



Guideline for handling pesticide residues in Czech organic production



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1. Introduction

1.1 Pesticide residues and organic production

The use of pesticides is greatly restricted in organic farming. Only a few natural substances are authorized. Synthetic pesticides, which make up the great majority of all pesticides, are forbidden (EC 2007, 2008). Residues of prohibited pesticides may indicate intentional fraud on the part of the producer (illegal use of the substance) or of the processor (mix-up of conventional and organic foods). However, organic products are grown, transported and processed in an environment where pesticides and other chemical substances are commonly used. Unintentional contamination of organic products can occur in the fields, during storage, transport or processing without the fault or knowledge of an organic farmer. Thus, pesticide residues found in organic products can be either a sign of fraud or the result of unintentional contamination. For certifiers, it is crucial to distinguish between these two causes. In practice, however, this is often difficult.

Analyses of pesticide residues in foods have become an important control tool. They are carried out in conventional as well as in organic foods. In addition, pesticide analyses can also be carried out with leaves or soil, in the context of organic inspection. From 1 January 2014 on, inspection bodies have to analyse samples which correspond to a minimum of 5 % of the operators (EC, 2013). Organic production and certification is regulated at EU level. However, EU legislation gives very little guidance with regard to the handling of pesticide residues. This has caused uncertainty among organic producers, certifiers and authorities, and it has led to non-harmonized interpretation in various EU countries and in the private sector. A comprehensive overview of the subject is given by Rombach (2006).

1.2 Prospects and limits of chemical analyses in organic inspection

Pesticide analyses can provide a powerful complement to organic inspection, but they cannot replace inspection. As some pesticides break down rapidly, analyses cannot detect all kinds of fraud equally well. For best results, pesticide analyses must complement other inspection techniques such as visual observations. Pesticide analyses based on risk assessment are more effective than random monitoring (for details see 'sampling methodology' below). Finally, the sheer communication about making residue analyses already has some preventing effect against fraud.

1.3 Situation in the Czech Republic

The situation in the Czech Republic has been reviewed by Urban (2012). In recent years, analysis of residues in organic products has become very important in the Czech Republic. Residue analyses help to improve the efficiency and guarantee of the organic control system, to ensure the integrity of organic production and the quality of organic products. Regular monitoring of foods in general, including organic foods on the Czech market is carried out by the Czech Agriculture and Food Inspection Authority (SZPI) and the State Veterinary Administration (SVS), both authorized by the Czech Ministry of Agriculture (MoA). The Central Institute for Supervising and Testing in Agriculture (ÚKZÚZ) is responsible for monitoring organic production (including analyses of leaves and soil). Analysis of pesticide residues is also carried out, on a much smaller scale, by private organic inspection and certification bodies.

As a result of these activities, pesticide residues have repeatedly been found in organic products, particularly in imported organic foods. Residues were also found in leaf or soil samples derived from Czech organic farms. Due to the lack of official guidance, these findings create practical and legal uncertainty and present a challenge to all involved parties.

With regard to the interpretation of residue findings in organic *foods*, the decision rules of the 'BNN orientation value' have been translated into the Czech language. In the absence of official guidance, some organic food processors and retailers, as well as the certification body KEZ o.p.s. use them as an unofficial guidance for the certification of final products.

With regard to residue findings on organic *farms* (e.g. in leaves or soil), no guidance is available and a formal methodology of interpretation has not yet been established. Such findings do not only apply to the certification of organic products, but also for the certification of organic processes and enterprises, which are relevant for subsidies.

1.4 Aims of this document

This document was prepared in the project «Development of guidelines for the use of pesticide analysis in organic inspection in the Czech Republic (sampling, evaluation and interpretation)». At the beginning of this project, a workshop with stakeholders was held. The present document builds on the outcomes of this workshop, and elaborates guidance for all stakeholders involved in Czech organic production and its control, on how to deal with residue analyses.

In recognition of the European dimension of the problem, the project followed a two-step approach. In the first step, the present guideline was prepared. It is written in a general style and in the English language, so that it potentially applies for many countries. Although the current project aims specifically at the situation in the Czech Republic, its use for other countries is welcome!

In the second step, a national guideline for the Czech Republic will be prepared, based on this document. The present document will serve as a blueprint for this guideline, which will be tailored to the specific situation in the Czech Republic and written in the Czech language. The aim is that all control bodies and authorities dealing with organic production and organic products in the Czech Republic will use this guideline.

2. Proposals for a residue policy

2.1 Background for the residue policy

The EU policy towards sampling and analysis as part of the organic inspection is laid down in Reg. 889/2008; Art. 65.2. This policy has recently changed. According to the *original policy* (which is currently still in force), sampling was mandatory only in cases of suspicion, while it was non-mandatory in all other cases. According to the *new policy* (in force from 1 January 2014 on, as specified in Reg. 392/2013), a minimum number of samples has to be analyzed as a routine (i.e. also in the absence of suspicion). The relevant passage reads: «The number of samples to be taken and analysed by the control authority or control body every year shall correspond to at least 5 % of the number of operators under its control» (EC, 2013).

Thus, a national residue policy is part of the national implementation of the EU Organic Regulation, with particular respect to the control and the infringement provisions (Art. 65 & 91). The following points are important:

- Sampling and analysing of products have to be used as a supplementary tool to the physical inspection and to the verification of documentary evidence with the aim to detect the use of non-authorized products or production techniques.
- Risk based approach: the results of the risk assessment must be reflected in the sampling policy.
- The number of samples to be taken and analysed by the control body every year must correspond to at least 5 % of the number of operators under its control.
- In cases where the use of a non-authorized product is suspected, sampling and analysis must be carried out (Article 65.2 of Regulation (EC) No 889/2008).
- The provisions of Reg. 889/2008, Art. 91 have to be applied in all cases when an operator finds residues of non-authorized products.
- The Commission services consider it very important that the competent authority has a sound knowledge of the activities and performance of all CBs which it has approved to operate on its territory (EAHC 2011). Experience has shown that the following elements contribute to an efficient supervision: (1) verification of the CBs' sampling policies; (2) reporting of the number of samples analysed in the CBs' annual report.
- There is no guidance from the EU Commission regarding the interpretation of analytical results.

In conclusion, the national residue policy must establish the legal and organisatory framework, so that the CBs can efficiently include residue analyses into their control procedures. In the case of the Czech Republic, the establishment of a residue policy falls within the duty of the Ministry of Agriculture.

2.2 Responsibilities of the different actors

2.2.1 General considerations

Clear roles and responsibilities of all actors in the control system are a pre-requisite for efficient functioning. This includes clear guidelines for communication between these actors. Responsibilities are mostly defined by general legislation. If uncertainties remain, these should be clarified as part of the national residue policy.

2.2.2 Considerations regarding the Czech Republic

For the Czech Republic, the current roles and responsibilities of all actors were identified in a workshop, and proposals for amendments were made.

- **Ministry of Agriculture (MoA):** Today, the MoA is in charge of legislation and of supervision of the control system. It is also in charge of subsidies for organic farmers and of fines for organic farmers who break the rules. In the workshop, it was proposed that the MoA should issue an official sampling plan, and it is hoped that the MoA will adopt the residue guideline prepared in this project.
- **Official food authorities:** The Czech Agriculture and Food Inspection Authority (SZPI) and the State Veterinary Administration (SVS) monitor foods on the Czech market for pesticide residues. If they find pesticide residues in organic foods, they should inform the MoA, which will inform the control body (CB).
- **ÚKZÚZ:** The Central Institute for Supervising and Testing in Agriculture (ÚKZÚZ) is responsible for controls of primary production (including sampling and residue analyses), and it hosts the Czech National Reference Laboratory (NRL). If ÚKZÚZ finds pesticide residues in samples from organic farms, it should inform the MoA (results including interpretation), which will inform the CB.
- **Control bodies (CB):** CBs have the most detailed know-how on organic production and processing, and on the risks of contamination and fraud. CBs are regularly present on all organic farms and processing units, where they carry out controls. If a suspicion arises during inspection visits, they must take samples immediately. In addition, CBs are best suited to carry out targeted sampling based on risk analysis. CBs are the only institution which is entitled to de-certify organic farms, if this should become necessary after residue analysis. In the event of de-certification, CBs must inform the MoA. Finally, it was mentioned that due to their regular presence on organic farms, CBs are predestined to inform organic farmers about new developments such as new rules and emerging risks.

Communication: There is a clear need for good communication between all actors. For the actors within the Czech Republic, the pathways for communication are clear. However, organic trade is often international, thus requiring communication also with actors from a multitude of other countries. It was noted that *international communication* on residue cases needs to be improved.

2.3 Evidence in the case of irregularities

2.3.1 General considerations

Organic inspection was originally based on visual inspection of the farm or processing unit, and certification decisions were based on this evidence. With the increasing importance of residue analyses, the respective roles of visual inspection and of chemical analyses need to be re-defined. A national residue policy should clarify which kind of evidence is needed to substantiate a suspicion of fraud, and which kind of evidence is needed to prove that the precautionary measures taken by the enterprise to reduce risks of contamination were insufficient.

The claim of fraud is a severe accusation, and de-certification is a severe penalty of an organic producer. Thus, control bodies must have proofs for accusing organic farmers of fraud. As a general rule, as much information as possible should be provided to substantiate such a claim, and visual observations should be backed up with chemical analyses. For example, discoloured foliage may indicate the use of herbicides, but it may also be a symptom of other problems (e.g. nutrient supply, diseases). Such a suspicion should be substantiated by sampling the discoloured foliage and analyzing it for residues of herbicides.

2.3.2 Considerations regarding the Czech Republic

Some organic farmers suspected of fraud have successfully challenged the de-certification decision before court. As a result, visual inspections alone are not regarded as sufficient evidence for fraud any more. At the same time, samples taken by CBs are regarded as 'inofficial samples', and their value as proofs has also been questioned. Thus, there is uncertainty among CBs about what kind of evidence is needed to substantiate a suspicion of fraud, or of insufficient precautionary measures to reduce the risk of contamination. In the workshop, it was stated that the MoA should clarify what evidence is needed for which decision, as part of the Czech residue policy.

The residue policy should also clarify under what circumstances a sample is accepted as a valid proof. For foods, detailed sampling protocols are already existing, while for leaves and soil, such protocols will be included in the Czech residue guideline. In the opinion of FiBL, every sample which was taken according to an official protocol can be regarded as a valid proof, regardless whether it was taken by an authority or by a private CB.

3. Methodology of sampling

It is crucial for success that the sampling methodology is adapted to the specific purpose. If a specific suspicion arises during organic inspection, the inspector should reflect how to best prove or falsify this suspicion, and take samples accordingly. For monitoring, samples should be selected according to a risk assessment based on (i) pesticide usage in conventional agriculture, (ii) agronomic considerations such as high risks for pests or diseases (locally, seasonally, meteorologically and in relation to varietal sensitivity), (iii) experience with past cases of fraud or contamination.

3.1 General preparations by the inspection body

Successful sampling requires careful preparation by the inspection body. This includes

- a risk-based sampling plan,
- equipment for sample taking, and
- instructions for inspectors concerning (i) how to take samples, (ii) what to record when taking samples, (iii) sample transport and storage, (iv) choice of lab and of analytical method(s).

During the workshop, it was noted that a list of critical foods and pesticides would be useful. However, such risks may change within a few years, and a list would therefore only be useful, if it were continuously updated.

The participants of the workshop mentioned in the introduction agreed that such preparations exist in all CBs in the Czech Republic, and that their adequacy is assessed during accreditation audits. Therefore, there is no need to include these aspects in the Czech residue guideline. The only exception is the sampling of materials other than food (e.g. leaves, soil, machinery), for which instructions are included in this guideline.

3.2 Risk-based sampling plans

For better cost-effectiveness, sampling plans should be adapted to the risks (EAHC 2011), and this is also required by Reg. 392/2013. For the Czech Republic, high risks were identified for the following situations:

- Greatest risks are associated with **parallel production** (organic and conventional production on the same farm). On one hand, there is a greater temptation to use unauthorized substances such as pesticides; on the other hand, illegal use is more difficult to prove, because the presence of pesticides on the farm does not constitute a proof of use. A similar case is 'almost parallel' production, where one family member runs an organic part of a farm, and another family member a conventional part of a farm. Note: contamination risks may exist in this case, even if such farms are legally separated (different ID numbers).
- The illegal use of pre-emergence herbicides was judged as a great risk, because it is difficult to prove analytically.
- In years with a difficult climate, illegal use of fungicides in vineyards was judged as a major risk, because of the great economic impact of downy mildew. Also in vineyards, drift was con-

sidered to be another major risk, due to the often small plot size of vineyards and the great spraying intensity in neighbouring vineyards. The problem is to distinguish between residues caused by drift from neighbouring plots and residues indicating illegal use in the organic plot.

- In grain storage, a risk of contamination with insecticide residues was identified. Again, such residues could be caused by contamination or by illegal use.

3.3 What materials should be sampled

There is much more information available on pesticide residues in foods than in non-food materials such as leaves or soil. If it makes sense in the context of the sampling plan, foods should be sampled in preference to non-food materials. In some cases, however, it is necessary to sample leaves or soil. As a general rule, plant materials should be sampled in preference to soil, because many pesticides strongly bind to soil particles and/or rapidly break down in soil.

- When **weeds with discoloured foliage or untypical growth** are observed, plant materials which exhibit these symptoms should be sampled and analyzed for residues of herbicides.
- In the case of **untypically bare soil (total absence of weeds)**, there is no possibility for sampling plant material, and soil should be sampled instead. It must be noted that some herbicides are not easily detected in soil samples.
- In the case of **untypically healthy vegetation** (absence of pests or diseases which normally occur on the crop under comparable situations), the foliage or fruits should be sampled and analyzed for residues of insecticides and fungicides.
- If the presence of **persistent organic pollutants** (e.g. DDT, HCB, dieldrin) in the soil is suspected, soil samples are normally analyzed.
- As an exception to this rule, **pumpkin seeds** strongly concentrate persistent organic pollutants and therefore may contain residues, even if these substances are below the limit of detection in the soil. In this case, the only safe method is to analyze the seeds.
- If the **illegal use of a pesticide** by the farmer is suspected, the spraying equipment may be sampled in addition to foliage or soil. The tank is filled with a small quantity of water, and then thoroughly stirred. Analysis of the water may provide a qualitative answer whether a pesticide was present or absent in the spraying equipment. In the case of **parallel organic and conventional production** on the same farm, however, analysis of the spraying equipment is meaningless.

3.4 Instructions for sampling

3.4.1 Sampling foods

For sampling *foods* for pesticide residue analysis, detailed sampling instructions are available, e.g. in Dir. 2002/63/EC (EC 2002). There is no need for additional guidance in the pesticide guideline.

3.4.2 Sampling vegetation

The following instruction is a modified version based on the guideline written by the IFOAM EU group (IFOAM EU group 2012).

- Walk over the field according to the spatial arrangement shown in the next section and take the appropriate number of primary samples.
- Depending on the crop, a leaf, a branch, a whole plant, a fruit or a bunch of fruits may constitute a primary sample.
- Avoid very young and very old leaves. Avoid damaged, diseased or rotting tissue.
- Avoid foliage with abnormal growth in most cases. However, if the use of herbicides is suspected, you may also sample such foliage *exclusively*.
- In fruit trees or vines, take samples from different heights and orientation (North, South etc.).
- Place all primary samples in a clean plastic bag.
- If you want to collect several laboratory samples, simultaneously fill several plastic bags with one primary sample from each sampling site.
- Each laboratory sample should weigh at least 200 g.

3.4.3 Sampling soil

The following instruction is modified version based on the guideline written by the IFOAM EU group (IFOAM EU group 2012).

- Walk over the field according to the spatial arrangement shown in the next section and take the appropriate number of primary samples.
- Sample the top 10 cm of the soil.
- Place all primary samples in a clean bucket.
- Remove stones, roots, animals etc. from the bucket.
- Thoroughly mix the soil.
- Take one or several laboratory sample of approximately 1 kg each.

3.4.4 Positioning of primary samples when suspecting illegal use on the field

- Sample the *vegetation* (preferably) or the *soil* (less preferred, but necessary in the case of bare soil), using the methodology described above.
- Primary samples should be arranged in the field in the shape of an 'X' or a 'W' (see figure 1 and 2 below).
- Headlands and any unrepresentative areas such as gateways and water troughs should be avoided.

3.4.5 Number of primary samples:

- smaller fields (max. 25 ha): 20 primary samples.
- larger fields (25 - 100 ha): 40 primary samples.
- very large fields (over 100 ha): 60 primary samples.

Figure 1: Spatial arrangement of primary samples on homogenous, rectangular fields when illegal use is suspected. Black dots = primary samples; shaded areas = headlands which are avoided during sampling. All primary samples within the blue circle are mixed.

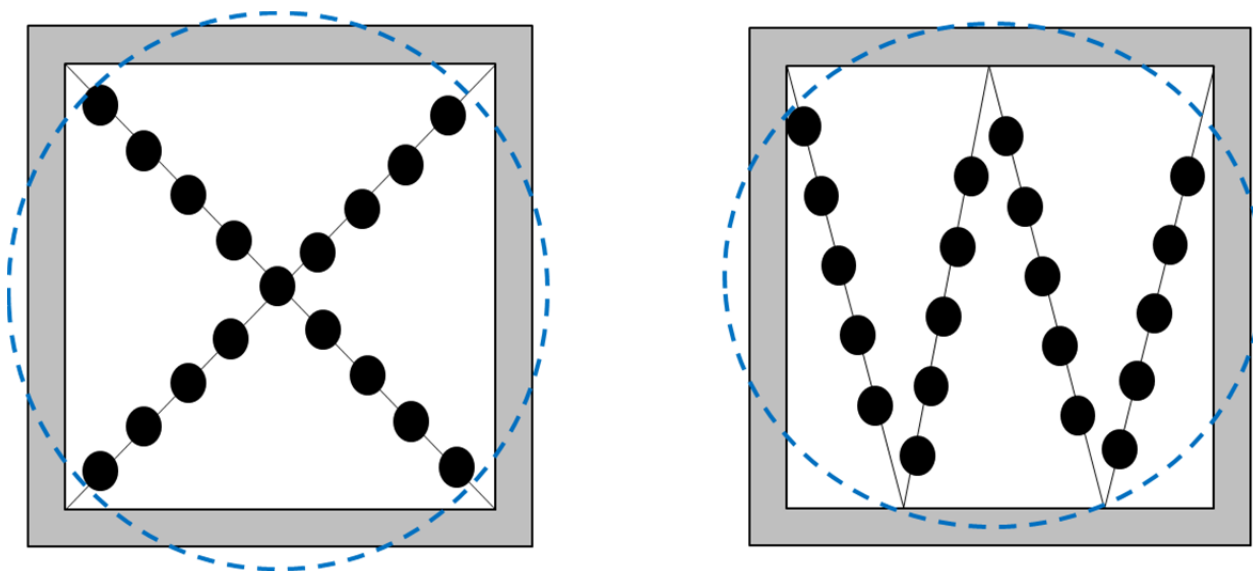
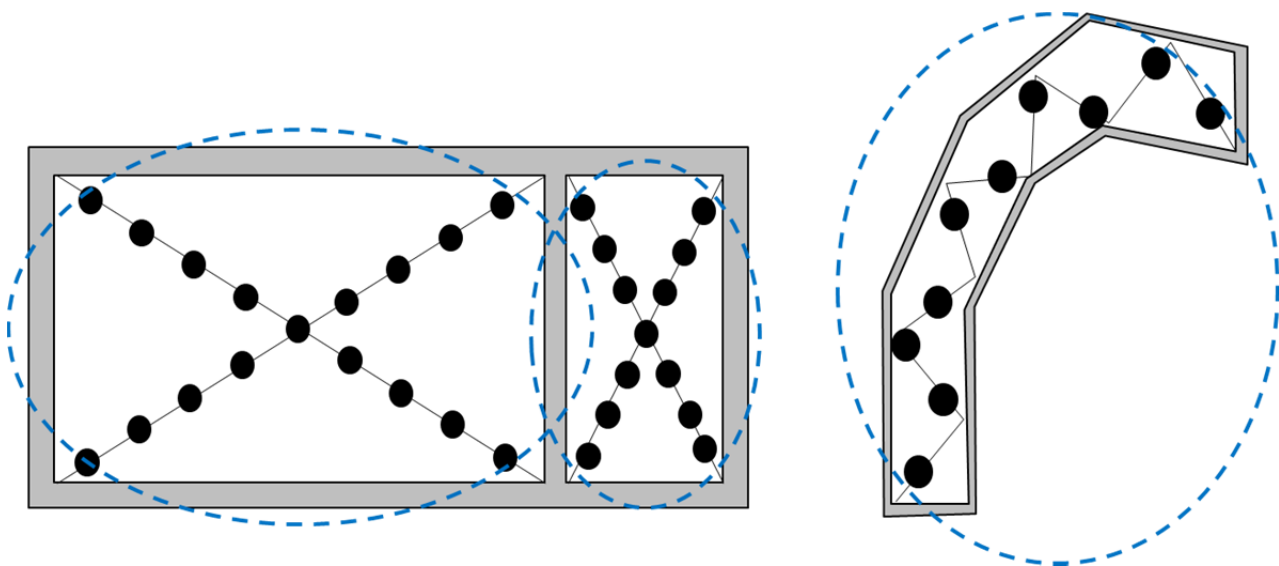


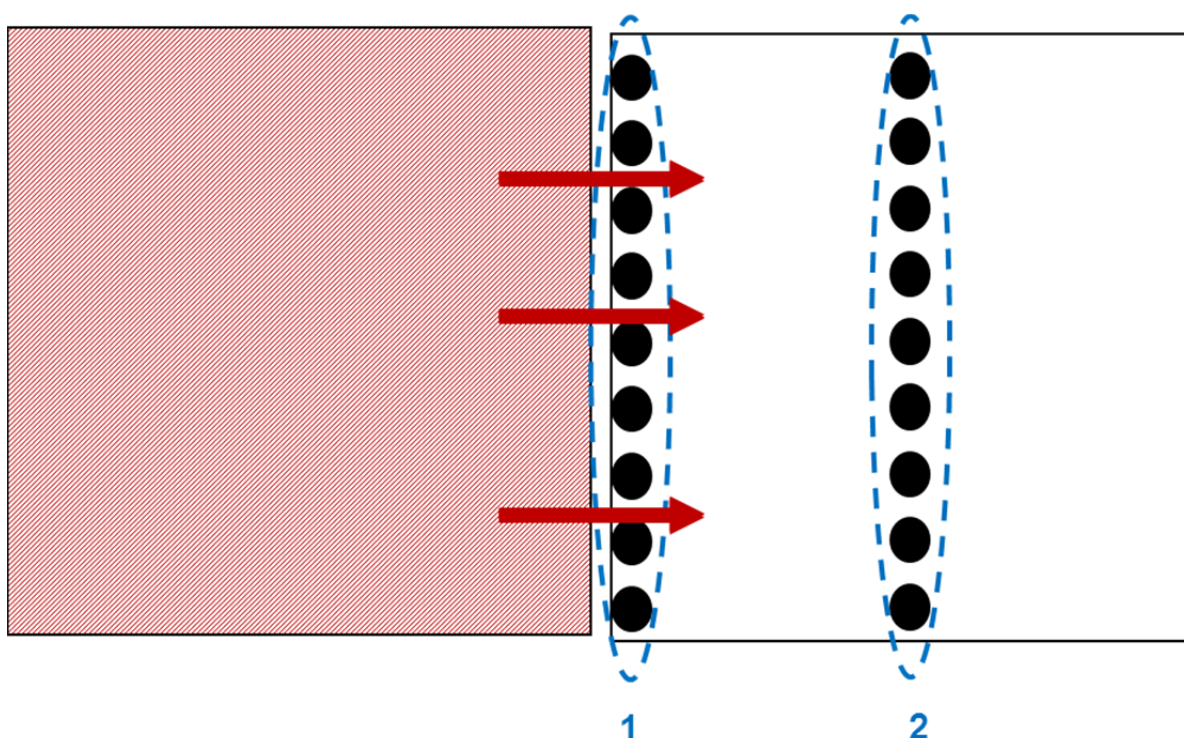
Figure 2: Spatial arrangement of primary samples on inhomogenous and irregularly shaped fields when illegal use is suspected. Black dots = primary samples; shaded areas = headlands which are avoided during sampling. All primary samples within one blue circle are mixed.



3.4.6 Positioning of primary samples when suspecting drift from neighbouring fields

- Sample the *vegetation* (preferably) or the *soil* (less preferred, but necessary in the case of bare soil), using the methodology described above.
- At least two laboratory samples must be taken. The first sample is taken along the edge of the field, on the side from where drift is suspected. The second sample is taken inside the field, at a distance where no drift is expected (see figure 3 below).
- If it is uncertain how far into the field the drift extended, more samples may be taken further into the field. If drift is suspected also from a second neighbouring field, the sampling is repeated along the edge neighbouring the second field.

Figure 3: Spatial arrangement of primary samples when drift from a neighbouring field is suspected. Black dots = primary samples; red = neighbouring, conventional field from where drift is suspected; red arrows = suspected distance of drift. All primary samples within one blue circle are mixed.



4. Interpretation of analytical results

Although organic production and inspection are regulated at EU level, EU legislation gives no guidance on the interpretation of analytical results. This gap has been filled with various interpretation guidelines issued by the private sector.

4.1 Interpretation of residues in organic food

4.1.1 Existing private interpretation guidelines and legal regulations

BNN Orientation value

BNN (Bundesverband Naturkost Naturwaren Herstellung und Handel e.V.) is the German Organic Processors and Traders Association. In 2001, BNN adopted a guideline to evaluate pesticide residues in organic products; the current version dates from 2012 (BNN 2012). It is the oldest interpretation guideline for pesticide residues in organic foods. Although the orientation value is binding only for the BNN member companies, it is widely followed in the European organic sector on a voluntary basis. It was translated into the Czech language and is also followed by stakeholders in the Czech Republic.

A central element is the orientation value of 0.010 mg/kg. Residues exceeding the orientation value will not automatically lead to de-certification. However, BNN members have agreed to trade only organic products which comply with the orientation value.

Bio Suisse decision chart for pesticide residues

Bio Suisse is the umbrella organization of the Swiss organic farmers' associations. Bio Suisse has developed a decision chart for pesticide residues in close collaboration with FiBL (Bio Suisse 2010). The Bio Suisse decision chart follows the BNN concept of an orientation value of 0.010 mg/kg, but the value is not given a name. This chart gives considerably more guidance on interpretation. Although it formally applies only to products sold under the Bio Suisse label, the second major organic label in Switzerland 'Migros Bio' also follows the chart. Discussions with the food control authorities are currently (=spring 2013) under way, and the chart might be revised as a consequence of these discussions.

Guideline for pesticide residue contamination for international trade in organic

IFOAM (International Federation of Organic Agriculture Movements) is the worldwide umbrella organization of the organic sector; the IFOAM EU-group is IFOAM's European branch. The IFOAM EU-group presented the 'Guideline for pesticide residue contamination for international trade in organic' to the public in 2012 (IFOAM EU group 2012). This Guideline also follows the BNN concept of an orientation value of 0.010 mg/kg, but the value is called 'action level'. This guideline gives considerably more guidance on sampling, including the sampling of non-food materials.

EOCC pesticide residues guideline

EOCC (European Organic Certifiers Council) is an organization of organic certifiers in Europe. The EOCC has formed a 'task force residues', which has developed the 'EOCC pesticide residues guideline', and presented it to the public in 2012 (EOCC 2012a). This guideline also follows the BNN concept of an orientation value of 0.010 mg/kg, but the value is called 'action level'. This guideline emphasizes the procedural aspects, in which certifiers should handle pesticide residues.

Together with this guideline, the 'EOCC task force residues' has also published a discussion paper, in which the possibilities of applying a maximum pesticide level for organic products are discussed (EOCC 2012b). This maximum level is called 'critical level'. The task force proposed that the critical level might be set at a value of 10 % of the MRL, but does not insist on this particular value.

USA

The organic market in the USA has established a practice to accept pesticide residues in organic products up to 5 % of the MRL (see EOCC 2012b).

Italy

The 'Ministerial Decree on accidental and technically unavoidable contamination of phytosanitary products in organic farming' specifies a maximum residue level of 0.01 mg/kg for organic products (EAHC 2011).

Belgium

In the Belgian region of Wallonia, the 'Order of the Regional Government of Wallonia on organic production and labeling of organic products' of 11th of February 2010 specifies how to handle residues (Annex I, Chapter 3). Here, it is stated that when the concentration of a pesticide residue exceeds the limit of quantification by 1.5, the certifier must consider that this pesticide has been used and take appropriate action, which implies that the product cannot be sold as organic. However, this does not apply if the operator demonstrates to the satisfaction of the inspection body that the residues are the result from a contamination by external factors [...] (see EAHC 2011).

United Kingdom

The 'Guidance Note for Control Bodies on the EU organic testing procedure within the UK: consultation version – September 2012' published by the Department for Environment, Food & Rural Affairs (Defra) explicitly delegates the possibility of marketing/non-marketing to the control body, and does not give any numerical value for the decision on organic marketing. It states that if a residue is caused by actions that are inconsistent with organic practices, the product should have its organic status removed. However, if the residue is at a low level and resulted from unavoidable contamination, the control body may decide not to remove the organic status of the product. It should ensure that its reasons for doing so can be justified from the results of the investigation.

4.1.2 Concepts of ‘orientation values’ versus ‘critical levels’

The existing guidelines described above employ two different concepts, which have different consequences for the marketing of products with residues. In the concept of ‘orientation value’, the residue is considered as *cause for suspicion*, which triggers further investigations, upon which the final marketing decision is based. In the concept of ‘critical level’, a certain residue level leads to *automatic de-certification*, independently of further investigations and their outcomes. The following table gives an overview over the concepts underlying the various guidelines and legislations.

Guideline / legislation	concept of ...	
	‘orientation value’	‘critical level’
BNN Orientation value	yes	yes (but only for BNN members)
Bio Suisse decision chart	yes	no (but in discussion)
IFOAM Guideline	yes	no
EOCC Guideline	yes	in discussion
US market	no	yes
Italy	no	yes
Wallonia	no	yes (unless shown that resulting from external factors)
United Kingdom	no	no

4.1.3 Conclusions for the Czech Republic

As a result of the workshop, the Czech interpretation guideline should have the following properties:

- There should be a lower threshold limit, below which no action is taken by the CBs and authorities. The value of 0.010 mg/kg is well established internationally, and has been successfully applied in practice for many years.
- An upper threshold limit, above which no marketing as organic food is possible (=‘critical level’), was also welcomed by the participants, because it would provide a guarantee to consumers concerning low pesticide residues in organic foods. At the workshop, 10 % of the MRL were considered to be a useful value. This value has recently been proposed by EOCC (EOCC 2012b).
- The participants welcomed a proposal for an interpretation guideline based on recent discussions in Switzerland (see below).

4.2 Proposed interpretation guideline for pesticide residues in organic foods

As far as possible, feeds should also be evaluated according to this guideline. For feeds which are also used as foods, the MRL defined for food shall be used. For feeds which are not used as foods (e.g. hay), no MRLs are defined, and an individual decision needs to be taken (see 'clarifications and exceptions' below).

4.2.1 Categorization by analytical results (type of substance, concentration)

Colours refer to the marketing decision (see below). Green = marketing as organic is possible; yellow = preliminary blocking of marketing (must be either confirmed or cancelled when investigations are finished); red = no marketing as organic is possible. In general, the orientation value is 0.01 mg/kg; exceptions are possible (e.g. for bromide).

Substance	Concentration
allowed in organic farming	1 residue \leq MRL
	2 residue $>$ MRL
not allowed in organic farming	3 residue \leq 0.01 mg/kg*. Only 1 non-allowed substance detected.
	4 a) residue $>$ 0.01 mg/kg*, but \leq 10 % MRL b) residues of more than 1 substance (regardless of concentration) c) residues in several lots of one producer (regardless of concentration)
	5 residues $>$ 10 % MRL**
	6 residues $>$ MRL

*0.01 mg/kg = 'orientation value'

**exception: if the residue is \leq orientation value, then case 3 applies always, even if the residue is $>$ 10 % MRL.

4.2.2 Categorization by cause of residues and by producer's fault

This categorization is normally made after completion of the investigations.

Causes and fault
A causes cannot be determined.
B contamination without producer's fault.
C insufficient care.
D Illegal use of substances, or mix-up of organic and conventional foods.

4.2.3 Procedures and measures taken in the different cases

Residue	Causes	Measures taken immediately after detection					Measures taken after completion of investigations					
		notify CERT immediately	notify MoA	investigation whether products are organic	investigation of causes	preliminary blocking of marketing	marketing as organic	no marketing as organic	improvements	penalties	information of all actors	Reconsider internal risk categorization
1	A, B, C						x					
2	A, B, C	x	x		x			x	x		x	x
3	A, B, C	x		x	x*		x		x*		x	x
4	A, B	x	x	x	x	x	x		x		x	x
	C	x	x	x	x	x		x	x	x	x	x
5	A, B, C	x	x	x	x	x		x	x	**	x	x
6	A, B, C	x	x	x	x	x		x	x	**	x	x
1 – 6	D	x	x	x	x	x		x	x	x	x	x

Abbreviations: CERT = certifier; MoA = Ministry of Agriculture.

*in case 3, the organic operator should carry out improvements on his own responsibility. In all cases 2, 4, 5 and 6, the operator should propose improvements, which must be agreed by the certifier.

** Penalties apply in case of insufficient care or illegal actions (cases C, D), but not in the other cases (A, B).

4.2.4 Clarifications regarding the residue value relevant for classification

- **Analytical tolerance:** the analytical tolerance can be subtracted from the mean residue value, before determining the cases 1 to 6.
- **Processing factor:** In processed foods, the residue values should be converted to raw foods.
Exception: If there are reasons to assume that the residue was caused after processing, no processing factor may be applied.

4.2.5 Exceptions regarding classification and measures taken

- **Bromide:** In mushrooms, cabbages, herbs and spices, and in all crops originating from fields near the seashore (max 75 km away), bromide is regarded as a natural constituent. The procedures are analogous to case 1 and 2. In all other crops / origins, the orientation value is 5 mg/kg.
- **Persistent organic pollutants (POPs):** It is known that many soils are contaminated to some extent by persistent organic pollutants (DDT, HCB, Dieldrin etc.) which were used in the past. Because these products are not on the market in Europe, present use can be excluded. In these cases, no investigation of the causes is necessary and no penalties are given. Due to the negative public perception of these compounds, organic marketing should be allowed only up to a level of 0.01 mg/kg for each substance, and only for a maximum of 2 detected substances. Fields with high contamination of POPs may be blocked for the cultivation of risk crops (family Cucurbitaceae, especially pumpkin seeds).

4.2.6 General clarifications

- **Feed:** MRLs are not defined for all kinds of feed. If no MRL is defined, the institution which is responsible for handling the case proposes a decision for the individual case. The MoA must agree to this decision, and it must be communicated to all actors. Such decisions may serve as precedents in future, similar cases.
- **Proportionality:** The 'Procedures and measures taken in the different cases' shown above are intended as a general rule. In *well-justified* cases, the institution which is responsible for handling the case may exceptionally consider to take a different decision. In this case, the MoA must agree to the exceptional decision, and the full reasons must be communicated to all actors. Such decisions are regarded as exceptions and shall *not* serve as precedents, and operators have *no right* to ask for such exceptions. Proportionality applies in particular (but not exclusively) to the case of *processed foods*, and of *milk, eggs and meat* (see below).
- **Marketing of processed foods/feed:** In processed food or feed, which were processed *before* the residue case was known, the certifier may waive the blocking of marketing, if it can be assumed that the residue is <orientation value in the processed food/feed.
- **Marketing of milk, eggs and meat:** In the case of contaminated feed: If the feed was used *before* the residue case was known, the certifier may waive the blocking of marketing for milk, eggs and meat derived from these animals, if it can be assumed that the residue in these products is <orientation value.

4.3 Interpretation of residues in leaves, soil and other agricultural materials

4.3.1 Existing interpretation guidelines

The existing interpretation guidelines apply only to foods, and not to non-food agricultural materials such as leaves or soil.

4.3.2 Conclusions for the Czech Republic

In the workshop, the following was concluded:

- Guidance is urgently needed for the interpretation of residues on leaves, soil or other agricultural materials.
- A separate guideline needs to be developed for such materials. It should be formally similar to the guideline for foods.
- For such materials, no MRLs are defined, and it is unclear whether the orientation value of 0.01 mg/kg is also applicable.
- For the time being, the interpretation guideline can therefore not work with fixed numerical threshold values. However, it is desirable to define such values in the future. For example, the residue investigations in Czech vineyards carried out by ÚKZÚZ may provide the background for setting such limits.

4.3.3 Discussions on persistent organic pollutants as a special case

During the workshop, the case of DDT residues in soils originating from DDT use in the past was discussed. The same arguments apply also for all other persistent organic pollutants. The following was concluded:

- Residues in the *soil* do not per se constitute a worry.
- Residues in organic *foods* are more critical, due to the very negative public perception of these compounds.
- If the farmer has grown a risk crop although he *knows* that a field is contaminated, this was judged as 'insufficient care' and categorized as case C (although the farmer has not *caused* the residues himself by applying the product).
- If the farmer has grown a risk crop *without knowing* that a field is contaminated, this was judged as 'without producer's fault' and categorized as case B. The participants of the workshop did not come to an agreement whether marketing as organic product should be possible in such a case. FiBL recommends to make the decision dependent on an analysis of the harvested product, which is then evaluated according to the guidelines for foods (organic marketing up to a level of 0.01 mg/kg for persistent organic pollutants).
- The participants agreed that farmers cannot be obliged to analyze all of their fields for potential contaminations.

4.4 Proposed interpretation guideline for pesticide residues in non-food materials from organic farms

4.4.1 Categorization by analytical results (type of substance)

Substance	Case
allowed in organic farming	7
persistent organic pollutants	8 (case B or C)
other non-allowed pesticides	9

4.4.2 Categorization after investigations (cause of residues)

Causes and fault
A causes cannot be determined.
B contamination without producer's fault.
C insufficient care.
D Illegal use of substances.

4.4.3 Procedures and measures taken in the different cases

		Measures taken immediately after detection				Measures taken after completion of investigations					
Residue	Causes	notify CERT immediately	notify MoA	investigation of causes	preliminary blocking of marketing	marketing as organic	no marketing as organic	improvements	penalties	information of all actors	Reconsider internal risk categorization
7	A, B, C					X					
8	B, C				X	*	*			X	X
9	A, B	X	X	X	X	*	*	X		X	X
9	C	X	X	X	X	*	*	X	**	X	X
7 – 9	D	X	X	X	X		X	X	**	X	X

Abbreviations: CERT = certifier; MoA = Ministry of Agriculture.

*in case 8 and 9, the final decision on marketing will depend on a residue analysis of the harvest, which will be handled according the scheme for *foods*.

** Penalties apply only in case of insufficient care or illegal actions (cases C, D), but not in the other cases (A, B).

4.4.4 Clarifications and exceptions

➤ **Persistent organic pollutants (POPs):** It is known that many soils are contaminated to some extent by persistent organic pollutants (DDT, HCB, Dieldrin etc.) which were used in the past. Because these products are not on the market in Europe, present use can be excluded. In these cases, no investigation of the causes is necessary and no penalties are given. The presence of such residues in soil does not constitute a worry per se. However, care must be taken if risk crops (family Cucurbitaceae, especially pumpkin seeds) are grown on polluted fields. In this case, the organic marketing of the harvest is only possible, if the residues in the harvest comply with the rules for organic food (analysis of harvested products necessary, evaluation see above). Fields with high contamination of POPs may be blocked for the cultivation of.

➤ **Proportionality:** The ‘Procedures and measures taken in the different cases’ shown above are intended as a general rule. In well-justified cases, the institution which is responsible for handling the case may exceptionally consider to take a different decision. In this case, the MoA must agree to the exceptional decision, and the full reasons must be communicated to all actors. Such decisions are regarded as exceptions and shall not serve as precedents, and operators have no right to ask for such exceptions.

4.4.5 Discrimination between drift and illegal use

When residues are found in a field, it is important to know whether they were caused by drift from a conventional neighbour (= case B) or by illegal use of the organic producer (= case D). The following method gives useful indications:

- › Take one sample right at the edge of the organic field, immediately bordering the conventional field (see figure 3).
- › Take another sample in the centre of the organic field.
- › If the residues at the edge of the field are considerably higher than in the centre, it can be assumed that the residues were caused by drift. Based on the limited data which are available at the moment, this procedure seems reliable, if the ratio edge/centre ≥ 4 , and less reliable, if edge/centre < 4 , but > 1 (see table below).

Ratio of residues edge/centre	Conclusions
edge/centre ≥ 4	Drift is the most likely cause of residues.
$4 > \text{edge/centre} > 1$	Drift is a possible cause of residues. If possible, find additional evidence to substantiate or discard the hypothesis of drift.
edge/centre ≤ 1	Drift is an unlikely cause of residues.

Additional evidence to support the hypothesis of drift is useful, particularly in cases of doubt. Such evidence must be evaluated case by case. Examples of additional evidence are:

- › Distance from the field centre to the conventional neighbour field (in very narrow fields, drift can have more severe effects than in wide fields).
- › Spraying schedule of the conventional neighbour. Note: Private control bodies cannot obtain data from neighbouring farms, if these refuse to make them available. By contrast, ÚKZÚZ in collaboration with the phytosanitary service (SRS) can obtain such data also from conventional neighbours.
- › Wind direction and wind speed at the day when the conventional neighbour sprayed.
- › Analysis of the organic farmer's spraying equipment.

4.4.6 Note on drift prevention

It is clear that drift is caused by conventional neighbours, and not by organic farmers themselves. If drift occurs once, it can be interpreted as being 'contamination without producer's fault' (= case B).

Nevertheless, organic farmers are obliged to take all measures which are necessary to minimize the likelihood of drift. If drift occurs repeatedly, the certifier should ask the organic farmer to put more emphasis on the measures for minimizing drift. Measures for minimizing drift are:

- › Talk to the neighbour and explain the problem of drift for organic farmers. At least, he should not spray in windy conditions.
- › Even better, try to find an agreement about the management of the conventional rows bordering directly to the organic field (for example, these might be untreated, or treated together with the organic crops).

- Increase the distance between the organic and the conventional crops by a strip of unused land.
- A hedge gives good protection against drift.
- The organic border rows which are most exposed to drift might be harvested separately and marketed conventionally. Talk to the conventional neighbour about a compensation.

5. Decisions and actions taken

Decisions concerning certification / de-certification of organic farms or products are part of the interpretation guidelines. Actions taken during and after the investigations are described above (roles of different actors). The major actions are:

- in-depth investigations, including unannounced inspections and analyses of further samples;
- preliminary blocking of foods during investigations;
- de-certification of farms and/or foods;
- improvements to prevent future contaminations
- blocking/reclaiming of direct subsidies;
- penalties;
- reconsideration of the internal risk classification for the operator and/or the concerned products (depending on the outcomes in the case). A higher risk classification means that the operator and/or the products have a higher probability of being sampled in the future.

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