

# Contaminants and micro-organisms in organic and conventional food products

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# Potential differences between organic and conventional

Less residues of agricultural chemicals ?

Veterinary drugs

Pesticides

Herbicides

Contaminants and micro-organisms

Less nitrate in organic

Higher levels of environmental contaminants in organic ?

Higher levels of mycotoxins in organic ?

Differences in contamination with micro-organisms ?

Less antibiotic-resistant bacteria

# Survey on organic products

Sponsored by Ministry of Agriculture, Nature and Food Quality and the Dutch Food and Consumer Product Safety Authority

- Choice for most relevant products in The Netherlands
- Both plant and animal products
- No duplication with ongoing research  
E.g. no work on dioxins, toxoplasma, patulin

## Food products and parameters

Food product	Contaminants
Wheat	Heavy metals, mycotoxins, pesticides
Lettuce	Heavy metals, nitrate, pesticides, salmonella, E coli O157
Carrot	Heavy metals, nitrate, pesticides
Potato	Heavy metals, nitrate, pesticides
Fattening pig	Salmonella, E coli O157, Campylobacter, antibiotic resistant bacteria in manure, heavy metals and veterinary medicines in meat and kidney
Dairy cows	E coli O157 in manure, veterinary medicines in kidney
Laying hens	Salmonella in manure, heavy metals, antibiotics and coccidiostatica in eggs
Broiler	Salmonella, E coli O157, Campylobacter and antibiotic resistant bacteria in manure

# Sampling and analysis

- Samples were partly collected at the farms, partly at the slaughterhouse
- Products traced back to producer and accompanied by survey about the production methods and experience
- Most analysis at RIKILT, antibiotic-resistant bacteria at CIDC, Survey about production methods and experience by LBI
- Sampling in 2003-2004



## DON in wheat (2004)

	Until 24 <sup>th</sup> August		After 24 <sup>th</sup> August	
	DON (mg/kg)	num ber	DON (mg/kg)	numb er
Organic	<0.5 (<0.50-0.52)	7	1.7 (<0.50-11)	15
Conven tional	<0.5 (<0.50-1.5)	12	2.7 (0.52-6.3)	5

Similar results in recent German and Norwegian studies

# Survey lettuce



Product	Prod.	N=	Nitraat (mg/kg)	Cadmium (mg/kg)
Iceberg lettuce	Org	13	970	<0.02-0.022(n=5)
Iceberg lettuce	Con	13	978	<0.02-0.038(n=4)
Lettuce	Org	19	1342	<0.02-0.042(n=6)
Lettuce	Con	19	3216	<0.02-0.052(n=8)

No *E. coli* and *Salmonella* detected in any sample

# Nitrate in carrot



Production	year	N=	lowest	average	highest
organic	2003	20	34	232	449
organic	2004	15	11	230	864
Conv.	2004	15	16	70	180

Confirmed by recent French study but contrary to previous Dutch study:

Adverse trend, due to use of too much dung ? Advice to farmers



# Microbial contamination in pigs



## *Salmonella*

- Overall incidence 27% (conventional around 30%)
- Incidence seems dependent on experience
  - 50% in “young” organic farms (1-4y)
  - 1 out of 14 farms with long experience (6-14)
- Coincidence ?
- **Requires follow-up**

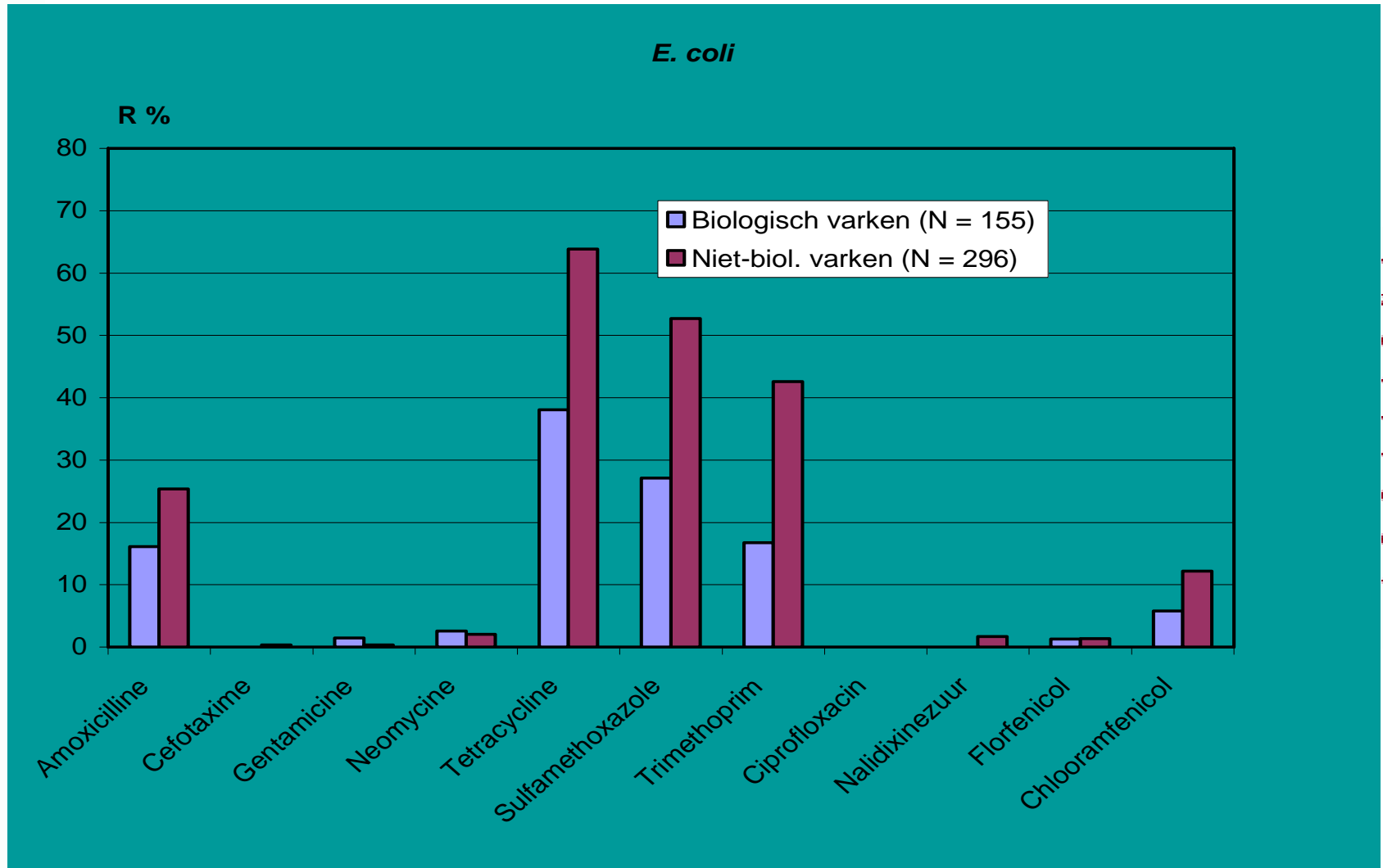
## *Campylobacter*

- Contamination, around 55%

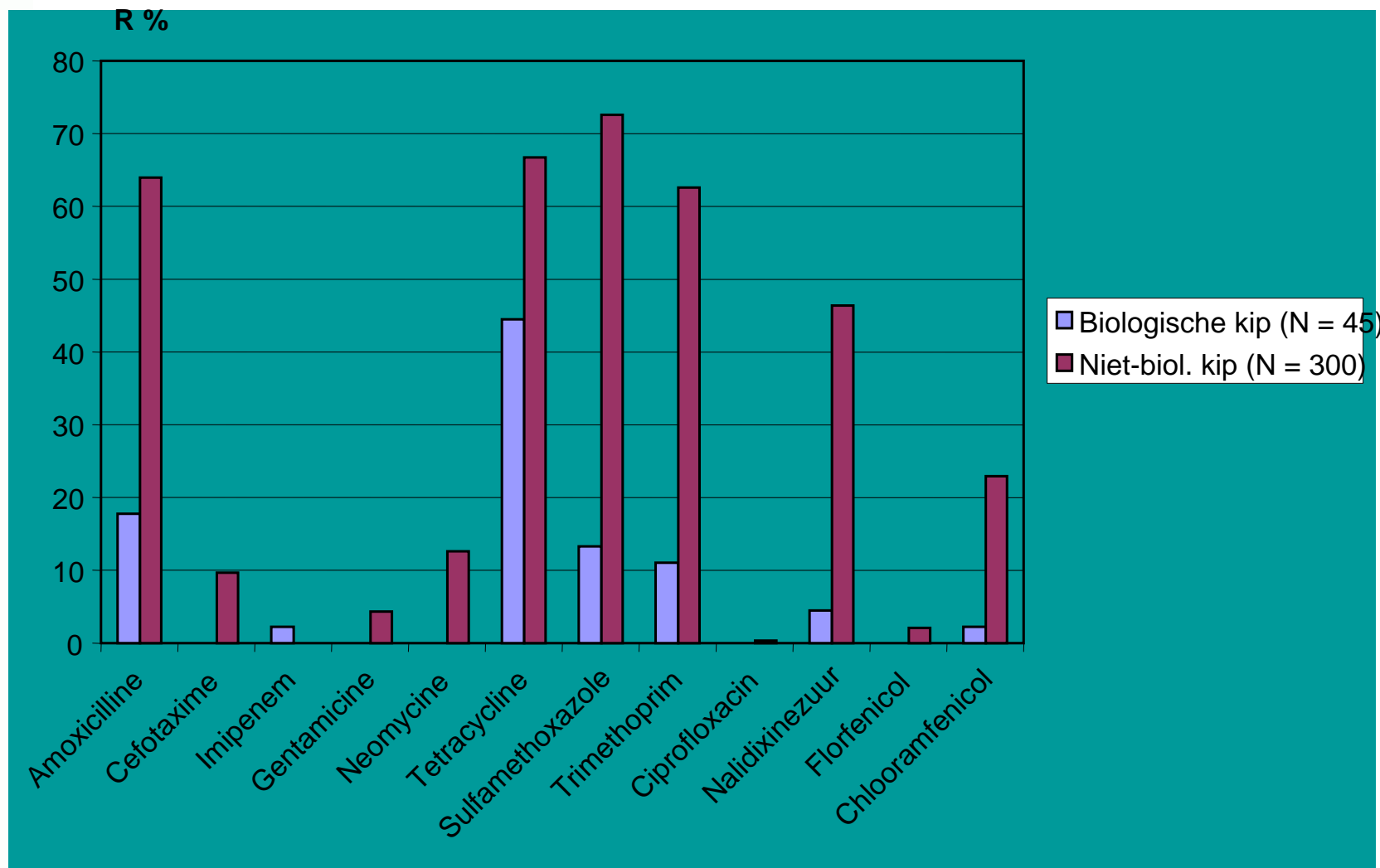
# Antibiotic-resistant bacteria

- Increase in numbers
- Possibly due to widespread use of antibiotics in breeding of animals
- Routine use in feed prohibited within the EU

# Antibiotic-resistant *E. coli*'s in pigs



# Antibiotic-resistant *E. coli*'s in broilers



# Survey on organic products: summary

- No differences in mycotoxins in wheat
- Much lower nitrate levels in lettuce
- Higher nitrate levels in carrots
- Equal incidence of *Salmonella*-contamination in pigs, but relation with experience
- Higher incidence of *Campylobacter* but no *Salmonella* in broilers
- Lower numbers of antibiotic-resistant bacteria in pigs and chickens

# Conclusions

Overall organic produce scored better, or equally good as conventional produce. Except for nitrate levels in carrots and the incidence of campylobacter in broilers.

Thank you for your attention