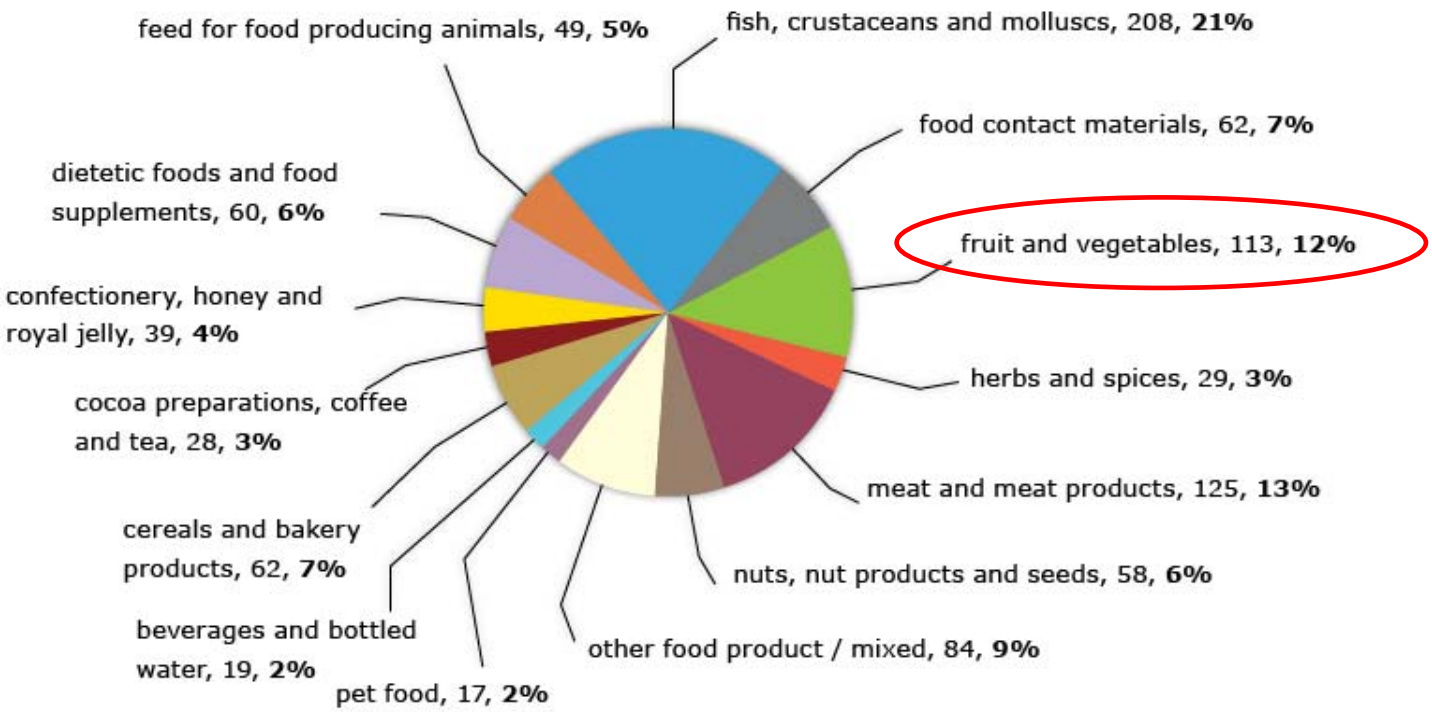
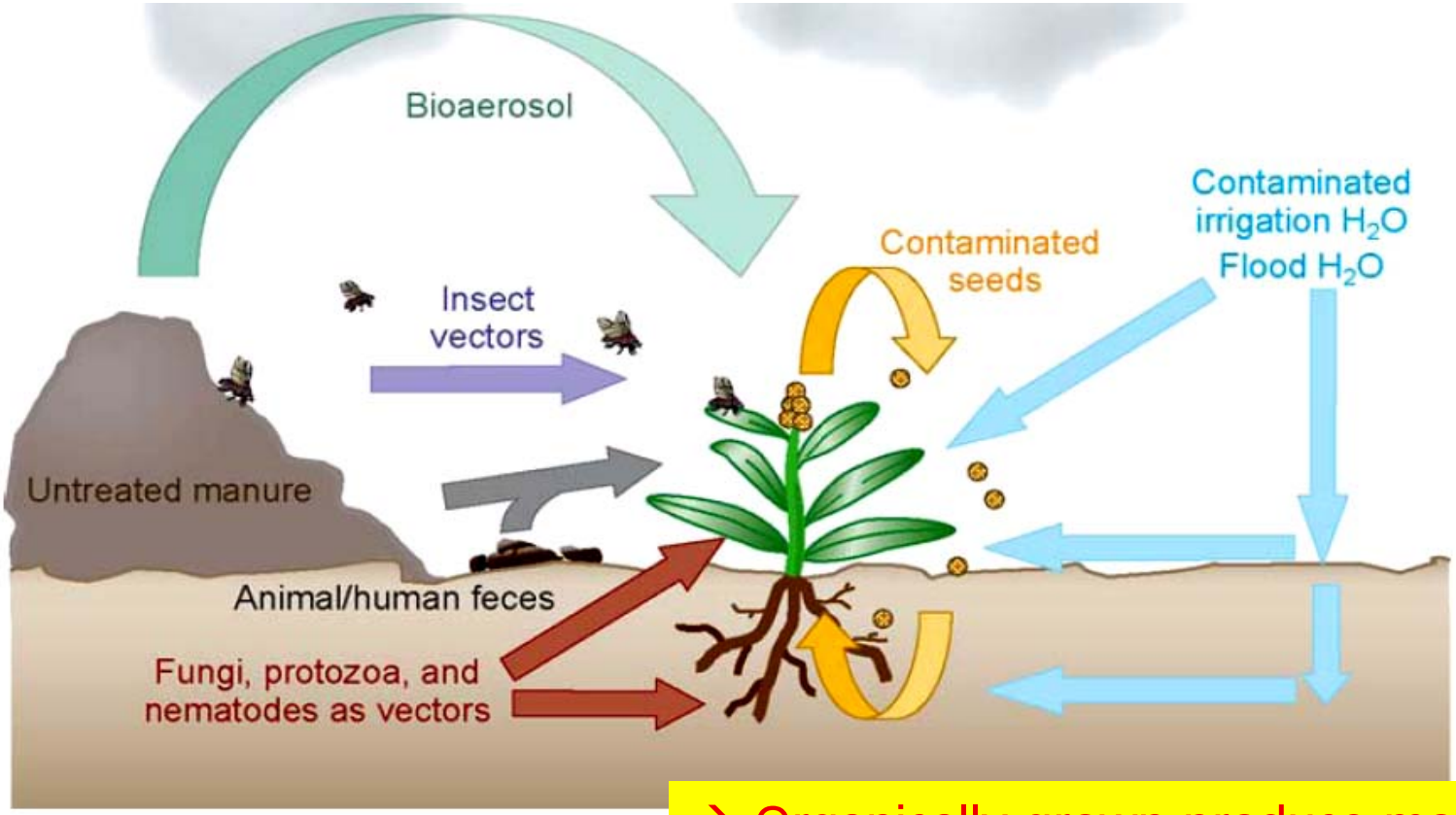
Number of RASFF alert notifications 2007 by product category

Rapid Alert System for Food and Feed (RASFF)

Network involving the EU Member States, Norway, Liechtenstein and Iceland
Alert notifications are sent out when food presenting the risk is on the market and rapid action is required



PATHWAYS OF INFESTATION IN THE FIELD



→ Organically grown produce more at risk?

Factors that can contribute to the contamination of fruit and vegetables with human enteric pathogens in the field. Brandl 2006.

OBJECTIVES OF PATHORGANIC

Principal aim: to improve the quality and safety of organically produced vegetables

Harmonization of methods

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Survey of vegetables regarding enteric pathogen infestation in five European countries

Mechanisms / factors affecting colonization

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Recommendations

Survey strategy

WP 1

Literature survey and questionnaires

Workshop "Method Harmonization"

Selection of plants and manure types for the surveys

WP 2

Sampling of manures in every country (40 samples per country)

DNA from enrichment cultures and specific PCR (all samples) and ISO (country samples) analyses

E. coli	*Salmonella*	*Listeria*	*Campylobacter*	*Staphylococcus*
CH	AT/CH	DE	SE	AT

Selection of 2 to 3 farms per country for sampling and analysis of vegetables

DNA from enrichment cultures and specific PCR analyses (all samples)

E. coli	*Salmonella*	*Listeria*	*Campylobacter*	*Staphylococcus*
CH	AT/CH	DE	SE	AT

Strategy for vegetable screening

- 2 to 3 fields per country selected
- 500 plants of spinach / lettuce collected from each field
- Pooling of 25 g of outer and inner leaves from 10 plants each

➔ 50 samples per field processed for enrichment cultures

Analysis for pathogen prevalence in five different labs

Pathogen contamination of fresh plant produce could be a serious issue!

WP 3

Mechanisms / factors affecting colonization

- Are plant genotypes available which are less prone to pathogen colonization?
- How does the manure type / treatment affect pathogen persistence?
- Are some pathogen strains better capable of plant colonization?
- Are soils in organic farming (due to higher microbial diversity) less prone to pathogen infestation than conventionally treated soils?

WP 4

Recommendations

Stakeholder workshop, leaflets and farmers' brochures

Which challenges for the organic sector will project results contribute to solve?

Challenge: Increasing public demand for SAFE organic food

- Risk assessment
- Recommendations regarding manure treatment & application
- Communication with farmers throughout the project for increasing risk awareness
- Testing (organic) soils for their biological buffering capacity
- Indicating whether use of specific plant genotypes has potential to limit pathogen colonization
- Baseline for further improvements in organic farming

Which new research questions and hypotheses has the project raised?

- **Plant breeding** may provide cultivars restricting the colonization of certain human pathogens
- **Bacterial strains**, possibly also plant growth-promoting, may be inoculated to out-compete „invading“ pathogens
- **Post-harvest practices** have to be carefully assessed in terms of further proliferation of human pathogens
- **Genetic markers** correlating with plant colonization traits may be applied in epidemiological surveillance programs

Which challenges do you see in the future for the organic sector and which research needs do they point to?

- Spread of antibiotic resistance genes
- Climate change and increased plant colonization by human pathogens
- Increasing demand for ready-to-eat vegetables and potential consequences for product safety
- Increasing global trade, also of organic products, and potential consequences for product safety

Added value of transnational research

- Global challenges can only be met by multinational collaboration
- Varying climatic, environmental and regulatory conditions can be only addressed by multinational collaboration
- Complimentary expertise can be rarely encountered within one country
- Value of multinational projects for the organic farming sector is higher (more data, more widespread information, better promotion...)

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