Quality Assurance. **From farm to shop.**

FEED

MONITORING-REPORT

Feed Sector

+++ First Edition +++ First Edition +++ First Edition +++ First Edition +++

Edition 2014

A GOOD INVESTMENT WITH CERTAINTY

Feed Monitoring in the QS scheme

Since 2008, QS scheme participants have drawn more than 122,000 feed samples and conducted at least 1.6 million individual analyses. The analysis results have been evaluated to their full extent for the first time for this Feed Monitoring Report 2014. A transgression rate of not quite 0.5 % in the past seven years confirms the consistent quality assurance of the economic operators.

In the QS scheme, every business that produces or trades in feed is obliged to participate in feed monitoring. According to the latest figures, this affects roughly 3,600 compound feed and feed material producers and almost 50,000 agricultural businesses which mix their own feed. They are all aware of their responsibility for perfect feed and they invest a lot of money in the monitoring of feed safety. An average of 5 million euros is spent every year for the analyses initiated by the QS scheme alone – and that pays dividends to everyone involved.

PERFECT FEEDS ARE THE BASIS OF SAFE FOOD

Being a QS scheme participant means working hand-in-hand with others, from feed producers through all stages of livestock farming and meat production to the shop counter. Everyone can rely on the work of everyone else here. This principle is reflected again in feed companies where they form a separate chain of consecutive responsibility stages in which the produce is transported again and again and often stored in between. With each of these interim stages, the risk of potential contamination increases along with the responsibility of each individual for perfect feed. ■

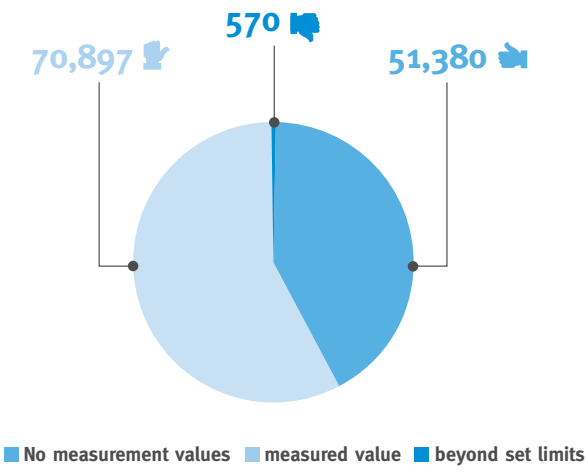
Detailed evaluations, interesting facts and background information for practitioners – this issue of the Feed Monitoring Report provides an overview of seven years of QS feed monitoring. The removable poster gives information on undesired substances and the feeds in which they were most frequently detected. We wish you interesting reading!

Our service:
On request, we will prepare customised evaluations for your company – just talk to us!
Your QS-Team

GOOD GRADES FOR QS SCHEME PARTICIPANTS

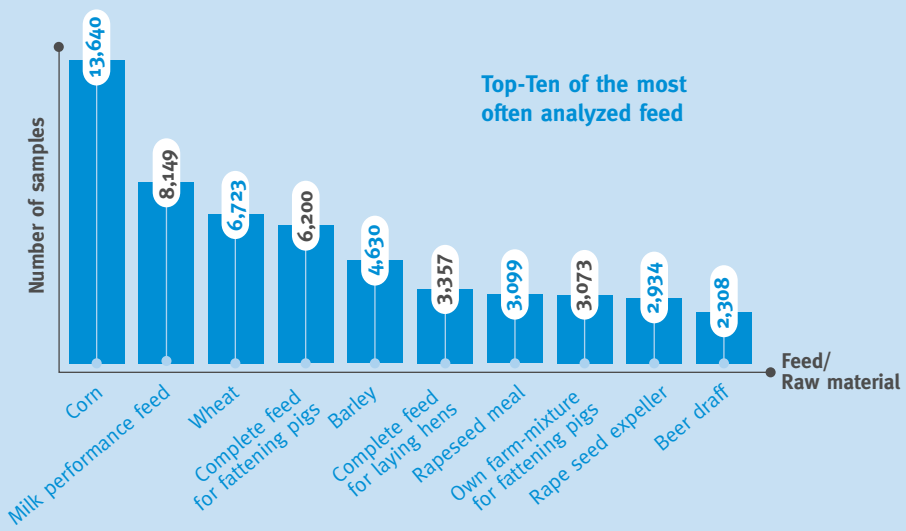
The QS scheme participants are fully “committed to the cause”: over 120,000 samples have been analysed within the framework of feed monitoring since 2008. And the results show that scheme participants do good work – no values were measured in just under 71,000 cases; in other words, no undesirable substances were detected. Although roughly 51,000 samples did show a result, the measured values were below the stipulated limit values. Only 570 samples showed values that exceeded the guidance value, “intervention level” value or maximum concentration level. This is equivalent to a mere 0.5 % of all samples. What is the breakdown of values that exceeded stipulated limits? The intervention level value was exceeded in 7 of the 570 critical samples. 125 of the 570 samples exceeded the statutory maximum level, and the guidance value, which is below the statutory maximum level and applies to selected substances (such as aflatoxin B1), was exceeded in 438 of the 570 samples. ■

Results of the analysis: only 570 samples beyond set limits



TESTS IN DETAIL

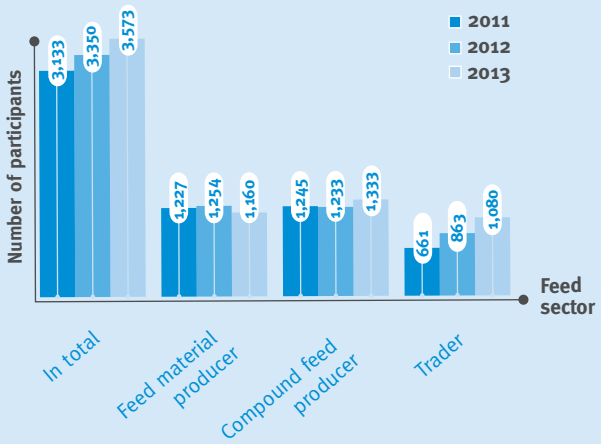
The various products have to be sampled at different intervals: the more a raw material is used or a feed produced, the more frequently they have to be examined in QS Monitoring. On top of this, some raw materials and feeds are classified as especially critical. An example of this is corn and processed corn products from certain countries, as well as oils and fats. The inspection frequency is much higher for these feeds than for other feedstuffs. A separate evaluation of these hot spots is contained in the inner section of the report. ■



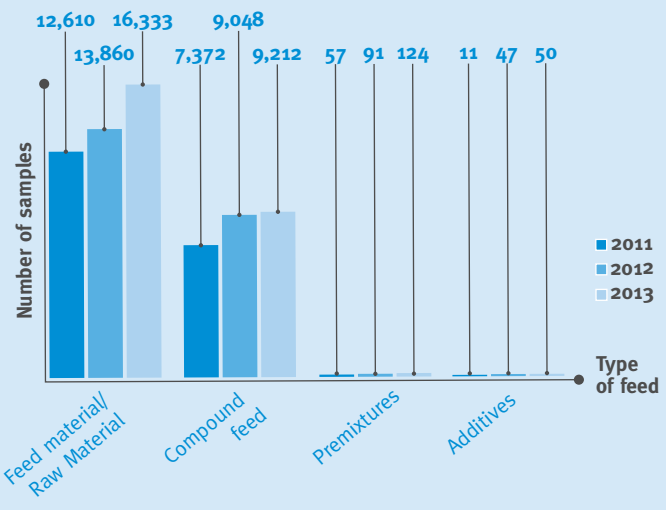
HAND IN HAND: A SUPPLY CHAIN CONTINUES TO GROW TOGETHER

Every business in the QS scheme that produces or trades in feed undertakes to participate in feed monitoring. Year-on-year comparisons show that the number of tests is increasing. One reason is that more and more companies are joining the QS scheme. The fact that the highest number of tests were conducted on feed material is due to the interconnected control system: the participants monitor both their raw materials and the end products. Based on this procedure, therefore, every stage monitors the previous stage as well as its own production process and output. The compound feed producers are the most frequent "testers": 45.6 % of all samples were taken by compound feed producers, 26.7 % by feed material producers, 4.4 % by traders and 0.2 % by additive producers. 23.1 % of all samples were taken on farms/agricultural businesses, with cattle farming businesses accounting for 49.7 % of these latter samples, pig farmers for 46.5 % and poultry businesses for 3.8 %. ■

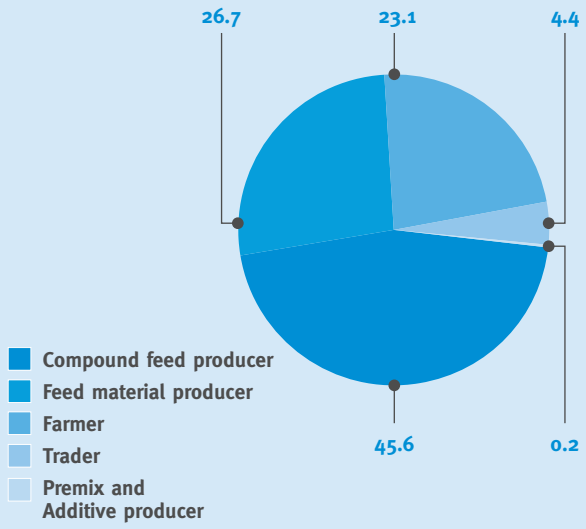
Growing participant numbers feed monitoring



Number of samples in type of feed in %: Feed materials are mostly analyzed



Sampling frequencies sorted by industry in % : Compound feed producer take most of the samples



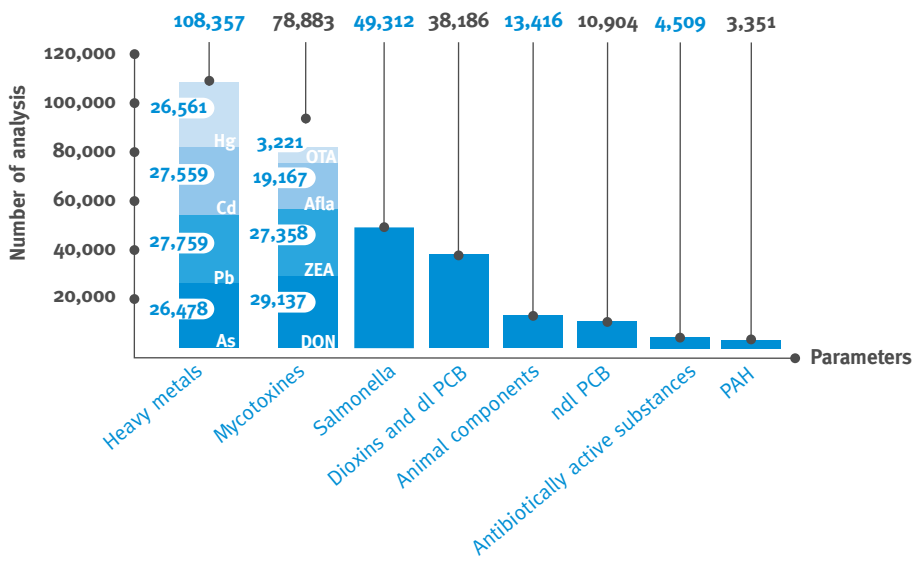
PARAMETERS UNDER THE MICROSCOPE

Feed monitoring is a tool for self-assessment at each individual business location. Testing feed for compliance with maximum levels, intervention level values and guidance values enables us to draw conclusions regarding in-house quality assurance. At the same time, the result supplied by a sample shows directly whether a specific feed lot or batch can be marketed without reservation.

Heavy metals

Heavy metals head the hit list of most frequently analysed parameters. As these metals are typical environmental toxins, nearly all feed products and raw materials have to be tested for possible traces. The focus is on arsenic, lead, cadmium and mercury. Some products also need to be tested for nickel.

Number of analysis per parameter: Heavy metals are number one



Mycotoxins

In second place are the mycotoxins. These health-threatening fungal toxins occur in certain kinds of weather during the growth and flowering mostly in cereals, or at a later stage during storage. Deoxynivalenol (DON) and Zearalenone (ZEA) pose a particular risk to sows and piglets, which means that major attention is paid to the potential presence of these contaminants in the feed for this livestock. In addition, numerous raw materials are tested for the mycotoxins Aflatoxin B1 and Ochratoxin (OTA).

Dioxins

A special element of QS feed monitoring is "positive release sampling". Some production processes are considered particularly critical. This is why certain feed material and compound feed products have to undergo lot-based positive release sampling before being brought into circulation – resulting in a higher number of tests for dioxins and dioxin-like PCBs. Release sampling is necessary for, among other products, refining fatty acids, salts of fatty acids and raw coconut oil as well as mixed fats and oils processed using fatty acids and mixed fatty acids. ■

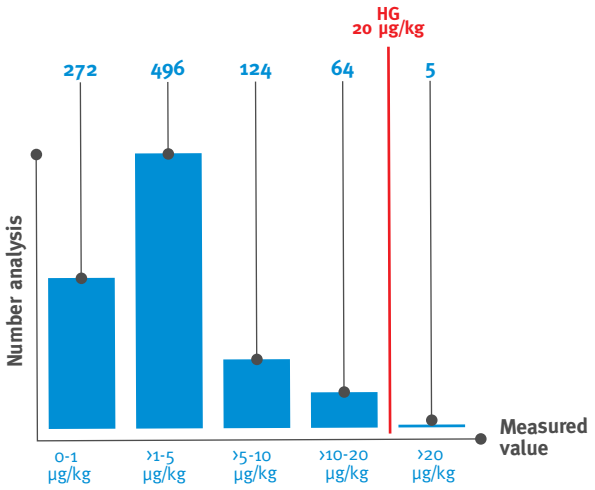
FEED "HOTSPOTS"

Aflatoxin finds in corn under control

QS AD-HOC MONITORINGPLAN FOR CORN TAKING HOLD

With the alarming finds of Aflatoxin B1 at the beginning of 2013, which found its way into the market in maize consignments from Serbia, it became clear very quickly that Aflatoxin B1 contamination was also to be expected to an increasing extent in corn from other regions since the harvest in 2012. QS reacted immediately. An Ad-hoc monitoringplan for corn from certain countries of origin was prescribed as early as May 2013. Ever since, compound feed producers, feed material producers and dealers have had to have samples taken of every batch of corn and processed corn products from the affected countries during the receiving inspection of raw materials – 100 % monitoring. The inspection results show that the sector has responded, either by changing suppliers or no longer purchasing products from certain regions. The maximum concentration in a batch was only exceeded in five instances, four times in corn and once in corn gluten meal. The scheme participants had to take immediate action here, however, because these products may not be fed to animals. The Ad-hoc monitoringplan still applies, because the sector has focused on sustainability here.

Measured values of Aflatoxin B1 in Corn and corn processing products: Only 5 exceedance of the maximum level



HG: Maximum level (20 µg/kg). From value of 20 µg/kg product is not suitable for the market

PECULIARITY: AFLATOXIN B1 AND QM MILK

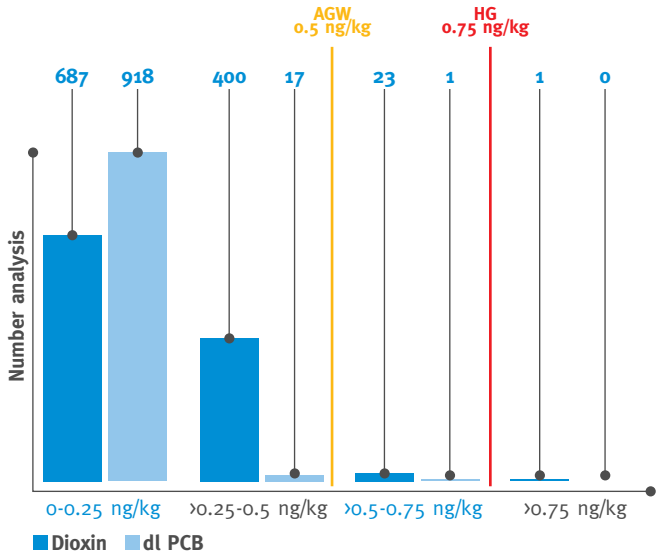
With feeds given to dairy cattle, a QS guidance value of 1 µg/kg of Aflatoxin B1 applies in addition to the maximum legal concentration. If values are above this level, QM-Milch e.V. must be notified in addition to QS head office. If utilisation in dairy cattle businesses cannot be excluded, the supplier must, as a precaution, notify the customer that the QS guidance value has been exceeded by issuing a warning such as "Product not suitable as feed for dairy cattle". ■

Dioxin incident in 2011 has a lasting effect on the industry

QS RESPONDS SUCCESSFULLY WITH TIGHTENED CONTROL PLANS FOR FATS AND OILS

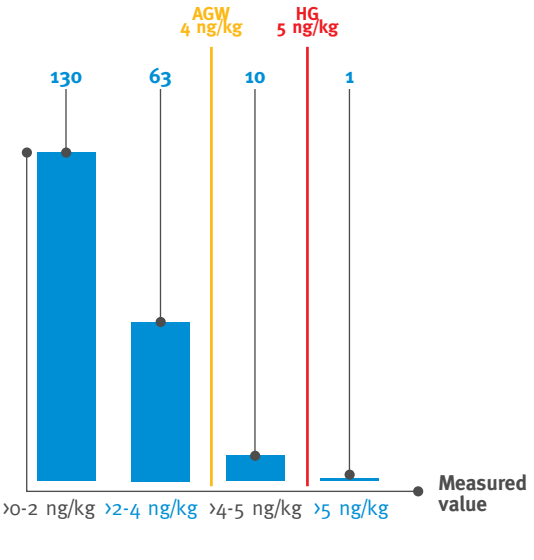
An incident with far-reaching consequences shook the sector at the beginning of 2011. Some feeds with sometimes high dioxin concentrations found their way into the marketplace after technical fatty acids had been mixed with fatty acids for feeding purposes. Consequently, a large number of businesses had to be suspended. QS responded immediately by tightening its control plans for products containing oils and fats from particularly risky processes with the so-called release inspection. Ever since, traders and producers must subject their final products batch by batch to a release inspection prior to marketing, which also means 100% monitoring. A glance at the results of the current 2,624 analyses shows that thanks to the strict intervention of QS, the scheme participants now have the situation under control. Accordingly, the legally prescribed maximum dioxin level was only exceeded in two instances. Although it was above the action threshold in 33 instances, it was still below the maximum level. A similar pattern was seen with dioxin-like PCB where the action threshold was exceeded in one instance. Even though the numerous tests did not produce any alarming results, they show that dioxin and PCB still have to be monitored. A reading was determined with 86 % of the samples examined. Dioxin was detected in 817 samples and dioxin-like PCB in 918 – albeit in small quantities. 480 analyses produced results close to the action threshold, which is almost 20 % of all tests. Conclusion: there is still good reason for diligence, because dioxins and PCB remain a risk. ■

Analysis results of Dioxins and dl-PCB in oils and fats



AGW: Intervention level (0.5 ng/kg). From value of 0.5 ng/kg company must search for the cause and initiate measures.
HG (only Dioxines): Maximum level. From value of 0.75 ng/kg product is not suitable for the market

Analysis results of Dioxins in fish oil

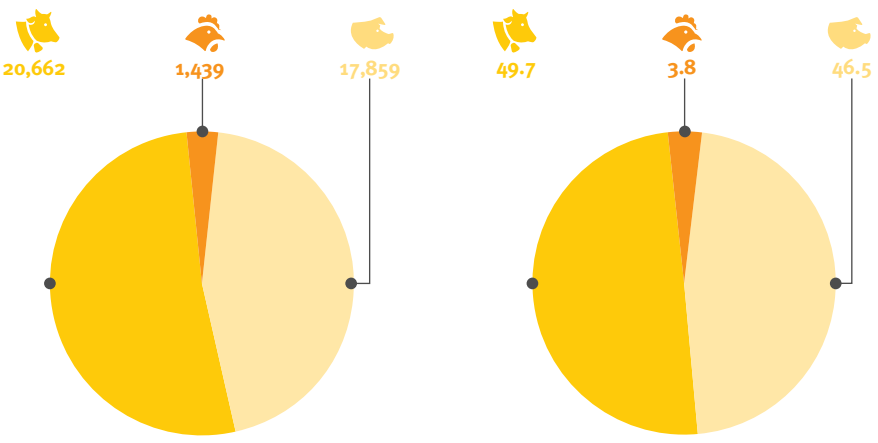


AGW: Intervention level (4 ng/kg). From value of 4 ng/kg company must search for the cause and initiate measures..
HG: Maximum level (5 ng/kg). From value of 0.75 ng/ kg product is not suitable for the market

FEED MONITORING ON FARMS

There are just under 50,000 livestock farmers in the QS scheme, who produce their own feed. These “on-farm mixers” account for roughly one in four of the tests carried out within the framework of feed monitoring. Sampling on the farms is organised via the coordinators, generally during the independent inspection by the auditor. In total, just under 40,000 tests have been carried out to date, chiefly on cattle and pig farms. The poultry farmers generally use purchased ready feed for poultry fattening and therefore participate only seldom in the agricultural feed monitoring process. ■

Sampling at agricultural businesses: cattle farmers lead the way



No. of analysis by type of business

Distribution of samples in %

Special effect: acid as preservative

A sample tests positive for antibiotically active substances although the sample does not actually contain any such substances. How can this happen? Feed like silage, in which acid is used as a preservative, can supply a “false positive” result. This is why particular attention should be paid to the type of feed used for testing.

SALMONELLA: MONITORING IN THE INTERESTS OF CONSUMER PROTECTION

Salmonella are considered to be the frequent cause of serious gastrointestinal illness in humans. A high level of food safety is therefore important in order to minimise and wherever possible prevent the spread of salmonella through slaughtering pigs and poultry. This is why there are strict hygiene requirements for livestock farmers stipulated by the legislator and QS. These regulations concern, among other things, the storage and handling of feed: storage in closed rooms as well as regular cleaning and disinfection of these rooms, silos and containers in which feed is stored are a “must” for farmers and agricultural businesses.

In addition, all poultry and pig farmers should always consider feed when identifying potential entry pathways for salmonella. To support them in this process, feed products are subjected to specific tests for salmonella as part of QS monitoring. This enables farmers to identify potential risk herds for salmonella contamination at an early stage and to take appropriate action. This protects the entire value added chain – from farmer to consumer – by preventing the spread of contamination. It is worth mentioning that almost 50,000 tests for salmonella have been carried out to date, and that only 54 samples were positive – equivalent to just 0.1%. 14 of these samples came from agricultural businesses.

THE 4 MOST FREQUENT CONTAMINANTS IN AGRICULTURE

Antibiotically active substances and salmonella

Antibiotically active substances are among the most frequently investigated parameters in agriculture - because if they are detected in a sample, then the product in question must be removed from the market. Fortunately, this was only the case in 36 out of 3,154 tests, however.

Parameter	Total tests	Positive findings	Type of business
Antibiotically active substances	3,154	36	15 cattle farming 21 pig farming
Salmonella	7,194	14	3 cattle farming 11 pig farming

DON and ZEA

Although DON and ZEA, two mycotoxins that can directly impact animal health, were frequently detected, it was rare for the values to exceed admissible limits: out of more than 11,000 tests in total, levels exceeding the EU reference values were found in only 21 cases.

Parameter	Total tests	Value measured	Value exceeding limit	Type of business
DON	6,332	2,872	17	17 pig farming
ZEA	4,966	2,370	4	3 cattle farming 1 pig farming

FLAWLESS RAW MATERIALS

While only few tests showed levels exceeding limit values for undesirable substances, no such levels at all were found for other substances, such as heavy metals and dioxins. The satisfying results of feed monitoring are also due to the fact that the farmers handle feed with extreme care and receive flawless raw materials from the feed producers. By controlling the raw materials that leave their premises, the producers play a key role in ensuring safe feed on the farm. ■

FACTS, FIGURES AND BACKGROUND INFORMATION

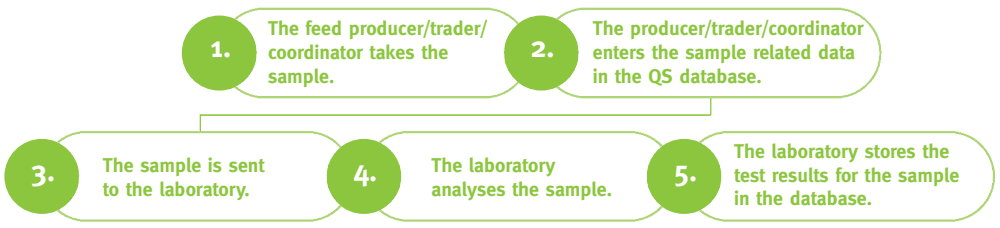
HIGH REQUIREMENT PROFILE FOR LABORATORIES

Only laboratories possessing QS approval may be commissioned to carry out tests within the framework of QS feed monitoring. In order to obtain this approval, laboratories must be accredited in accordance with DIN EN ISO/IEC 17025. They must also provide proof that they participated in round-robin tests on the relevant parameters within the last twelve months prior to recognition. In addition, QS ensures that all laboratories use the stipulated testing methods and requires a list of parameters and their determination limits as well as analysis margins for the feed sector. In order to maintain their QS recognition, all laboratories must participate in regular mandatory laboratory competence tests.

SPECIALISED KNOWLEDGE FOR SAMPLING

All business that produce or trade in feed must participate in feed monitoring. The participants can take the samples for this purpose themselves. Although this may not appear to be a neutral process at first glance, it nevertheless makes for a high level of safety due to the cross-stage approach in the QS scheme – because each stage takes samples from both incoming raw materials and outgoing goods. This creates a system of mutual control within the chain. In the agricultural sector, on the other hand, the sampling process is organised by the coordinators; samples must always be taken in agricultural businesses by third parties, and the feed samples are mainly taken by the auditors during the independent inspections. The basic rule is that only qualified personnel may take samples.

VON DER PROBENZIEHUNG BIS IN DIE QS-DATENBANK



RISK-BASED CONTROL PLANS

There are a high number of different control plans within the framework of QS feed monitoring, and these plans are tailored to the specific requirements of the sector in question. The control plans are regularly reviewed and can be adapted as soon as it becomes necessary to react to topical developments and occurrences in the market. The test results are naturally also taken into account when preparing the control plans. If products have a conspicuous number of positive findings, then the testing frequency is increased. By the same token, testing frequency can be reduced if numerous tests show a low risk. Since 2014, for example, breweries no longer have to test their by-products for salmonella as often as they used to. ■

REPORTING OBLIGATION IN THE CASE OF INCIDENTS

- **Values above the maximum level:** the batch must be blocked; the product is no longer suitable for use. In addition, the scheme participant must report the matter to the feed monitoring authority as well as QS head office using the paper of incident.
- **Values above the "intervention level":** if values exceed the intervention level, the business must carry out an in-depth investigation of its processes, establish the cause and initiate corrective action. The product may remain in circulation, however. Reporting of the matter to QS head office is mandatory. The feed monitoring authority should also be informed.
- **Values above the guidance value:** if values exceed the QS guidance value stipulated for selected active substances and target animals (e.g. aflatoxin B1 for dairy cattle), the rule for scheme participants is that the product is still legally fit for circulation but may no longer in all cases be sold to QS scheme participants. The matter is to be reported to QS head office (QS paper of incident), who coordinates the further procedure with the scheme participant.
- The business must report all **positive findings** for salmonella, antibiotically active substances and animal constituents to QS head office (QS paper of incident). Notification of the feed monitoring authority is recommended. In addition, it is necessary to differentiate with regard to the serovar, the antibiotically active substance or the animal species.
- If values are measured for DON, ZEA or OTA that **exceed the EU reference value**, there is no obligation to report the matter to QS. However, in-house measures for handling of the product must be stipulated and documented.

Remark: Besides the obligation to report such information to QS, in many cases it is also required to report to the supervisory authorities.

COMPARISON: OFFICIAL MONITORING AND QS FEED MONITORING

Number of tested samples by business category

Official annual statistics*	2013	2012	2011	2010
At livestock farmers	4,536	4,296	5,072	5,381
At producers or traders	10,668	10,294	11,499	11,996
Total	**15,204**	**14,590**	**16,571**	**17,377**

QS monitoring	2013	2012	2011	2010
At livestock farmers	4,674	4,547	5,057	4,999
At producers or traders	21,045	17,970	15,612	13,576
Total	**25,719**	**22,517**	**20,669**	**18,575**

Testing frequencies for undesirable substances

Official annual statistics*	2013	2012	2011	2010
Undesired substances with stipulated maximum level, including:	**39,299**	**38,667**	**36,762**	**35,088**
Aflatoxin B1	2,287	1,815	1,811	1,810
Organic chlorine compounds[1]	8,829	9,746	10,974	10,581
Heavy metals[2]	12,170	11,870	11,272	10,878
Dioxins	3,577	3,365	3,225	2,396
Spread of coccidiostats	9,989	9,721	7,609	7,530
Undesired substances without stipulated maximum level, including:	**13,939**	**13,462**	**13,474**	**11,426**
PCBs	3,489	3,177	2,993	2,444
Mycotoxins (except aflatoxin B1)	7,587	7,117	7,486	7,233
Total	**53,238**	**52,129**	**50,206**	**46,514**

QS monitoring	2013	2012	2011	2010
Undesired substances with stipulated maximum level, including:	**52,525**	**41,280**	**33,169**	**24,902**
Aflatoxin B1	5,049	2,495	2,361	2,205
Organic chlorine compounds	13,322	10,403	7,527	3,109
Heavy metals (Pb, Cd, Hg, Ca)	22,952	21,016	17,560	15,595
Dioxins, dioxin-like PCBs and total dioxins and dioxin-like PCBs, of which:	11,202	7,366	5,721	3,993
– Dioxins	4,554	2,843	2,376	1,789
– PCB (dioxin-like PCBs)	4,379	2,681	2,053	1,644
– Total dioxins and dioxin-like PCBs	2,269	1,842	1,292	560
Undesired substances without stipulated maximum level, including:	**15,689**	**14,136**	**10,114**	**9,212**
PCB (non-dioxin-like PCBs)	3,654	2,960	411	169
Mycotoxins (DON, ZEA, OTA)	12,035	11,176	9,703	9,043
Total	**68,214**	**55,416**	**43,283**	**34,114**

***Excerpt from the results of official feed monitoring in Germany in the control year 2013, Federal Ministry of Food and Agriculture.**
N.B. Legally stipulated maximum levels came into force for the parameter "non-dioxin-like PCBs" on 18 April 2012, but the parameter is still listed in this table under "Undesirable substances without stipulated maximum level".

[1] Chlordan, DDT, dieldrin, endosulfan, endrin, heptachlor, hexachlorbenzene, α- and β-HCH, gamma-HCH (lindane)
[2] Lead, mercury, arsenic, cadmium

THE EDITOR: WHO IS QS?

Since 2001 the QS scheme provides for food safety - from farm to shop. Today 95 percent of the pork and poultry meat produced in Germany originates from QS-certified farms, the share of beef is 70 percent. More than 79,000 livestock farmers take part in the QS scheme. The common goal: Consistent self-assessment as well as comprehensive process assurance and traceability. Producers of fresh fruit, vegetables and potatoes are added. Within the QS scheme together they produce safe food according to specific QS requirements, supported by all up- and downstream stages of the food supply chain.

Imprint

Editor
QS Qualität und Sicherheit GmbH
Dr. Hermann-Josef Nienhoff, Managing Director
Schedestraße 1-3
53113 Bonn
Germany

Phone +49 (0)228 350 68-0
Fax +49 (0) 228 350 68-10
info@q-s.de
www.q-s.de

Pictures: QS Qualität und Sicherheit GmbH, Shutterstock

Data basis: Analysis results of QS feed monitoring from January 2008 to September 2014

QS. Quality scheme for food.

As of September 2014