

CORE organic

RISKS AND RECOMMENDATIONS REGARDING HUMAN PATHOGENS
IN ORGANIC VEGETABLE PRODUCTION

PATH  ORGANIC

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AUSTRIAN RESEARCH CENTERS

BACKGROUND

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

Table 2. Largest *E. coli* O157:H7 outbreaks.

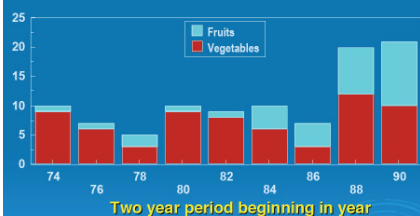
Year	Place	No. of people sick	Contamination source
1989	Montana, USA	243	Undercooked ground beef
1996	Sakai, Japan	5,727	Poorly washed white radish sprouts
1996	Scotland, UK	496	Undercooked ground beef
2000	Walkerton, Canada	>2,000	Contaminated drinking water
2002	Pennsylvania, USA	51	Petting infected dairy animals

September 2006 *E. coli* spinach cases rise to 173
E. coli outbreak caused \$77M losses



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Identification of Increased Incidence of Produce Related Outbreaks in Early 1990s



Source: CDC Foodborne outbreak surveillance system

Table 7. General Outbreaks of IID Associated with the Consumption of Salad Items, Vegetables or Fruit* Reported to CDSC, England & Wales, 1992-1999

Year	General Outbreaks	Foodborne Outbreaks	Salad/fruit/veg Outbreaks	Percent
1992	373	224	9	4.0
1993	456	227	5	2.2
1994	488	191	15	7.9
1995	834	178	5	2.8
1996	732	161	12	7.5
1997	591	220	3	1.4
1998	609	120	5	4.2
1999	505	87	6	6.9
Total	4588	1408	60	4.3

Source: GSURV database, Epidemiology Division, PHLS CDSC - 07/06/00

Table 2 Number of outbreaks^a linked to single items of fresh produce in the United States in 1990-2004

Produce type	<i>S. enterica</i>	Pathogenic <i>E. coli</i>	<i>Shigella</i> spp.	<i>Campylobacter</i> spp.
Fruit ^b	32 (76) ^c	8 (19)	1 (2)	1 (2)
Leafy vegetables	8 (30)	13 (48)	3 (11)	3 (11)
Seed sprouts	9 (60)	6 (40)	0	0
Total	49	27	4	4

Brandl 2006

Factors involved in the emergence of produce-linked outbreaks

Changes in the produce industry

- Intensification and centralization of production
- Wider distribution of produce over longer distances
- Introduction of minimally processed produce
- Increased import of fresh produce

Changes in consumer habits

- Increased consumption of meals outside the home
- Increased popularity of salad bars
- Increased consumption of fresh fruits and vegetables, and fresh fruit juices

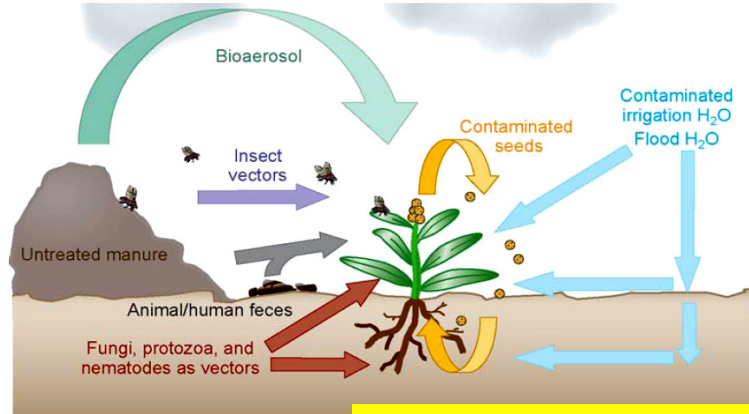
Increased size of at-risk population (elderly, immunocompromised)

Enhanced epidemiological surveillance

Improved methods to identify and track pathogens

Emerging pathogens with low infectious dose

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.

- Increased import of organically produced vegetables

GLOBAL ISSUE

- Different agricultural practises in different countries
- Different climatic and environmental conditions in different countries
- Little information on prevalence of human pathogens in European products
- No European guidelines to avoid pathogen contamination in organic farming



Multi-national and multi-disciplinary project



Partners

Austrian Research Centers (A), University of Natural Resources and Applied Biosciences (A), Danish Inst. for Food and Veterinary Research (DK), FiBL (CH), The Royal Veterinary and Agricultural University (DK), Agroscope FAW Wädenswil (CH), Agroscope Reckenholz-Tänikon (CH), GSF (D), Swedish University of Agricultural Sciences (SE), Wageningen University (NL), Plant Research International B.V. (NL)



Expertises

- Knowledge on national agricultural procedures in organic farming
- Food safety and quality control
- Pathogen detection and surveillance (5 pathogens!)
- Analysis of animal manure and slurries
- Plant-microbe interactions
- Ecology of enteric pathogens (5 pathogens!)
- Greenhouse / field experiments
- Modeling

OBJECTIVES OF PATHORGANIC

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

Harmonization of methods



Survey of vegetables regarding enteric pathogens in five European countries

Mechanisms / factors affecting the colonization



Recommendations

WP1. Current practise and harmonization of methods

Modeling expertise
(DK, NL)

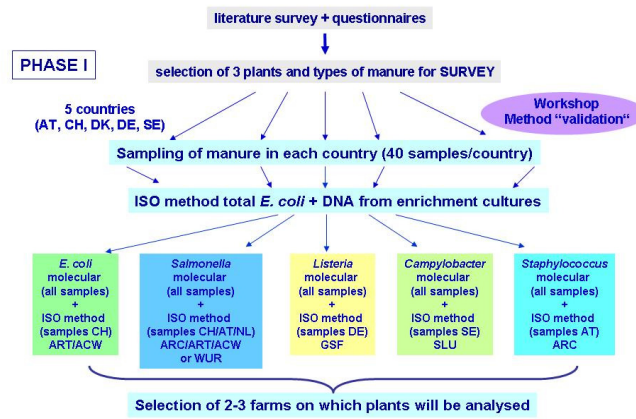
Knowledge of organic farming practises
(all countries, CH)

- Extension of a model for pathogen transfer through use of manure-based fertilizers
- Description of food chains through evaluation of questionnaires
- Comprehensive toolbox for the detection of pathogens
- Established protocols for sampling and surveys

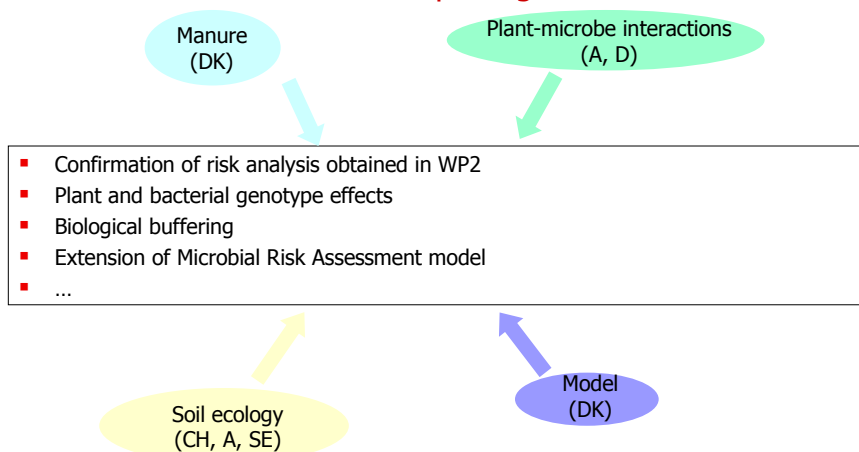
Sampling strategies
(CH, NL, A, SE)

Pathogen detection
(A, D, SE, CH, DK)

WP2. Surveys of food-borne pathogens



WP3. Mechanistic description of food contamination with human pathogens



WP4. Final risk assessment, communication and recommendation

- Recommendations for a realistic risk model for various pathogens in risk plants
- Recommendations for improved farm management procedures
- Workshop with various stakeholders
- Scientific and non-scientific publications



OVERVIEW OF WPs

