



Organic Food Quality & Health

---

**Are organic foods better ?**

**A literature review**

**German report 2003**

**Angelika Meier-Ploeger, University of Kassel**

# Assessment of Food Quality from different farming systems

- Council of the Federal Agricultural Research Centres:

Tauscher et al (ed)

**Status Report 2003**

[www.bmvel-forschung.de](http://www.bmvel-forschung.de)

**Authors:**

**16 members of Federal Research Institutes  
from the Ministry of Consumer Affairs,  
Food and Agriculture (BMVEL),**

**8 external members**

Bewertung von Lebensmitteln  
verschiedener  
Produktionsverfahren



Arbeitsgruppe des Senats der Bundesforschungsanstalten  
„Qualitative Bewertung von Lebensmitteln aus alternativer  
und konventioneller Produktion“

# Goals of the Study

---

- **Status report on scientific knowledge about the aspects of**
  - **food quality in general**
  - **results of scientific studies for foods produced under different farming systems**
  - **definitions of terms**  
e.g. conventional farming, organic production
- **Research needs for projects to encrease knowledge about organic foods**

# What is Food Quality ?

---

- **Process quality:**

**influence of food production and processing  
on resources and social issues**

**from farm to fork**

**protection of**

- **abiotic resources: e.g. water, soil, air**
- **biotic resources: agro- and natural biodiversity**

**social issues**

- **Ethical concerns: animal welfare, landscape, culture**
- **fair production and trade, psychological values**

# What is Food Quality ?

---

- **Product quality:**
- **Absence of hazards**
  - artificial : e.g. pesticides, heavy metals, veterinary residues
  - natural : e.g. poisons, pathogens in plants
  - undesired ingredients: e.g. fat, GMOs
- **Presence of healthy nutrients**
  - e.g. vitamins, minerals, secondary compounds
  - e.g. functional food additives

# Structure of the Report

---

- **Quality of food from different farming systems**
  - **Process quality: crop production and animal husbandry**
  - **Product quality: food from plants and animals**
- **Complementary assessments of food quality**
- **Socio-economic and psychological aspects of food quality: the consumer's point of view**

# Process quality is better with organic farming

<u>Parameter (organic vs. conventional):</u>	
• Biodiversity	+
• Landscape	=
• Protection of soil functions	=
• Maintenance of water quality	+
• Reduced eutrophication	+
• Reduced impact on acidity	+
• Less impact on greenhouse effect	+
• Resource protection	+
• Lower toxicity to humans	+

# Quality of plant products: is organic better?

---

<b>Products</b>	<b>Nutritional quality</b>	<b>Sensory quality</b>	<b>Processing quality</b>
<b>Cereals, field</b>			
<b>Cereals, processed</b>			
<b>Potatoes</b>			
<b>Oilseeds, field</b>			
<b>Vegetable oil, fat</b>			
<b>Vegetables and fruits</b>			
<b>Wine</b>			

# Quality of plant products: is organic better?

Products	Nutritional quality	Sensory quality	Processing quality
Cereals, field	+ (/-) (less mycotoxins)	no difference	-
Cereals, processed	+ (/-) (minerals)	no difference	(+/-) - less
Potatoes	not clear	not clear	no difference
Oilseeds, field	+	no data	no data
Vegetable oil, fat	+(less residues)	no difference	no difference
Vegetables and fruits	+ (less residues, more SPC)	+	no difference
Wine	+ (less residues, more SPC)	not clear	no data

# Quality of livestock products: is organic better?

<b>Product</b>	<b>Nutritional quality</b>	<b>Sensory quality</b>	<b>Processing quality</b>
<b>Milk</b>			
<b>Beef</b>			
<b>Lamb</b>			
<b>Pork</b>			
<b>Poultry</b>			
<b>Processed meat</b>			
<b>Fish</b>			
<b>Eggs</b>			

# Quality of livestock products: is organic better?

Product	Nutritional quality	Sensory quality	Processing quality
Milk	less protein, unclear aflatoxin	no difference	no difference
Beef	no data	no data	no data
Lamb	no data	no difference	no data
Pork	no difference	no difference	no difference
Poultry	less fat	less tender	less meat
Processed meat	no nitrite salt, higher cholesterol oxide	no data	for bacon, no difference
Fish	no data	no data	no data
Eggs	no difference	no difference	no data

# Future Challenges

---

- **The knowledge gap must be filled:**
  - What defines good or poor product quality?
  - How can the difference between healthy or unhealthy food be measured?
  - What impact do production, processing, transport and trade have on the chain of organic products?
- **Research must be improved and increased:**
  - Interdisciplinary studies must be carried out with clear framework conditions and scientific methodology
  - Long-term studies are crucial
  - New concepts and methodologies have to be developed
- **Current conditions (money, staff and equipment) not adequate to provide missing knowledge**

# Conclusions of the study

---

- **Clear scientific evidence** can be shown for organic farming products vs. conventional foods in the field of process quality. Organic food is better.
- **No clear scientific evidence** is available on differences in product quality between organic and conventional farming.
- **Future research areas** are listed for process quality, specific product quality assessment, complementary methods, consumer studies, market research and lifestyle and health