

**Risks and Recommendations Regarding
Human Pathogens in Organic Vegetable
Production Chains (PATHORGANIC)**

PATHORGANIC

**Assessing and Reducing Risks of
Pathogen Contamination in Organic
Vegetables**

As consumers strive to eat healthy diets, they show an increasing demand for uncooked and minimally processed vegetables preferentially from organic production lines. At the same time, outbreaks of disease have been traced back to the consumption of fresh plant produce contaminated with enteric pathogens. PathOrganic will define guidelines to confront food safety risks in organic vegetable production.



PathOrganic addresses the quality and safety of organically produced vegetables throughout the production chain. The project's main concern is the contamination of fresh plant produce with bacterial pathogens. Thus, it examines how factors such as environment, plant genotype, fertilizer application technique or soil buffering affect pathogen spread and persistence in organic vegetable products. As a central part of the project, field surveys of organic farming systems will be carried out in six European countries and potential risk factors will be thoroughly evaluated. Finally, recommendations will be provided for improved procedures in organic vegetable production lines with the aim to secure organic food safety.

Specific objectives are:

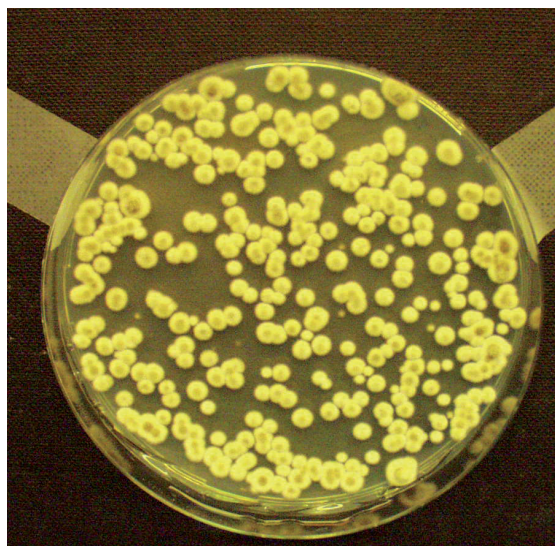
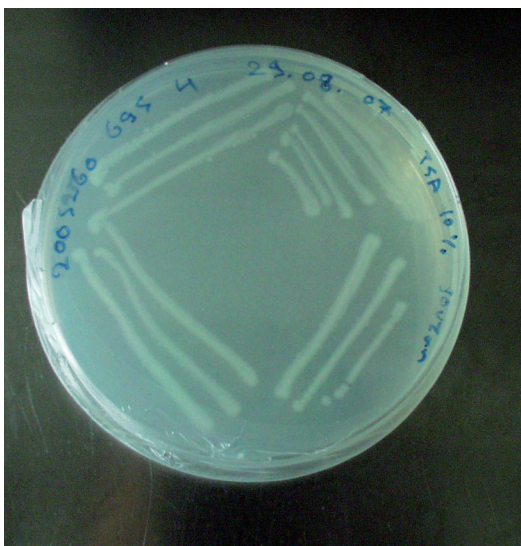
- ▶ To **survey the presence of human pathogens** in organic plant produce. Field surveys of organic farming systems will be performed and plant products will be sampled in six European countries.
- ▶ To **determine critical control points** (CCPs). Factors suggesting a problem with food safety will be subjected to detailed analysis in specially designed greenhouse and field experiments.
- ▶ To **provide recommendations** for improved procedures that help secure the quality of certified organic vegetable production chains.

Safety Guidelines Are Lacking

A continuous rise in the number of outbreaks of diseases associated with the consumption of vegetables has been observed during the last few decades. The food safety issue seems to apply particularly to organic production systems, where the use of animal manure for fertilization constitutes an elevated risk of contamination of fresh produce with human pathogens. On the other hand, organic soils may be better able to suppress introduced pathogens due to higher microbial diversity than conventional soils. From a European perspective, the prevalence of human pathogens on vegetables and their involvement in outbreaks are not well documented, and safety guidelines defining measures to be taken and criteria to be obtained for minimizing contamination are lacking.

Pathways of Contamination with Bacterial Pathogens

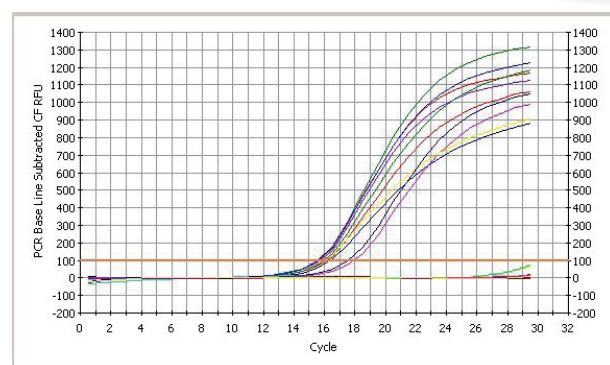
Most cases of human disease linked to fresh plant produce consumption involve bacterial faecal contamination. Both manure and irrigation water have been evidenced to contribute significantly to the spreading of human pathogens to fields and crops. A variety of human pathogens have been shown not only to attach to and proliferate on the surfaces of plant tissues, but to survive and multiply also inside plant tissues. The largest reported vegetable-borne outbreak to date occurred in Japan in 1996 caused by *E. coli* O157:H7, and in 2006 the same pathogen triggered a spinach-linked outbreak in the U.S. Besides pathogenic *E. coli*,



investigations within PathOrganic target *Salmonella enterica*, which has been isolated from many types of vegetable such as lettuce, seed sprouts or melon. Other pathogens of concern include *Campylobacter spp.*, which is frequently found in the farming environment, *Listeria monocytogenes*, commonly found on decaying plant matter, and *Staphylococcus aureus*, which incidentally has been detected also in plant produce.

Risk Assessment and Recommendations

PathOrganic aims to perform a quantitative microbial risk assessment for organically grown horticultural products. Based on a transnational survey on organic plant produce, “risk crops” and “risk factors” will be identified and critical control points will be determined. This information together with experimental findings will be combined in a quantitative risk assessment model for contamination of a selected risk plant with enteric bacteria. Finally, recommendations for production procedures which help to secure the safety of organically grown vegetables will be formulated, and will subsequently be dispersed through a brochure and via a workshop with stakeholders.



Project Consortium

Universities and research centres from six European countries work closely together as partners within PathOrganic. The consortium is characterized by multi-disciplinarity and highly complementary expertise.

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Work packages

PathOrganic has four work packages (WPs) with the following main activities:

- WP1 will investigate the **common practice** in organic vegetable production in the participating countries and specifically **adapt analytical techniques** for pathogen detection and quantification in fresh plant produce.
- WP2 will **identify high-risk crops** and production systems and determine **critical control points** in the production chains.
- WP3 will supply data for **microbial risk assessment** and examine specific risk factors in **experimental trials**.
- WP4 will establish a **risk assessment model**, formulate **recommendations** for improved farm management procedures, and present project results in **consumer-oriented publications**.

Further information

You will find further information at the project website <http://pathorganic.coreportal.org/>.

The project is initiated as a result of the cooperation in CORE Organic. In this EU supported ERA Network, 11 European research funding organisations have launched a joint call, which intends to step up cooperation between national research activities in organic food and farming. Further information on CORE Organic can be obtained at www.coreorganic.org.

By subscribing to the CORE Organic news you can follow the progress in the project. Subscription is possible via www.coreorganic.org.

