

# MONITORING-REPORT

Feed Sector

Edition 2015

**Countries of origin of feeds, additives and premixes**



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## SECOND ISSUE OF THE MONITORING REPORT

330,000 additional analysis results

The QS database for feed monitoring contains more than 2 million analysis data in the meantime, which means that 330,000 additional analysis results are available compared to the Monitoring-Report 2014, thus providing even more meaningful evaluations.

The latest analysis data come from 20,000 samples drawn in the period from 1st September 2014 to 30th June 2015. As was the case last year, it was again confirmed that all economic operators in quality assurance are consistent,

as the number of instances where maximum levels were exceeded lay at just short of 1 % (231 samples) during this period. Other important facts and figures on contaminants can be found in the enclosed poster.

As some high DON and ZEA levels were found during the 2014 harvest, mycotoxins in maize (incl. Aflatoxin B<sub>1</sub>) is one of the main topics of this issue. Focus is also placed on the various countries of origin of feeds and in particular additives and premixes in this second issue of the Monitoring-Report.

In addition to this, the current report contains information on the plant protection product residues most frequently found in feeds, as well as important tips on the correct sampling of feeds.

We wish you an interesting reading on all topics –  
Your QS Team ■

### MYCOTOXINS IN MAIZE – A LOOK BACK TO THE HARVEST 2014

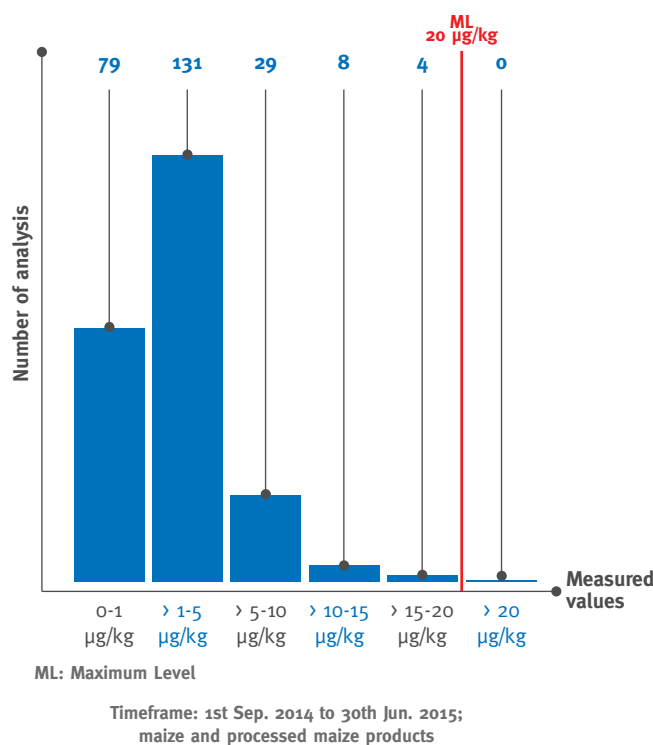
Considering last year's maize harvest, it was distinguished above all by increased mycotoxin levels – in particular DON and ZEA – but also Aflatoxin B<sub>1</sub>.

#### AFLATOXIN B<sub>1</sub>

**Contamination with Aflatoxin B<sub>1</sub> continues, but maximum levels not exceeded**

As in previous years, the latest evaluation conducted within QS feed monitoring shows that contamination with Aflatoxin B<sub>1</sub> also plays a role in maize and processed maize products harvested in 2014. Several values lie close to the legally prescribed maximum level of 20 µg/kg. Aflatoxin B<sub>1</sub> was detected in 251 of a total of 2,993 analyses and four of them (0.1 %) were just below the maximum level. Serbia and Italy were given as the countries of origin of the affected samples. Significantly increased levels of Aflatoxin B<sub>1</sub> were established in eight additional analyses (0.3 %). In these cases too, Serbia and Italy were again listed as the countries of origin of the maize along with Austria. ■

**Aflatoxin B<sub>1</sub> in maize and processed maize products just below the limit value**



#### Ad hoc Monitoring Plan for Aflatoxin B<sub>1</sub> Coordinated with Current Harvest Situation

**Im Currently:** A severely increased level of Aflatoxin B<sub>1</sub> was detected in a batch of maize from Poland in July 2015. The value was almost twice as high (39.4 µg/kg) as the maximum permitted level. The finding was reported to QS as well as within the EU Rapid Alert System. Thereupon, the ad hoc monitoring plan for Aflatoxin B<sub>1</sub> in maize was adapted at short notice to add Poland as a critical country of origin.

**Outlook for 2015 harvest:** There will also be an ad hoc monitoring plan for Aflatoxin B<sub>1</sub> in maize for the 2015 harvest in which the company's own risk management is to be given more consideration in all probability. QS will give notification as soon as the new monitoring plan is available. ■

### MAXIMUM LEVELS – PRODUCT AND SPECIES IMPORTANT

Different maximum levels apply for Aflatoxin B<sub>1</sub>, depending on the product. The animal species should also be taken into account because stricter values have been established in some cases (e.g. complete feed for dairy cattle). The following table shows an overview of the legally determined maximum levels in line with Directive 2002/32/EC. ■

**Legally determined maximum levels for Aflatoxin B<sub>1</sub>**

Products intended as animal feed	Maximum level in mg/kg (ppm) in relation to a feed with a moisture level of 12 %
Raw feed materials	0.02
Supplementary feeds and complete feeds	0.01
Excluding:	
– Compound feeds for dairy cattle and calves, dairy sheep and lambs, dairy goats and kids, piglets and young poultry	0.005
– Compound feeds for cattle (except dairy cattle and calves), sheep (except dairy sheep and lambs), goats (except dairy goats and kids), pigs (except piglets) and poultry (except young poultry)	0.02



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## OBLIGATION TO STATE THE ORIGIN OF FEEDS

### IMPORTANT: OBLIGATORY DECLARATION OF ORIGIN

Since the beginning of 2014, the country of origin of feeds must be listed in the database. The reason for this was the detection of aflatoxin in maize of the 2012 harvest in which particularly high values were established in maize from Serbia and south-eastern Europe. With mycotoxins in particular, the risk can usually be restricted to certain regions or countries of origin in which there were special weather conditions. **Important:** Only when the countries of origin have been recorded for all feeds does monitoring have a solid database which can be used to make meaningful evaluations of the countries of origin – currently, for example, for the assessment of the new maize harvest and classification of countries (e.g. high-risk countries).

### INTERNATIONAL GOODS FLOWS IN THE QS SCHEME

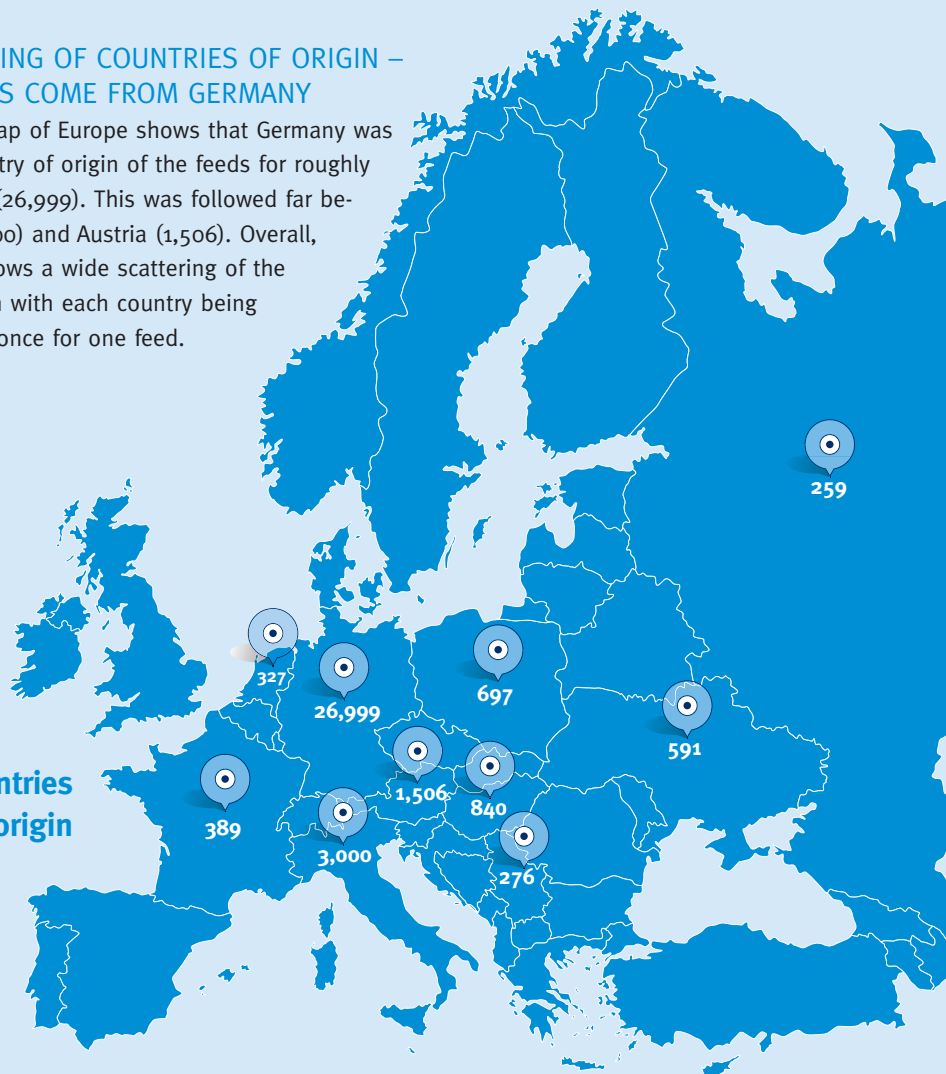
Since 2014, the country of origin of all feed samples has been recorded in the database and it is worth taking a closer look at the countries and/or regions from which feeds find their way into the QS scheme. The chart shows the countries of origin of feeds which QS-certified companies have recorded in the QS database. (Companies which supply into the QS scheme via a recognised standard do not enter any data into QS Feed Monitoring by the way, but conduct comparable feed monitoring as prescribed by the standard to which they adhere).

### LARGE NUMBER OF RECORDED FEEDS COME FROM EUROPE

Between 1st January 2014 and 30th June 2015, a total of 36,998 samples were drawn for QS feed monitoring. The largest proportion of samples, viz. 89 % came from Europe. Only 338 samples were recorded in the database as coming from Asia and 330 as coming from a South American country.

### WIDE SCATTERING OF COUNTRIES OF ORIGIN – MOST SAMPLES COME FROM GERMANY

A glance at the map of Europe shows that Germany was given as the country of origin of the feeds for roughly ¾ of all samples (26,999). This was followed far behind by Italy (3,000) and Austria (1,506). Overall, the evaluation shows a wide scattering of the countries of origin with each country being recorded at least once for one feed.



### LOWER SAXONY, BAVARIA AND NORTH RHINE-WESTPHALIA MOST FREQUENTLY LISTED

If you look at the distribution of samples from Germany by federal states, it is conspicuous that Lower Saxony is given as the place of origin of most feed samples (6,019), followed closely by Bavaria (4,104) with 15 %, and North Rhine-Westphalia (3,870) with 14 %. Baden-Württemberg is given as the state of origin of a further 2,425 samples, followed by Schleswig-Holstein (1,881), Saxony-Anhalt (1,662), Hesse (1,300), and Saxony (1,284). Brandenburg, Thuringia, Mecklenburg- Western Pomerania, Rhineland-Palatinate, Hamburg and Bremen were recorded as the federal state of origin of fewer than 1,000 samples and Berlin and Saarland of fewer than 100. ■

### RASFF Portal

The RASFF (Rapid Alert System for Food and Feed) provides an updated overview of the feeds in which undesired substances were found. It contains a list of all contaminants in feeds and foods which were reported to the authorities in each individual EU member state.

<https://webgate.ec.europa.eu/rasff-window/portal/>



### QS Crisis Diary – Incident Journal

Cases of feed contamination have also been centrally recorded in the QS Crisis Diary since 2012. This means that all scheme participants can obtain information quickly on incidents and crises in the feed sector. With the QS Incident Journal available at <https://www.q-s.de/ereignisjournal-geschuetzt/startseite-ereignisjournal.html> all interested parties can get an overview of incident and crisis management as well as the practical quality assurance performed by QS. Information on current cases in the feed sector is published in the Incident Journal. At the same time, you can also read all about the measures QS takes on an operative and communicative level. All cases are shown in anonymised form for reasons of data protection.



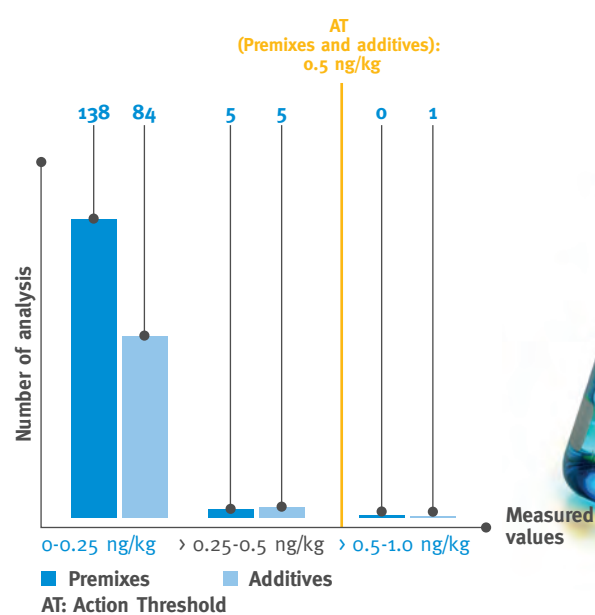
## ADDITIVES AND PREMIXES

### BACKGROUND CONTAMINATION MUST BE MONITORED

Additive and premix manufacturers have been participating in the QS scheme since 2012. This means that the manufacturers either have to be certified themselves (in line with QS or another recognised standard) or that the premixes and additives are imported into the QS scheme via the Gatekeeper regulation (by means of additional monitoring).

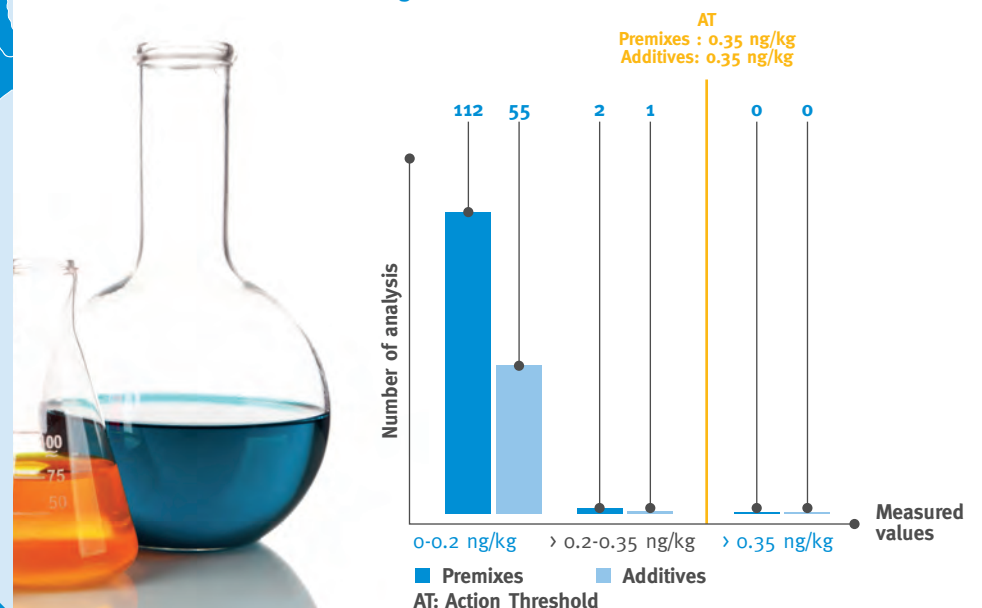
To date, a total of 655 samples have been uploaded into the database for additives (196 samples) and premixes (459 samples). The samples were examined for 4,525 individual parameters, which equates to an average of roughly seven analyses per sample. Analysis for the parameters dioxins, dioxin-like PCBs, non-dioxin-like PCBs, heavy metals and, with third-country products, analysis for antimicrobially effective substances are required as a minimum.

### Dioxins – one exceeding of the action threshold for additives



Levels of dioxins were determined in 143 of 148 analyses (96.6 %) of premixes and 90 of 111 analyses (81.1 %) of additives, but the legally determined maximum level was not exceeded in any instance. The legally determined action threshold of 0.5 ng/kg was exceeded in one sample, a compound of trace elements. When an action threshold is exceeded, the company in question is required to establish the cause of the increase, but the goods remain marketable.

### Dioxin-like PCBs – no exceeding of the threshold



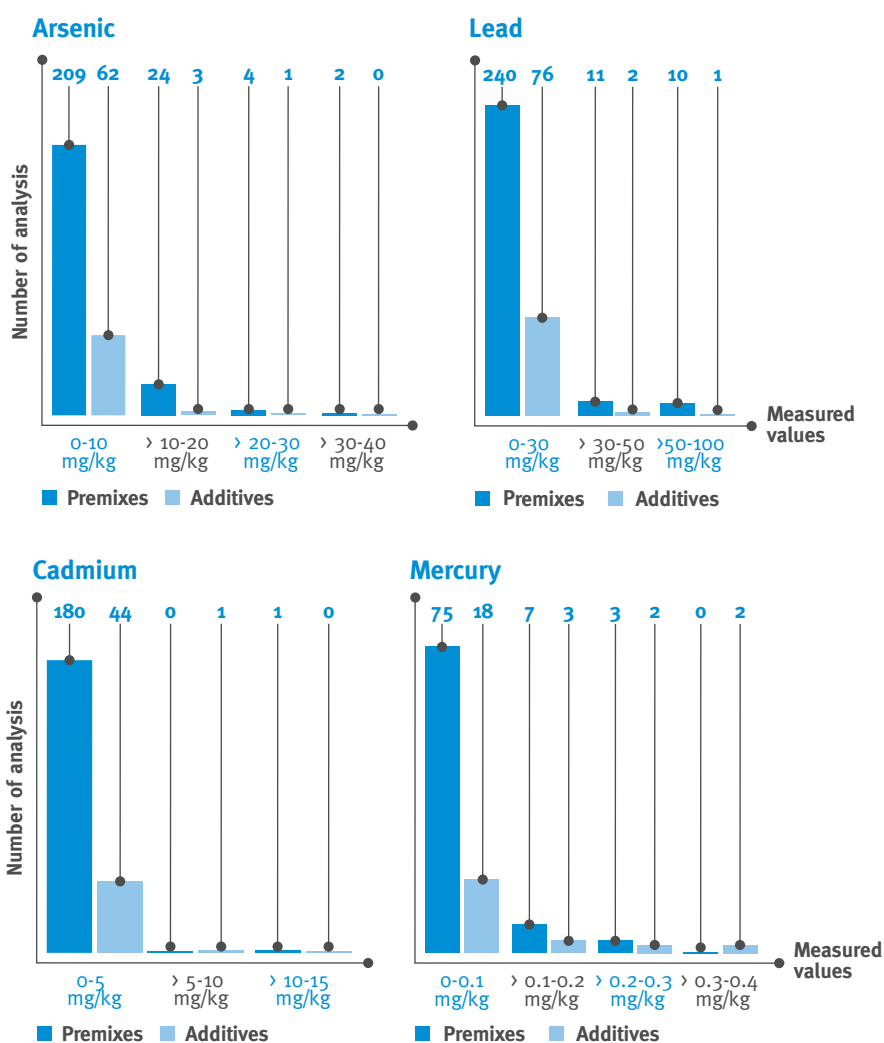
A level of dioxin-like (dl) PCBs was measured in 114 of 119 analyses (95.8 %) of premixes, with the equivalent number lying at 56 out of 73 analyses (76.7 %) for additives. Neither with premixes nor additives was the action threshold for dl PCB exceeded (no maximum legal level has been set for dl PCB).

The values for dioxin as well as dl PCB point to a background contamination which should continue to be kept under observation. The background contamination is slightly lower with non-dioxin-like (ndl) PCB, which were detected in 52.6 % of the analyses of premixes (61 of 116) and in 63.9 % of the analyses of additives (46 of 72). The maximum level was not exceeded in any instance. ■

### ARSENIC AND LEAD – BACKGROUND CONTAMINATION WITH PREMIXES IN PARTICULAR

Where premixes are concerned, the scheme participants commissioned a total of 1,272 analyses for heavy metals spread roughly evenly over the four heavy metals arsenic (319), lead (318), cadmium (318) and mercury (317). The distribution of the 588 analyses of additives is exactly the same, with 147 analyses for each of the four heavy metals.

The most important news up front is that the maximum level was not exceeded in any analysis. Viewed more closely, a relatively high level of background contamination can be found for arsenic (As) and lead (Pb) – especially among the premixes (As 74.9 %, Pb 82.1 %) – compared to cadmium (Cd) and mercury (Hg) (premixes: Cd 56.9 %, Hg 26.8 %). These values show that permanent monitoring for heavy metals continues to make good sense.



### IMPORTS OF ADDITIVES FROM CHINA AND OTHER PLACES

Although Germany is recorded as the country of origin for roughly 60 % of all additives, a large number of feeds are also imported into the QS scheme, and the majority of additives (approx. 15 %) are imported from China. This is followed by European countries such as Slovenia (approx. 6 %) and Sweden (approx. 3 %), as well as Poland, Slovakia and Spain (each with approx. 2 %). In some cases, India, Indonesia and Canada are also recorded as countries of origin.

## Control Plans

### 42 CONTROL PLANS DIRECTED TOWARDS THE SECTORS

A lot of emphasis is placed on risk orientation in the QS scheme. Feed monitoring is aligned specifically to the products and concerns of the scheme participants and QS continues to develop further all the time. When feed monitoring began, QS started off with only a few control plans, but in the meantime the feed monitoring guideline contains 42 different control plans which are precisely aligned to the individual sectors and products (including 25 control plans for feed material producers and 10 for compound feed manufacturers). The control plans are tested and adjusted as necessary every year in cooperation with experts.

### A VIEW TOWARDS 2016 – TWO NEW CONTROL PLANS

From 2016, a separate, sector-specific control plan will be included in the guideline for the product group “By-products of fruit processing”. The plan covers all products listed under items 6.05.01 to 6.07.01 and 13.02.05 of the positive list. No company-specific control plan will be prepared. This applies in similar manner to “By-products of the milk processing industry” (Item 13.02.06 of the positive list). As these products will be included in the control plan for dairy produce, no company-specific control plan will be prepared here either from 2016.

## PLANT PROTECTION PRODUCT RESIDUES

### EXAMINATION OF RAW MATERIALS ESSENTIAL

Plant protection products are used exclusively in the field or in storage areas. Accordingly, the main focus of analysis is on agricultural primary products and raw products. For this reason, QS also prescribes an analysis of all starting products because unlike the situation with many other parameters, sampling of the end products is often unsuitable as there are as good as no determined maximum levels for processed products. EU Regulation 396/2005 establishes “maximum levels of pesticide residues in or on foods and feeds of plant or animal origin” only for raw products. With products (e.g. wheat bran) for which no specific maximum residue level has been established, the value of 0.01 mg/kg may not be exceeded (cf. Article 18, Para. 1b). Only with organic chlorides (see Directive 2002/32/EC, 10 Active Substances) are maximum levels also established for processed feeds (e.g. endosulfane for compound feeds).

Under certain circumstances, it can nevertheless be necessary to examine the processed product or compound feed. In this case, the processing path of the product must be taken into account. On this basis, the concentration in which the active substance is present in the raw product can be partially derived. The processing factors (factors on the basis of which the calculated value can be converted for processed products) published by the BfR can also be used. The overview is limited to only a few products, however (see [http://www.bfr.bund.de/de/a-z\\_index/verarbeitungsverfahren-8400.html](http://www.bfr.bund.de/de/a-z_index/verarbeitungsverfahren-8400.html)).



### MORE THAN 300 ACTIVE SUBSTANCES

A number of different active substances are concealed behind the parameter “Plant protection product residues”. The QS database contains more than 300 active substances which can be selected for analysis. The QS scheme contains recommendation lists since 2011. These were prepared to offer a pre-selection of relevant active substances with certain products or product groups. They are currently available for cereal grains, tubers and roots, oil seed and oil fruits and/or feed fats.

### PLANT PROTECTION PRODUCT RESIDUES DETECTED SELDOM

More than 1,6 million analysis for individual active substances have been conducted to date within the scope of QS feed monitoring (as of 30th June 2015). Only in approx. 0.6 % (absolute number 9,799) of the analysis a value was determined.

### Top 10 analysed plant protection product active substances

Plant Protection Product Active Substance	No. of Analyses	Plant Protection Product Active Substance	No. of Analyses
1 Pirimiphos-methyl	4,187	6 Endosulfane sulphate	378
2 Chlorpyrifos-methyl	807	7 Piperonyl Butoxide	363
3 Chlorpyrifos	551	8 Endosulfane beta	351
4 Deltamethrin	489	9 Hexachlorobenzene	209
5 Endosulfane alpha	390	10 Endosulfane	179

The active substances included in the Top 10 make up approx 80 % (absolute number 7,904) of the total number of active substances found.

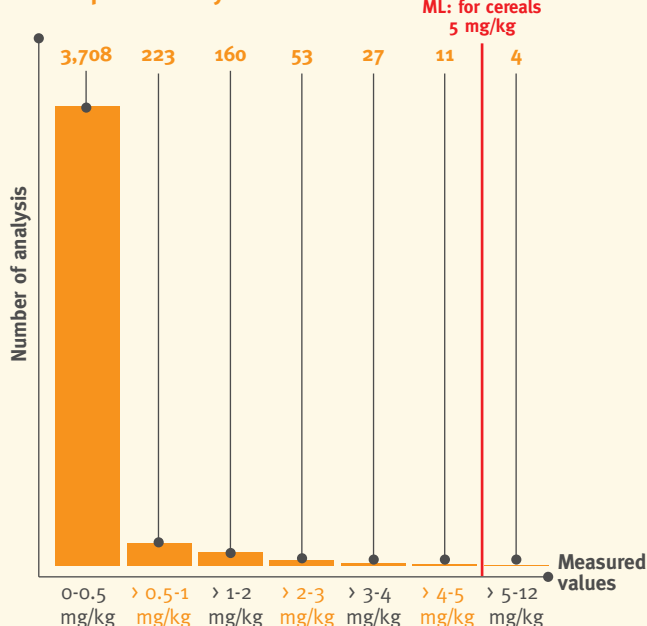
### PIRIMIPHOS-METHYL DETECTED MOST FREQUENTLY IN WHEAT

A closer look at the active substance pirimiphos-methyl shows that it was detected most often in wheat.

The levels at which pirimiphos-methyl was detected in feeds range mainly around values just above the detection limit of 0 to 0.5 mg/kg (3,708 analyses or 88.6 %).

A maximum level of 5 mg/kg has been established for cereals. It was exceeded in three instances, once with wheat (value 11.66 mg/kg), once with barley (value 7.6 mg/kg) and once with maize (11 mg/kg). Pirimiphos-methyl was also found in a self-mixed sow feed (6.8 mg/kg).

### Pirimiphos-methyl



### Top 5 feeds in which pirimiphos-methyl was most frequently detected

Plant Protection Product Active Substance	No. of Analyses
1 Wheat	930
2 Barley	493
3 Wheat bran	326
4 Maize	233
5 Rye	199

### Glyphosate – Nothing conspicuous in QS samples

Glyphosate has been used since the seventies mainly as a weed killer and is currently a topic of public discussion as its authorisation within the European Union expires at the end of the year. An extension of its authorisation is currently being examined and it remains to be seen whether the active substance will be re-authorised. 176 tests for glyphosate have been conducted within the scope of QS feed monitoring since 2010. A level of 0.1 mg/kg was detected in one sample of wheat bran – a value clearly below the limit value for wheat (10 mg/kg). The active substance could not be detected in any of the other 175 analyses.

# SAMPLES AND SAMPLING

## CORRECT SAMPLING ESSENTIAL FOR RESULT

The correct drawing of a sample is the basis for a significant analysis result. Depending on the parameters, sampling has the greatest influence on the analysis result, e.g. if the harmful substance is unevenly distributed in the sample (nest formation). In this way, faulty sampling can easily lead to a false result.

## THE ESSENTIAL ASPECTS OF SAMPLING

**Die Qualifications of the sampler:** The sample may only be drawn by a qualified person who has received specific training and gained experience of sampling. If there is no sufficiently qualified sampler at a company, an external sampler can be called upon to draw samples, e.g. a person of a laboratory or certification body.

**Cleanliness of equipment:** The equipment and containers used for sampling must be clean. Working in dirty conditions can lead to carryover. Salmonella, for example, was detected in a sample although the product itself was not contaminated with salmonella.

**Suitable sample quantity:** Sufficient sample material must be drawn to ensure proper analysis. The sample quantity must be adjusted to suit the number of parameters that have to be considered. It should also be ensured that quantity is sufficient for a second analysis if a result is questioned.

**Note:** If there is doubt about the analysis result of a sample, the parameter can be set to "Clarification required" in the QS database. The sample can then be examined again by a second laboratory.



## AVERAGE SAMPLE SIZES MAKE IT MORE DIFFICULT TO FIND THE CAUSE OF CONTAMINATION

The greater the quantity from which the sample is drawn, the more goods have to be rejected in the event of contamination and the more difficult become traceability and the identification of the cause. Which goods are contaminated? What can be the cause of the contamination (raw material, processing stage)? Are other feeds affected? Has the feed already been given to the livestock? Is the retained sample still on hand? To limit the possible damage, QS therefore prescribes that no average sample sizes are formed from different batches. It is also important to select a batch as small as possible.

## RETAINED SAMPLES HELP TO AVOID DAMAGE

The law requires that samples of every raw product and end product must be retained (cf. Regulation (EC) No. 1831/2005). In addition to the samples for QS feed monitoring, samples of all feeds marketed as QS produce must be drawn and retained. Retained samples help to avert damage from businesses, e.g. in the event of complaints from customers. It can be clarified subsequently whether the batch should have been rejected or not. ■

**Note:** When easily perishable feeds are involved (e.g. whey or draff), the retained sample should be kept refrigerated or frozen. Only in this way it can be ensured that the product is not spoilt in the event of a complaint about the feed and examination of the retained sample. This applies in equal measure to samples sent to the laboratory. Easily perishable samples must be refrigerated during packaging and transport.

# MYCOTOXINS IN MAIZE – THE 2014 HARVEST

## INCREASED LEVELS OF DON AND ZEA IN MAIZE CONTINUE TO BE ONE FOCUS OF THE SECTOR

Sharply increased levels of the fusarium toxins deoxynivalenol (DON) and zearalenone (ZEA) were found in maize in 2014. This was also reflected in QS feed monitoring. The values for DON lay between 8 and 24 mg/kg in ten of a total of 606 analyses and therefore above the EU guideline value of 8 mg/kg. Germany and Poland were given as the countries of origin here. With ZEA, nine out of 561 analyses lay between 2 and 7 mg/kg and therefore above the EU guidance value of 2 mg/kg. Germany and Austria were given as the countries of origin of these samples.

### DON and ZEA exceed the guidance values in the 2014 maize harvest



The table can be seen below showing the different guidance values recommended by the EU Commission (Recommendation 2006/576/EC).

Mycotoxin	Products intended as animal feed	Guidance value in mg/kg (ppm) in relation to a feed with a moisture level of 12 %
Deoxynivalenol	Raw feed products (*)	8
	– Cereals and cereal products (**) except for maize by-products	12
	– Maize by-products	5
	Supplementary and complete feeds except:	0.9
	– Supplementary and complete feed for pigs	
	– Supplementary and complete feed for calves (< 4 months), lambs and kids	2
Zearalenone	Raw feed products (*)	2
	– Cereals and cereal products (**) except for maize by-products	3
	– Maize by-products	
	Supplementary and complete feeds except:	0.1
	– Supplementary and complete feed for piglets and gilts	0.25
	– Supplementary and complete feed for sows and fattening pigs	
	– Supplementary and complete feed for calves, dairy cows, sheep (including lambs) and goats (including kids)	0.5

(\*) The following should be observed with cereals and cereal products fed directly to livestock: their use in a daily ration should not have the result that the animal is exposed to a higher quantity of these mycotoxins than in the corresponding exposure if only the complete feed is used in a daily ration.

(\*\*) The term "Cereals and cereal products" not only covers the raw feed products listed under Heading 1 "Cereal grains, their products and by-products" of the non-exclusive list of the most important feed materials in PART B of the annex to Council Directive 96/25/EC of 29 April 1996 on the circulation of feed materials (OJ L 125 of 23 May 1996, P. 35) but also other feed materials acquired from cereals, above all grain forage and grain roughage.

## THE EDITOR: WHO IS QS?

QS has been ensuring food safety since 2001 – from the farm to the shop counter. 95 percent of the pork and poultry meat from German production today comes from QS-certified businesses and the equivalent figure is roughly 80 percent for beef. Approximately 79,200 livestock farmers participate in the QS scheme overall. The joint objective is consistent self-assessments and comprehensive assurance of processes and origins. Producers of fresh fruit vegetables and potatoes are also involved. Within the QS scheme, they produce safe foods in line with clearly defined criteria with the support of all upstream and downstream stages of the process.

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