

Organic World Congress of IFOAM in Victoria/Canada in August 2002

Food Safety Debate and Development of Standards/Regulations for Organic Farming and Organic Food

Otto Schmid,
FiBL, Research Institute of Organic Agriculture,
Frick, Switzerland

How does Organic Food production contribute to food safety?

Afssa Study in France on Food safety/quality of Organic Food (published 2003) /
EU 6th Framework Research Program: one of the main priority area (Start 2003)

Food Safety is an issue of public health laws, which Organic Farming has to fulfil as well!

Methods

Evaluation of the main umbrella standards/ regulations for organic food:

- EU Regulation 2092/91, Codex Alimentarius Guidelines for Organic Food,
- IFOAM Basic Standards and some private standards (e.g. BIO SUISSE,)

- literature analysis, expert consultation (in France and Switzerland)
- estimation of the potential of OF to reduce risks by an appropriate risk management

- Main focus to assess how different measures might potentially reduce food safety problems:
 - a. direct measures (precautionary principle, e.g. exclusion of certain products) and
 - b. indirect measures (system-approach, preventive measures)

- Results discussed with food safety experts. Deficits identified. Proposals for actions.

Historical Development of the organic standards: importance of the precautionary principle

Standards must fulfil different functions for different groups and purposes:

- Give guarantees and information for consumers;
- Promote the development of good practice by guiding organic producers;
- Maintain a base for inspection and certification as well as accreditation (IFOAM)
- Standards must also be a tool for the application of the precautionary principle

Contents of the standards have always, especially in animal production, been influenced by public debates on food quality and health/food security: pesticides, nitrates, BSE, etc.

Organic farming is particularly dependent on consumer choice - relative rapid adaptation of new standards requirements in consumer sensitive areas often well before these issues were of concern within conventional agriculture, e.g.:

- Exclusion of antibiotics in feed, no abattoir waste for ruminants, etc.

Conclusions

- a. Areas such as contamination with chemical pesticides and GMO need a broad discussion about the strategies to follow. I
- b. several areas: more specific monitoring (identifying early potential risks) , better documentation, develop risk management strategies (e.g. better utilisation HACCP, etc.).
- c. Some issues such as microbiological risks, contamination with veterinary treatments, feed additives, and risks with parasites in animal products have to be further elaborated in standards.



Towards sustainable food safety risk management:

More system/process based (indirect) approaches instead of single, isolated measures should be developed.

Table 1. Approach/asures in standards to reduce food safety risks

Areas	Direct measures:	Indirect measures
General Management	Restrictive list of permitted inputs	<ul style="list-style-type: none"> • Good traceability systems. • Special input criteria.
Risks from parasites and bacteria	Same requirements as in conventional agriculture	The higher risk of parasites in pasture grazing systems - reduced through preventative measures and more extensive grazing.
Bacteriological risks	Strict exclusion of sewage and industrial manure	Appropriate manure/compost treatment
Fungal risks (e.g. mycotoxins)	Same requirements as in conventional agriculture.	Less intensive systems, reduced use of concentrates in animal production, no monocultures
Chemical and pesticides residue (contamination) risks	Exclusion of a wide range of conventional/synthetic pesticides (more information needed on background contamination)	Allowed pesticides in OF, special criteria for evaluation, mineral or edible compounds or well-known from human medicine. Same requirements as for conventional products (new EU Reg. 1112/02)?
Food Additives	Exclusion of a wide range of additives (some might give allergenic reactions)	strict criteria for the evaluation of new additives (necessity given?)
Veterinary Medicines	Exclusion of antibiotics in feed	<ul style="list-style-type: none"> • Priority: preventive measures • longer withdrawal periods.
Nitrates, nitrites and nitros amines	No specific, except the exclusion of the use of synthetic nitrogen	<ul style="list-style-type: none"> • Limited use of nitrogen (from animal origin or legumes) • less intensive production.
Heavy Metals	Stricter limits for certain fertilisers (e.g. EU)	<ul style="list-style-type: none"> • Less use of concentrates • No use as growth promoter (e.g. copper), only for physiological need
GMO's	Exclusion (only permitted in vaccinations)	<ul style="list-style-type: none"> • Inspection systems improved • additional sample analysis (contamination).
BSE	Same requirements as in conventional agriculture	<ul style="list-style-type: none"> • Since long time: exclusion of animal by-products in feeds • restrictions on the purchase of animals from non-organic holdings.
Viral, dioxins, radioactive risks	Same requirements as in conventional agriculture	
Irrigation water	The same requirements as in conventional agriculture	

Table 2 : Potential food safety risks : evaluation of direct and indirect potential effects of standards/regulations for organic food production

Potential food safety risks	Direct potential effects					Indirect pot. effects					Future issues
	++	+	=	-	--	++	+	=	-	--	
General food safety risk management	++	+				++	+				D, M, R
1 Risk of parasites			=					=			M, R
2. Risks from bacteria: <i>E. coli</i> , etc.		+						=			M, R
3 Risks of fungi/diseases:			=				+				M, R
4 Risks of viral diseases			+				+				M
5 Risks of chemicals, pesticides	++ +						+				M, D
6 Risks of additives	++					++					R
7 Risks of veterinary treatments	++						+				M, D, R
8 Nitrates, nitrites, nitrosamines risks		+					+				M, R
9 Heavy metals risks		+				++					M
10 GMO risks	++ +					++					M, D, R
11 Dioxins risks (e.g. in eggs)			=					=			M
12 BSE risks		+					+				M, R

Influence* : +++ very positive ++ positive + positive tendency - negative tendency -- negative --- very negative gfl = general food legislation / like in conv. agriculture

Proposed actions: D = broad discussion M = more specific monitoring, R = eventually more restrictions in standards

* partly based on literature and partly on subjective expert opinions.

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of PARASITES in Animal Husbandry				
<ul style="list-style-type: none"> • Efficiency of veterinary treatments? • Impact of husbandry systems (rotation of pasture, free range systems, possible contact with wild animals, intensity of grazing, use of contaminated animal feed, young/older stock, etc.)? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 and national regulations :</i> = No direct restrictions <i>Private standards (IFOAM, national programmes):</i> = like CEE/EU				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 EU and national regulations:</i> ++ limited density of stock: max. Kg/ha, max. no./ha - Requirement for open pastureland, free range. - max. 3 treatments/annually against worms <i>Private standards (IFOAM, national programmes):</i> + Good management of free range runs required				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term				
a) Elaboration of preventive systems (e.g. rotations with cattle, sheep, grass for hay/ensilage) b) Ev. more restrictions on the management of free range systems/pasture.				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Few comparative studies (S, CH) show positive risk management effects (CH), EU-NAHWOA Project, 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

BACTERIOLOGICAL RISKS (E. coli, Salmonella etc.)				
<ul style="list-style-type: none"> • Pathogenic germs from manure (compost)? • Efficiency of cleaning/ disinfectant products used? • Intestinal flora variation in relation to growth rate, age and feed (assessment of each animal category)? 				
Potential direct effects to reduce certain risks				
<p><i>CE/EU 2092/91 and national regulations:</i> + no sewage allowed</p> <p><i>Private standards (IFOAM, national programmes):</i> + IFOAM: no human excrements allowed as fertiliser on plants for direct consumption, hygiene requirements.</p>				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<p><i>CE/EU 2092/91 plus national :</i> + chicken breeds with slower growth rates/less stress. - free range run for animals - Limited range of disinfectants (less efficient?) ++ No manure from industrial farming systems</p> <p><i>Private standards (IFOAM, national programmes):</i> + IFOAM: Composting of manures recommended. + BIO SUISSE: regular testing for salmonella required.</p>				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
<p>a) short term b) long-term</p> <p>a) More specific regular monitoring required b) Ev. mandatory to compost certain manures.</p>				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Very few studies (USA E.coli case with conv. manure). Different situations in different areas/continents 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISKS OF FUNGI/DISEASES (e.g. Mycotoxins)				
<ul style="list-style-type: none"> • Influence of cultural practises on the conservation and dissemination of toxic fungi (rotation, soil cultivation)? • State of harvested material (conditions for fungal growth and genesis of toxic compounds)? • Storage conditions? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national :</i> = No direct restrictions <i>Private standards (IFOAM, national programmes):</i> Such as CEE/EU				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulation:</i> + Minimal quantity of fibrous matter in animal feed, ++ Limited concentrate usage - No chemical fungicide allowed before harvest. <i>Private standards (IFOAM, national programmes):</i> ++ Balanced rotation required, less risk than monoculture.				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term				
a) Regular and more specific monitoring (HACCP etc.). b) Ev. restriction on the utilisation of certain concentrates in the ration and on storage (e.g. aeration) .				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Very few direct comparisons (F, NL, DK). • Problems mainly during bad storage and processing. 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISKS OF VIRAL DISEASES				
<ul style="list-style-type: none"> • Transmission by organic manures? • Transmission by wild fauna? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 /plus national regulations:</i> = Not mentioned <i>Private standards (IFOAM, national programmes):</i> = Not mentioned				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulation :</i> + Less intensive systems <i>Private standards (IFOAM, national programmes):</i> + Like CE/EU				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term				
a) More specific regular monitoring required				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • No direct comparisons, only general literature 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of PESTICIDE RESIDUES				
<ul style="list-style-type: none"> • Risks linked to pesticides of natural origin? griculture? • Comparison of the level of contamination in organic and conventional agriculture (data collection)? • Cross contamination of organic food? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national regulations:</i> ++(+) No direct use of synthetic chemicals <i>Private standards (IFOAM, national programmes):</i> + Additional exclusion of certain "natural" pesticides				
Evaluation of potential direct effects (compared to conv. agr.)				
++(+)	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulations:</i> + Strict separation of organic and conventional products. + Same requirements for natural pesticides as for synthetic pesticides except for plant strengtheners. <i>Private standards (IFOAM, national programmes):</i> + Measures against contamination from neighbouring convent. farms mandatory. "Old" conversion residues + A system to monitor better the causes of contamination in elaboration (with HACCP).				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term Discussions on the approach (system or analytic) a) More specific regular monitoring required (analyse background contamination) for certain crops/regions.				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Recent studies in USA, F, CH. Residue action levels? 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of FOOD ADDITIVES				
<ul style="list-style-type: none"> • Impact of the transformation and formulation on organic foods? • Allergic properties? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national regulations:</i> ++ Existing restrictive list. <i>Private standards (IFOAM, national programmes):</i> ++ BIO SUISSE: No synthetic flavours, exclusion of alginates (ev. allergy risk)				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 /plus national regulations:</i> ++ Well elaborated control systems <i>Private standards (IFOAM, national programmes):</i> ++ Strict criteria for new additives. + Use of lower dosis of sulphites in wine in several private standards				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term a) Stricter criteria for new additives. Finalisation of the EU-list for processed animal products.				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Almost no comparative studies • Black list of additives from consumer groups (D,CH) • Discussions about Nitrate/nitrite in meat products (Dossiers from D, UK, DK) - Clostridium bot. risk? • Use of sulphites for wine processing in discussion 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of VETERINARY MEDICINE Residues				
<ul style="list-style-type: none"> Antibiotics, considering both residues and antibiotic resistance? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national regulations:</i> ++ No antibiotics in animal feed + Twice the official withdrawal period, max. 3 treatments courses/annually <i>Private standards (IFOAM, national programmes):</i> Like in CE/EU				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulations:</i> + Preference for preventive measures and medication based on phytotherapy and homeopathy. <i>Private standards (IFOAM, national programmes):</i> + Composting of chicken manure from conventional sources.				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term b) More restriction on the use of antibiotics by vets, ev. de-certification of treated animals as "organic"				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> Almost no comparison existing. Some ongoing studies (CH, D, UK), EU NAHWOA Project 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of NITRATE, NITRITES, NITROSAMINES				
<ul style="list-style-type: none"> • Effects of organic fertilisation on nitrate contents? • Factors favouring the accumulation of nitrates (greenhouse cultures, seasons, etc.)? • Factors involved in the formation of nitrosamines? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 /plus national regulations:</i> + Limited fertilisation (max. 170 kg N/ha) <i>Private standards (IFOAM, national programmes):</i> + BIO SUISSE: Exclusion of heated greenhouses between November and February				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 /plus national regulations:</i> + Lower stocking density. No easy soluble synthetic nitrogen <i>Private standards (IFOAM, national programmes):</i> + General restrictions on the utilisation of fertilisers that alter product quality. - Importance of higher/good humus content in soils (higher mineralisation in autumn)				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term a) More specific regular monitoring required b) Ev. stricter rules for horticulture (organic fertilisers and composting)				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • High number of rather old studies: majority shows lower nitrate contents in Organic Food. 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of HEAVY METALS				
<ul style="list-style-type: none"> • Input of (cadmium) from natural phosphates? • Local contamination and recommendations on the localisation of organic farm unites/parcels, especially after conversion? • Accumulation of heavy metals associated with their use as growth promoters? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national regulations:</i> + Stronger restrictions for heavy metals in fertilisers (Cadmium in natural phosphates) <i>Private standards (IFOAM, national programmes):</i> ++ BIO SUISSE: more restrictive than official norms.				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulations:</i> ++ No sewage sludge ++ No manure from industrial farming +/- Limitation on the quantity of copper for plant protection (max. 8kg/ha). <i>Private standards (IFOAM, national programmes):</i> + Stricter restrictions on heavy metals in composts - Some countries stricter use or even non-use of copper				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term a) More specific regular monitoring required				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Few comparative older studies (F, CH, D, HU) 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of GMO CONTAMINATION				
<ul style="list-style-type: none"> • Health safety for humans? • Contamination of organic fields? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 /plus national regulations:</i> ++(+) Non-authorized, (except for vaccines) <i>Private standards (IFOAM, national programmes):</i> Such as CE/EU				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 /plus national regulations:</i> ++ Strict separation <i>Private standards (IFOAM, national programmes):</i> ++ Internal restrictions on the contamination level				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term				
a) More specific regular monitoring required b) Exclusions of certain ingredients with high risk of contamination in some areas.				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> • Cases of contamination • Dossiers about GMO contamination problems (UK, D, CH) • Complete separate processing units for certain products 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of DIOXINES RESIDUES				
<ul style="list-style-type: none"> Contamination of eggs? 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 plus national regulations:</i> = Not mentioned <i>Private standards (IFOAM, national programmes):</i> Not mentioned.				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 plus national regulations:</i> + Utilisation of conventional feed very limited (max. 20 % for chickens) -(-) Outdoor run for chickens (depending on the region) <i>Private standards (IFOAM, national programmes):</i> + contamination of the environment must be examined.				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	-
Issues to be elaborated in organic food standards				
a) short term b) long-term				
a) More specific regular monitoring required				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> Almost no comparative studies. Case known from NL with higher contamination in outdoor run, experience from Belgium: risk factor burning wastes in the court of a poultry outdoor run 				

Assessment of potential direct and indirect effects of organic food standards on food safety risk issues

RISK of BSE				
<ul style="list-style-type: none"> Fertilisers of animal origin (bone/blood meal etc) 				
Potential direct effects to reduce certain risks				
<i>CE/EU 2092/91 and national regulations:</i> = Utilisation of animal waste as feed forbidden. <i>Private standards (IFOAM, national programmes):</i> ++ IFOAM as in CE/EU, abattoir waste forbidden since 1984 (biodynamic since 1924!)				
Evaluation of potential direct effects (compared to conv. agr.)				
++	+	= /gfl	-	--
Potential indirect effects to reduce risks				
<i>CE/EU 2092/91 and national regulations:</i> + Very restricted purchase of non-organic animals, restrictions on the certification of such animals as organic. <i>Private standards (IFOAM, national programmes):</i> + in several countries since 2001 no more fertilisers based on meat and bone meal permitted.				
Evaluation of potential indirect effects (compared to conv.)				
++	+	= /gfl	-	--
Issues to be elaborated in organic food standards				
a) short term b) long-term				
b) ev. still more restrictions concerning the purchase of animals from the exterior.				
Remarks (Literature, Problems)				
<ul style="list-style-type: none"> No comparative study. Documented BSE cases, which show until now no case of BSE from an animal born on an organic farm 				