Influence of cattle manure on the bacteriological quality of organic Iceberg lettuce

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Introduction

- Increasing occurrence of food borne diseases associated with fresh fruits and vegetables

- Possibilities for contamination of fresh produce from farm level to consumers:
  - Production
  - Harvesting
  - Processing
  - Storage
Introduction

- Manure may harbour human pathogen bacteria
- Organic plant production is based on organic fertilizer, mainly farmyard manure
- Composting - possible method to sanitize fresh manure - no requirement of composting or sanitizing before use in organic plant production
Introduction

Can consumption of organically grown plant products for fresh consumption constitute a risk for food borne diseases?
Experimental design

- The field trials were carried out in 2001 and 2002 in Tingvoll on the west coast of Norway on an organic dairy farm

- Iceberg lettuce

- Fertilizing treatments
  - Slurry
  - Solid manure
  - Compost
  - Inorganic fertilizer
Composting
Experimental design
Experimental design

- Bacterial analysis:
  - Faecal indicator bacteria: thermotolerant coliform bacteria and *E. coli*
  - The pathogens:
    - *E. coli* O157:H7,
    - *Salmonella* spp
    - *L. monocytogenes*
Results

Manure:

- Significant difference in numbers of faecal indicator bacteria was detected between untreated manure and inorganic fertilizer.

- In 2002 *E. coli* O157:H7 was recovered from:
  - Slurry (10 of 10 samples)
  - Solid manure (8 of 10 samples)
Results

Fertilized soil:

- One week after fertilizing, the only difference which could be detected in numbers of faecal indicator bacteria was between soils fertilized with inorganic fertilizer and slurry.

- In 2002, one week after fertilizing, *E. coli* O157:H7 was recovered from soils fertilized with:
  - Slurry (9 of 10 samples)
  - Solid manure (1 of 10 samples)

- *E. coli* O157:H7 was not recovered from the soils 7 – 41 weeks after applying manure.
Results

Lettuce:

- No difference in bacteriological quality
- The levels of faecal indicator bacteria were low
- *Escherichia coli* O157:H7, *Salmonella* spp. and *L. monocytogenes* were not detected in any samples of lettuce
Conclusion

- The results indicate that lettuce fertilized with manure does not pose a greater risk for food borne diseases than lettuce fertilized with inorganic fertilizer