



Federal Office of
Consumer Protection
and Food Safety



“Pesticide residues in food”

National reporting 2018 Federal Republic of Germany – condensed version



Summary

The report presents the results of the analysis of food for pesticide residues. In accordance with Regulation (EC) No 396/2005, the compliance with current legislation was checked and analyses to assess consumer exposure were carried out.

In 19 official laboratories of 16 federal states, 19,611 food samples were analysed for the presence of pesticide residues. 5,495 of these samples were taken at random in the framework of the monitoring programme, in order to be able to make representative statements about consumer exposure. However, with regard to the selection of the other samples, foodstuffs known for presenting higher risks were preferred. For this reason, the results do not allow to draw conclusions on the contamination level of the entirety of all foodstuffs available on the market.

For reporting to the European Food Safety Authority (EFSA) and the European Commission, the samples are divided in "surveillance" and "follow-up enforcement" samples. The routine and monitoring samples are denominated as "surveillance" samples, while suspect samples, complaint samples and persecution samples are summarised as "follow-up enforcement" samples.

In the reporting year, a total of 19,338 samples fall under the category "surveillance" and 273 samples under the category "follow-up enforcement".

In 2018, 1,516 samples were analysed in the framework of the coordinated multi-annual Community control programme. These samples were part of the 19,611 samples analysed in total.

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1 Information about maximum residue levels

"Maximum Residue Level" (MRL) means the upper legal level of a concentration for a pesticide residue in or on food. For setting MRLs, data on the toxicology of the substance and on the intake quantity of the respective foodstuff as well as data from field studies carried out in accordance with good agricultural practice are taken into consideration.

The report distinguishes between the exceedance of a MRL and the objection (non-compliance) of samples. Not all samples with MRL exceedances are objected (non-compliant) by the respective responsible authority, as for an objection (non-compliance) further arguments like the analytical measurement uncertainty have to be taken into account.

When it is established that a consumer risk through pesticide residues in a foodstuff cannot be excluded, the European Rapid Alert System for Food and Feed (RASFF) is notified, so that all responsible authorities in the EU are informed accordingly.

In 2018, Germany issued 21 notifications due to pesticide residues; seven of these were alerts.

2 Food-related view on the results

(only "surveillance" samples without substances which are proven to (mainly) not stem from pesticide use: chlorate and the quaternary ammonium compounds (QAC) didecyl-dimethylammonium chloride (DDAC) and benzalkonium chloride (BAC))

In total 202 different foodstuffs were analysed. As every year, the majority were fruit and vegetables.

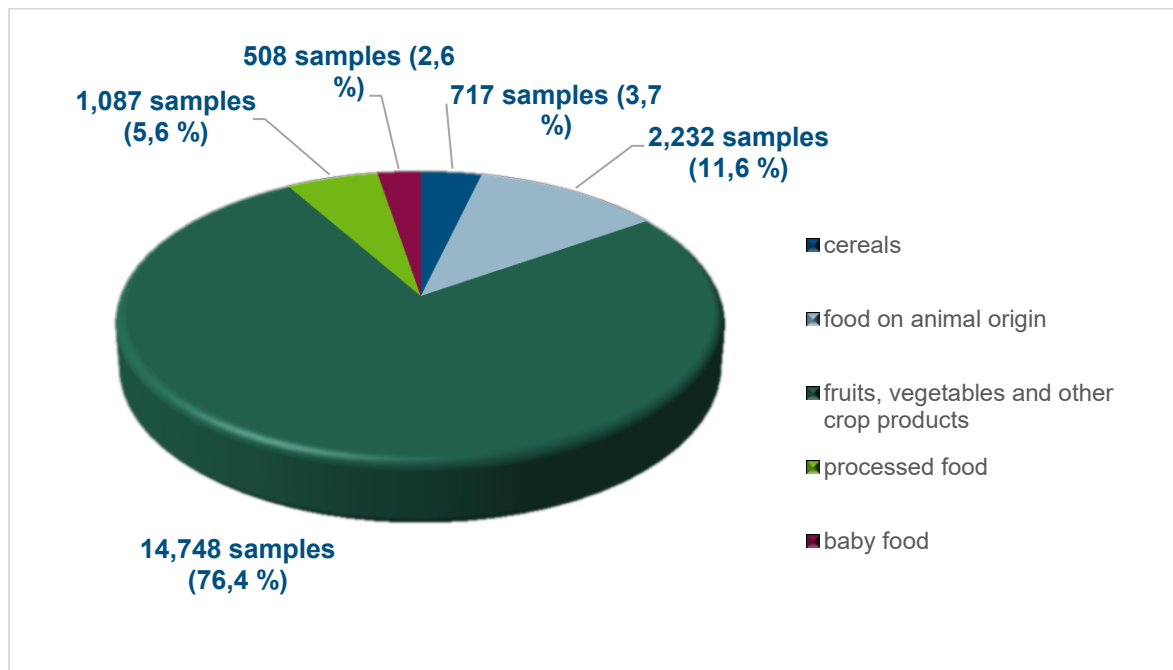


Figure 1: Distribution of sample numbers between food groups

Strawberries (777 samples), bovine milk and milk products (720 samples), apples (614 samples), sweet peppers/chilies (579 samples), table grapes (556 samples) and asparagus (512 samples) were analysed the most frequently.

Table 1: Residues in food groups

Food group	Number of samples				
	total	with residues < LOQ (limit of quantification)	with residues < MRL	> MRL not objected	> MRL objected
Cereals	717	388 (54.1 %)	329 (45.9 %)	34 (4.7 %)	16 (2.2 %)
Food of animal origin	2,232	1,478 (66.2 %)	754 (33.8 %)	16 (0.7 %)	5 (0.2 %)
Fruit, vegetables and other products of plant origin	14,748	4,918 (33.3 %)	9,830 (66.7 %)	453 (3.1 %)	234 (1.6 %)
Processed food	1,087	470 (43.2 %)	617 (56.8 %)	21 (1.9 %)	6 (0.6 %)
Food for infants and young children	508	440 (86.6 %)	68 (13.4 %)	6 (1.2 %)	4 (0.8 %)
Total	19,292	7,694 (39.9 %)	11,598 (60.1 %)	530 (2.7 %)	265 (1.4 %)

In the category food for infants and young children, 1.2 % of the samples contained residues above the MRL. 4 of 6 samples were objected. In 3 of these 4 samples (2 of them were processed fruit for infants and young children) were objected due to the residue definition for the fungicide fosetyl (sum). Predominantly, phosphonic acid was detected. Fosetyl was actually only detected in approx. 4% of the samples. Residue definition of fosetyl includes the lead compound fosetyl as well as the metabolite phosphonic acid and their salts. It should be noted that phosphonic acid can be present as a degradation product of the fungicide fosetyl but can also originate from other sources.

For fruit and vegetables the range of pesticide contaminations was particularly large, spanning from foodstuffs in which no residues were quantified, to products with objection rates of 54.5 % (jackfruit). However, the foodstuffs with objection rates of more than 10 % were mainly exotic fruits and vegetables like the mentioned jackfruit as well as okras, goji berries, papayas and ginger.

Fortunately, many foodstuffs with particularly high intake like potatoes, carrots, bananas or apples only had few MRL exceedances and objections.

Table 2 summarises the fruit and vegetable products without any objections or less than 0.5 % objections in at least 100 analysed samples.

Table 2: Fruit and vegetables with the lowest number of objections in 2018 (>100 samples)

Food	Number of analysed samples	Objections (%)
Potatoes	404	0.0
Bananas	321	0.0
Carrots	186	0.0
Sweetcorn	175	0.0
Onions	120	0.0
Green salad	470	0.2
Apples	606	0.3
Tomatoes	360	0.3
Peaches	299	0.3
Strawberries	771	0.4
Table grapes	546	0.4
Tangerines	275	0.4
Blueberries	244	0.4
Roman rocket/rucola	237	0.4
Oranges	236	0.4

The ten foodstuffs with the highest objection rates are presented in Table 3 (at least 100 samples).

Table 3: Fruit and vegetables with the highest number of objections in 2018 (>100 samples)

Food	Number of analysed samples	Objections (%)
Beans (with pods)	202	8.4
Kales	252	6.3
Fresh herbs	490	5,7
Sweet peppers/chilies	563	4.3
Currants	105	3.8
Teas	155	3.2
Herbal infusions (dried)	154	3.2
Linseeds	327	3.1
Aubergines	108	2.8
Spinaches	161	2.5

Also in 2018, organic products were controlled for residues. The contamination of these samples was much lower than that of conventionally produced samples. Only 26.0 % of the products stemming from organic farming contained residues, which could be quantified analytically – compared to 60.1 % of other products.

3 View with regard to origin

(“surveillance” samples and “follow-up enforcement” samples without chlorate and QAC)

19,545 samples were controlled, 44 % thereof from Germany, 28 % from other EU Member States and 15 % from Third Countries. 14 % of the samples were of unknown origin.

Big differences can be observed in the contamination level of foods with pesticide residues depending on their origin. In 2018 maximum residue levels were exceeded in 1.3 % of the analysed products (only “surveillance sampling”) from Germany and in 1.5 % of the analysed products from other EU Member States. With regard to products from Third Countries, this was the case in 8.8 % of the samples. Nevertheless, the percentage of samples without any quantifiable pesticide residues is still the highest in German foodstuffs.

Nearly two thirds of the samples were purchased from retail food traders and about less than one fifths from wholesalers. The rest was bought from growers, manufacturers and packers as well as from service providers, e.g. restaurants or delivery services.

4 Substance-related view on the results

(“surveillance sampling“ and “follow-up enforcement sampling“)

The range of pesticide substances tested for in 2018 comprised 1.004 different substances (including the legal residue definitions of sums, their metabolites and isomers). In the years before 2017, the number of active substances according to their legal residue definition was counted (without metabolites and isomers). Therefore evaluations since 2017 cannot be compared with previous years. This change became necessary due to an increasing number of complex residue definitions and varying residue definitions depending on the foodstuff. Only in this way was it possible to disclose all data without losses.

Obviously, no sample was analysed for all substances. On average, each food sample was analysed for 356 different substances.

565 of the 1.004 substances were not found in quantifiable quantities in any sample. On the other hand, for 163 substances residues above the valid maximum residue levels were detected.

The most noticeable substances among the 767 stated MRL exceedances were nicotine, fosetyl, dithiocarbamates, carbendazim and chlorpyrifos.

Since 2010 **nicotine** is banned for pesticide use in the EU due to its high toxicity. Natural causes of some plant species (nightshade family), contamination of nearby tobacco fields or tobacco processing plants and the contact of nicotine-contaminated hands of smokers are discussed as causes for the occasionally striking nicotine contents in fruit and vegetable products.

Due to the fact that the fungicide **fosetyl** is analysed together with its degradation product phosphonic acid, it cannot be decided whether the positive findings are due to a treatment with the fungicide or stem from other sources.

The determination of **dithiocarbamates** (Maneb, Mancozeb, Metiram, Propineb, Thiram, Ziram) occurs nonspecific as carbon disulfide (CS₂). Therefore it cannot be concluded analytically which dithiocarbamates were used. Only contents of Propineb and Thiram can be determined separately from that of CS₂. Besides even natural sources of CS₂ as certain plants with natural sulfur or carbon disulfide

compounds (for example Brassicaceae such as cabbage and rapeseed or allium species) influence analysis. This can lead to false positive results.

Pesticides containing the active ingredient **chlorpyrifos** are no longer authorized in Germany, the exhaustion period ended on 2 April 2015 and 6 May 2015 respectively. In the EU, chlorpyrifos is still authorized as an active substance in plant protection products until 31 January 2020.

5 Findings of multiple residues

(“surveillance sampling“ and “follow-up enforcement sampling”)

In 27.5 % of all samples, more than one substance was detected in quantifiable quantities. The percentage distribution of the number of quantified residues is presented in the following figure:

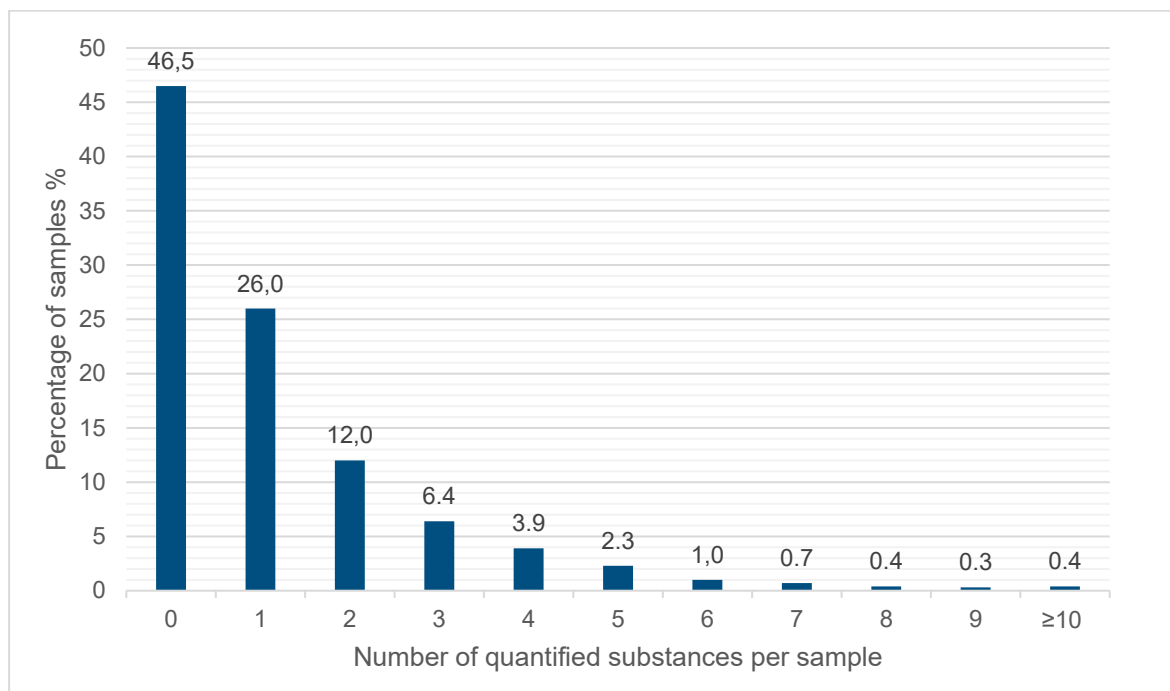


Figure 2: Percentage of samples without any residues or with residues of 1 to ≥10 substances.

Multiple residues above 50 % were found particularly in tangerines, grapefruits/pomelos, roman rocket/rucola, currants, oranges, fresh herbs, table grapes and products from boar.

6 Substances which are proven to (mainly) not stem from pesticide use

Some substances are legally regulated as pesticides, but their residues mainly originate from other sources than pesticide treatments. In order not to distort the overall picture of pesticide contamination, the quaternary ammonium compounds didecyldimethylammonium chloride (DDAC) and benzalkonium chloride (BAC) as well as chlorate are treated separately in the report.

Residues of chlorate can enter the food during processing, e.g. through washing and disinfection steps.

In 2018, chlorate was quantified in 16.3 % of the samples. In 8.6 % of the samples, residues were evaluated as exceeding the MRL. Chlorate was mainly objected in 'fruit and vegetables' (3.1 % of overall 4.588 samples).

Also in the category 'processed food' (a total of 191 samples) and 'food for infants and young children' (a total of 132 samples) several samples (2.6 %) respectively one sample (0.8 %) were/was objected for containing too much chlorate.

In products from organic farming, the residue situation with regard to chlorate is better than in conventional products. For only 4.7% of samples of organic origin, the chlorate residues detected were evaluated as exceeding the maximum residue level.

Quaternary ammonium compounds are used for example to disinfect milking plants and tanks. For this reason, they are often detected in dairy products. In 2018, residues of DDAC and/or BAC above the maximum level were analysed in 2.6 % of foodstuffs of animal origin.

In products from organic farming, the residue situation with regard to DDAC and BAC is also better than in conventional products, only 0.3 % of the samples contained residues above the MRL.