RISKS AND RECOMMENDATIONS REGARDING HUMAN PATHOGENS IN ORGANIC VEGETABLE PRODUCTION CHAINS

CORE organic

PATH ORGANIC
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

Eurosurveillance, Volume 12, Issue 44, 01 November 2007
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
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

Survey of vegetables regarding enteric pathogen infestation in five European countries

Mechanisms / factors affecting colonization

Recommendations
Survey strategy

WP 1

Selection of plants and manure types for surveys

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

WP 2

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

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

DNA from enrichment cultures and specific PCR analyses (all samples)
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
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...)
Thank you!

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