

MONITORING-REPORT

Feed Sector

Edition 2017

Soya bean meal from around the world



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Salmonella contamination is low



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Now even more detailed: Parameters in annual comparison



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NEW CHALLENGES FOR THE FEED SECTOR?

MOSH and MOAH keep the meat industry on its toes

Salmonella, dioxins, heavy metals and the like are among the common parameters found in residue analysis of feed. In addition, less familiar, but no less critical parameters have also shown up more recently and are forcing the industry to be vigilant. MOSH (mineral oil saturated hydrocarbons) and MOAH (mineral oil aromatic hydrocarbons) are currently the subject of much media attention. In particular the exact sources of MOSH and MOAH are so far unknown, prompting much speculation. For the purposes of objective classification, information is available in the following about current knowledge surrounding MOSH and MOAH. Which pollutants have increased in animal feed and where the evidence has declined can be read on page four.

We wish you interesting reading. Your QS Team

The editorial team would be delighted to receive your questions and suggestions regarding the QS Monitoring Report. Please submit these to presse@q-s.de ■

CARRY-OVER OF MOSH AND MOAH INTO FOOD

The entire supply chain faces new challenges due to possible contamination of packaged foods with hydrocarbon compounds – known as MOSH and MOAH. The causes for aromatic mineral oil transitions are not entirely clear to date. Printer inks, grease or exhaust gases from harvesting machinery are just a few of the possible origins of contamination. We do know: MOSH and MOAH often occur in the environment around feed and food, and now is the time to clarify the exact causes of contamination and carry-over effects.

ANALYSIS RESULTS

Classification of the analysis results is difficult, because there are no validated methods and thus no comparability with other results is given. Also, there are no limit values for MOSH and MOAH residues in food or feed. Therefore, it is not currently possible to draw any universal conclusions. Nevertheless, the detected residue levels (e. g. from former foodstuff) appear too low to explain the high carry-over effects into muscle meat.

Although currently no marketing restrictions exist, oil residues in food are undesirable. In terms of preventive consumer and animal protection, politics and the economy want to get to the bottom of the causes of MOSH and MOAH and further investigate the sources of contamination. Within the QS scheme discussions are ongoing as to where investigations on mineral oil residues are most appropriate.

EXCHANGE BETWEEN SECTORS

The European Commission has also taken up the subject. It has published recommendations on the monitoring of



mineral oil hydrocarbons in foods. Consequently, the EU reference laboratory, together with the Member States, is to draw up guidelines on sampling and analysis methods. In Germany, amongst others, the BLL (German Federation for Food Law and Food Science) together with representatives from the feed monitoring programme, the Federal Ministry of Food and Agriculture, the Federal Institute for Risk Assessment and various food and feed associations have established a round table to come to an understanding about the national implementation of these EU recommendations. ■

KEEPING AN EYE ON THE LIMITS?

A risk-based sampling of feed is essential. The interactive world map at www.q-s.de shows which raw materials in the QS scheme are obtained from which countries and what has been proven analytically. **Use this for your risk assessment.**



QS FEED MONITORING IN NUMBERS

... since the last report

Number of analyses	473,057
Number of samples	23,948
Number of exceedances*	205
Participants	4,889

Period: 01/07/2016 – 30/06/2017

... overall totals

Year	Number of analyses	Number of samples
Pre 2011	319,492	40,830
2011	303,610	20,832
2012	394,139	23,046
2013	427,405	25,719
2014	450,615	26,820
2015	427,993	26,928
2016	463,478	24,891
2017 (up to 30/06/17)	206,426	10,397
Total	2,993,158	199,463

Period: 01/07/2016 – 30/06/2017

Exceedances in selected feeds

Feed	Number of samples	Exceedances*
Feed material	14,914	1.21 %
...of which cereal	7,650	1.96 %
...of which oilseeds	2,263	0.40 %
Compound feed	8,778	0.23 %
...of which poultry	2,115	0.09 %
...of which pigs	3,206	0.47 %
...of which ruminants	2,897	0.10 %
...of which mineral feed	492	0.00 %
Premix	175	0.57 %
Feed additives	81	0.00 %
Total	23,948	0.86 %

Period: 01/07/2016 – 30/06/2017

*Exceedances of maximum level, action limit or guideline value for undesirable substances



www.q-s.de

SOYA BEAN MEAL FROM AROUND THE WORLD

UNDESIRABLE SUBSTANCES: LITTLE POLLUTION

There are no significant differences between soya products of different origins – this is the results of current QS feed monitoring evaluations.

Results from soya products by origin

Country of origin	Number of analyses	Value detected	Values > 50% of strictest limit value
Argentina	228	11.40 %	
Brazil	896	5.25 %	DI PCB, fludioxonil* (each found in soya bean extraction meal)
Germany	4,507	4.57 %	deltamethrin* (in soya beans, steam-heated)
Italy	3,414	7.23 %	
Croatia	109	0.00 %	
Austria	696	5.60 %	
Paraguay	262	6.87 %	
Poland	161	4.97 %	
Romania	277	9.03 %	
Switzerland	63	6.35 %	
Serbia	124	14.52 %	nickel (in soya cake)
Spain	1,293	10.90 %	Cypermethrin*, Salmonellae (2x) (each found in soya bean extraction meal)
Hungary	261	6.90 %	
USA	154	7.79 %	Salmonellae (2x) (each found in soya bean extraction meal)
Total	12,445	7.02 %	

Period: 01/01/16 – 30/06/2017

*with reference to the raw material (soya beans)



COMPARISON OF GERMAN AND FOREIGN FEED MATERIAL



DIFFERENCE IN EXCEEDING OF GUIDANCE VALUES

The comparison between Germany and other countries shows that a measurement for an active substance is detected with almost equal frequency, meaning that a value is above detection limit (Germany: approx. 45 %, other countries: around 40 %). Exceedances are fortunately found in only a very small number of cases. If we take a closer look, limit violations of maximum levels and guidance values for products of German origin are lower to the power of ten than for feed materials from abroad: the proportion in foreign products is a good 3 %, while the share is only 0.3 % in feed materials of German origin. ■

Exceedances for feed material: Germany vs. Rest of the World

	Exceedance				
	Value measured Number of samples in %	Action threshold Number of samples in %	Maximum level Number of samples in %	Guidance value Number of samples in %	Number of samples Total
Germany	6,559 45.02 %	1 0.01 %	2 0.01 %	40 0.27 %	14,568
Other countries	2,853 39.61 %	2 0.03 %	7 0.10 %	229 3.18 %	7,202

Period: 01/01/16 – 30/06/2017

FARMERS HAVE ON-FARM MIXTURES FOR POULTRY UNDER CONTROL

FEW IRREGULARITIES

The analysis results for on-farm mixtures made by poultry farmers are generally unremarkable. No limit values have been exceeded since collection of the data started in 2008. To generally estimate contamination levels, in addition to the limit values, the values below the stipulated limits (≥ 50 % of the most stringent limit) are also taken into consideration. Here too, the values are fine. Only the analyses for dioxins show occasional increased readings just below the limit values. Apart from this, there was one value respectively for each of the heavy metals arsenic and lead exceeding 50 % of the permissible limit.

The analysis for pesticide residues determined an elevated value for the active substance mecarbam (insecticide) throughout the entire period. In addition, a single positive result for salmonella was detected among the total of 274 samples. ■

Analyses on-farm mixtures – poultry

On-farm mixtures feed poultry	Number of Analyses	Values detected	in %	Value ≥ 50 % of strictest limit value	Limit values
Dioxins	40	40	100.00 %	2	AGW: 0.5 ng/kg; HG: 0.75 ng/kg
dl PCBs	19	18	94.74 %	0	AGW: 0.5 ng/kg
ndl PCBs	23	7	30.43 %	0	HG: 10 μ g/kg
Arsenic	50	36	72.00 %	1	HG: 2 mg/kg
Lead	50	46	92.00 %	1	HG: 5 mg/kg
Cadmium	50	49	98.00 %	0	HG: 0.5 mg/kg
Mercury	50	7	14.00 %	0	HG: 0.1 mg/kg
Salmonellae	274	1	0.36 %	1	positiv
Plant protection products	1,854	9	0.49 %	1*	HG: 0.01 mg/kg
Active antibiotic substances	41	0	0.00 %	0	positiv

* active substance: mecarbam

AGW: Action threshold HG: Limit value

Period: 01/01/2008 – 30/06/2017

Less than 8 % of the analyses revealed readings for any unwanted substance at all. This shows that irregularities were only established occasionally and in exceptional cases. On examining this 8 % more closely, it becomes evident that an increased content of dioxin-like PCBs (dl PCB) and the plant protection product fludioxonil were found in soya products from South America (**Brazil**). Samples with the **United States** indicated as land of origin produced two positive salmonella results. Soya products from Europe also reveal barely any irregularities. In **Serbia** (Danube region), one single elevated value for the heavy metal nickel was found. In **Spain**, two feed samples were flagged as unacceptable due to salmonella along with a single case due to the plant protection product cypermethrin.

The high number of soya processing mills in **Germany** is the reason that for the majority of analyses in the QS database, Germany is recorded as the country of origin. In actual fact, however, the country in which the product is farmed is defined as the origin and not the place where the product is processed. Although the processed product was produced in Germany, the origin of raw materials should be specified if known. Only in this way can conclusions be drawn regarding particular places of origin. Currently, more than 4,000 analysis results exist for soya products originating in Germany. Only in one single sample was the active substance deltamethrin found to exist in an elevated concentration.

By the way: The QS findings about different origins not resulting in a significant difference match those from other recognised standards organisations in the animal feed sector. ■

SALMONELLA CONTAMINATION IS LOW

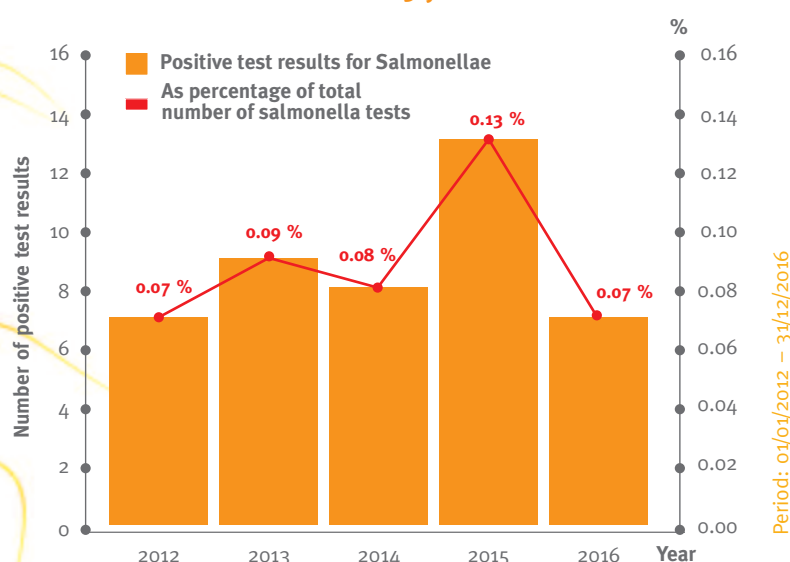
THE RISK STILL REMAINS

Tests for salmonella are an integral part of the QS feed monitoring programme. About 40 % of the samples in the QS feed monitoring programme are tested for salmonella. Samples are required for all types of feedstuff – from raw material via feed material through to compound feeds. Even for on-farm mixers, these individual blends are tested for salmonella.

The number of positive findings since the beginning of the QS feed monitoring programme in 2008 lies between seven and 14 – measured against the average number of analyses of approximately 25,000, this represents a rejection rate of less than 0.5 %. Salmonella contamination is therefore to be classified as very low.



Positive test results in the last 5 years



Salmonellae represent an extremely high risk, because they can spread rapidly and directly affect the health of the animals. If a sample analysis for salmonella tests positive, prompt action needs to be taken. All the following points must be taken into account:

Measures to be taken in case of positive test results for salmonella

Immediate measures	Further measures	Subsequent measures
<ul style="list-style-type: none"> • Embargo (internal) • Inform customer(s) and, if necessary, recall • Inform suppliers • Laboratory: Determination of serotype • Inform QS • Inform authorities 	<ul style="list-style-type: none"> • Disposal of products • Chemical or thermal treatment (use of acid, pelleting, etc.) • Inform all parties involved • If necessary, internal adjustment of the salmonella analysis interval 	<ul style="list-style-type: none"> • Root cause analysis <ul style="list-style-type: none"> › Analysis of raw material and further batches/lots • Industrial hygiene: <ul style="list-style-type: none"> › Cleaning/disinfection (of plants, silos etc.) › Check effectiveness of the cleaning (sample subsequent batches and analyse)

The **salmonella serotype is to be determined** immediately after a positive test result is established by the lab. In the entries logged in the QS database there were no mass occurrences of any of the serovars neither in a specific year nor for a specific feed. This shows that there is obviously very little spread of contamination along the feed chain. The following overview shows in detail, which serotypes were detected in which feed. ■

Salmonella serotypes in feed

Feed/serotypes	Positive test results total	Tennessee	Typhimurium	Mbandaka	Agona	Oranienburg	Enteritidis	Also analysed
Soya	9	2		1	2			Liverpool, Livingstone, Montevideo, Rissen
Rape	9	2	1	1	1	2		Livingstone, Meleagridis
Sunflower	4					2		Derby, Senftenberg
Cocoa shells	4							Kingston, Odozi, Vienna (2x)
Cereal	4		1					Hadar, Infantis, Lichtfield
Compound feed poultry	9		1	1	1*	1	1	Anatum, Give, Kentucky, Livingstone, Richmond
Compound feed pigs	1		1*					–
Compound feed ruminants	7	1	1*	2				Minnesota, Newport, Rittersbach
Fish meal	1	1						–
Former foodstuff	1							Mississippi
Total	49	6	5	5	4	4	1	24

Period: April 2008 – 30/06/2017



HARVEST 2016: INCREASED MYCOTOXIN CONTAMINATIONS

Experts point out that in 2017 a significantly increased contamination with mycotoxins is to be expected because of extreme regional weather conditions.

The current evaluation of feed samples in the QS scheme shows that the number of contaminations with mycotoxins was higher in 2016 than in the previous year. It is noteworthy that compared to the 2015 harvest, limit value violations for the mycotoxins zearalenone (ZEA) (+ 30 %) and deoxynivalenol (DON) (+ 16 %) were particularly frequent. Details of the analyses of the mycotoxins DON, ZEA and aflatoxin B1 are shown in the enclosed poster.

Wheat and triticale are among the types of grains that are most vulnerable to the predominantly domestic mycotoxins DON and ZEA. In addition to the choice of variety and soil preparation for sowing, the weather conditions during cereal flowering are a decisive factor for infections. Precipitation at temperatures of about 18 ° C favour the infection and these conditions were prevalent virtually everywhere in Germany in 2016. For 2016, Southern Germany and Northern France are among the highest risk areas of origin.

It is therefore necessary to know the origin of the feed and to limit the mixing rate accordingly to prevent maximum values being exceeded in the compound feed. Pigs are especially sensitive to DON and ZEA. The following table shows what impact the different mycotoxins can have on the health of pigs:

Effects that may be caused by mycotoxin contaminations in pigs

Effects that may be caused by mycotoxin contaminations in pigs

	Effects
DON	<ul style="list-style-type: none"> – Lower feed intake and less weight gains – Weakened immune system – Vomiting in cases of very high contamination (> 15,000 ppb)
ZEA	<ul style="list-style-type: none"> – Vaginal and rectal issues – Weak piglets at birth – Bad heat or not coming into heat at all – Inflamed teats and vagina
Aflatoxins	<ul style="list-style-type: none"> – Acute: Diarrhoea, reduced blood clotting, disorders of the nervous system, dead losses – Chronic: poorer feed conversion and feed intake, lower milk production
Ergot	<ul style="list-style-type: none"> – Poor or no teat development – Small litters, shorter gestation, more returns to service, abortions – Yellow, watery diarrhoea in piglets

Source: www.forfarmers.de (last amended: 31/07/2017)

New: Ergot

The parameter ergot will become part of QS control plans in the 2018 revision. According to this, each delivery batch of cereal is to be checked for ergot. Sensory checks are to be conducted and documented by the company itself as inspections of incoming lots of unmilled cereals. If ergot is detected, enumeration and documentation then takes place. If the content is above the legally prescribed limit of 1000 mg / kg, the goods may not be used in feed. Farmers are advised to keep an eye on the ergot contamination. ■



NOW EVEN MORE DETAILED: PARAMETERS IN ANNUAL COMPARISON

VALUES FOR DIOXINS AND DIOXIN-LIKE PCBs HAVE DROPPED

The annual comparison of parameters was expanded: in addition to showing how often an undesirable substance was detected, the measurement range is now also shown. For this purpose, QS has set 50 % of the maximum content as a limit. Therefore, the table below shows by how many percentage points the value measured was above this 50 % limit value. The following trends are emerging for the 12 selected parameters:

Dioxins, dioxin-like PCBs (dl-PCB), as well as the sum of the two parameters were detected in 2015 and 2016 in effectively equal frequency. Contaminations therefore still exist as before. The content levels measured in the individual samples, however, have fallen significantly in 2016 compared to 2015 to 2014.

A more differentiated picture is to be seen regarding **non-dioxin-like PCBs**: the frequency of detection has increased in the last three years, whilst contamination has fallen with the content values being clearly below the limit values.

Contamination with the **heavy metals** arsenic, lead and mercury has increased in 2016 compared to the previous year. Whereas, for example, in 2015 the levels of mercury greater than or equal to 50 % of the limit value in the samples tested were at 9.07 %, the value in 2016 has risen more than two percentage points to 11.86 %.

After a peak of positive **salmonella results** in 2015, the value for the year 2016 has returned to the level of 2014. A look at the figures for the first half of 2017, however, shows a renewed increase in positive results to 0.18 % – and this is also reflected in the figures in the enclosed poster.

Regarding the detection of **active antibiotic substances**, there was a decrease in 2015, however there were more positive test results in 2016, similar to 2014.

The two **plant protection products**, pirimiphos-methyl and chlorpyrifos-methyl were detected with increasing frequency from 2014 through 2015 up to 2016. The pollution load is, however, declining - particularly in the case of chlorpyrifos-methyl. ■

Analyses results for undesired substances in annual comparison

Parameter	2014			2015			2016			Trend	
	Number of analyses	Value established	Value ≥ 50% of strictest limit value	Number of analyses	Value established	Value ≥ 50% of strictest limit value	Number of analyses	Value established	Value ≥ 50% of strictest limit value	Trend (Value established)	Trend ≥ 50% of strictest limit value
Dioxins	4,738	84.85 %	7.59 %	4,579	87.49 %	7.41 %	4,455	87.21 %	4.50 %	→	↘
dl PCBs	4,520	82.08 %	6.01 %	4,387	85.82 %	6.53 %	4,237	85.58 %	3.78 %	→	↘
Total Dioxins & dl PCBs	2,160	86.34 %	6.81 %	1,993	89.76 %	7.66 %	1,911	89.48 %	1.70 %	→	↘
ndl PCBs	3,851	62.43 %	4.87 %	3,852	65.06 %	5.31 %	3,726	68.92 %	1.44 %	↗	↘
Arsenic	5,858	33.87 %	20.21 %	5,841	31.30 %	18.82 %	5,856	31.75 %	21.30 %	→	↗
Lead	5,976	45.03 %	9.10 %	5,924	46.17 %	8.04 %	5,931	46.03 %	9.23 %	→	↗
Cadmium	5,978	64.00 %	4.76 %	5,924	63.54 %	4.86 %	5,933	64.92 %	4.67 %	↗	→
Mercury	5,871	9.59 %	10.30 %	5,851	6.03 %	9.07 %	5,858	7.34 %	11.86 %	↗	↗
Salmonellae*	10,010	0.08 %	-	10,405	0.13 %	-	10,114	0.07 %	-	↘	
Active antibiotic substances	979	0.41 %	-	905	0.22 %	-	870	0.57 %	-	↗	
Pirimiphos-methyl (Pesticide)	4,831	11.24 %	100.00 %	4,844	12.10 %	99.66 %	4,651	13.24 %	99.84 %	↗	↘
Chlorpyrifos-methyl (Pesticide)	4,832	2.59 %	71.20 %	4,845	2.70 %	77.10 %	4,651	3.23 %	63.33 %	↗	↘

*only positive / negative results

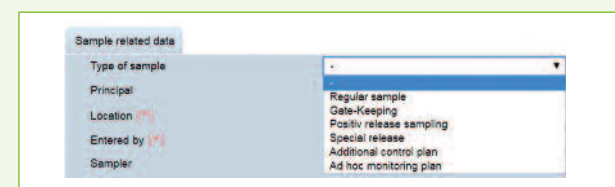
Period: 1/1/2014 – 31/12/2016

SAMPLE RELATED DATA NOW WITH INFORMATION ON THE TYPE OF SAMPLE

- AS PER CONTROL PLAN (REGULAR SAMPLE)
- FROM GATE-KEEPING
- FOR POSITIVE RELEASE SAMPLING
- FOR SPECIAL APPROVAL
- AS PER ADDITIONAL CONTROL PLAN
- AS PER AD-HOC PLAN



Since July 2017 information on the type of sample has also been collected when entering sample monitoring data in the QS database. A distinction is made between regular samples, samples for gate-keeping, additional control samples or ad-hoc samples. The sample types for approval testing and special approval are also available for selection, these being required for certain fat and oil products. An even more sophisticated analysis of monitoring data will be possible in the future by gathering information on specimen type.

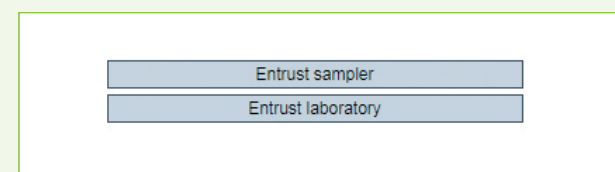


NEW STATUS "SAMPLE RELATED DATA CREATED"

If a data record is not fully created at the outset, but is saved for subsequent processing, this will now automatically be allocated the status "Sample related data created".

Teststandort QS	Sample related data created
Teststandort QS	Sampler commissioned
Teststandort QS	Laboratory commissioned

Please note: With this status, the chosen laboratory does not yet have access to the data record. During the next processing stage, data records of this type can be unlocked for a sampler via the button "Entrust Sampler" or, if internal processing is completed, transferred to the laboratory. In this case, the button "Entrust Laboratory" is to be selected. Only with the status "Laboratory commissioned" does the appointed laboratory have access to the data record and can save the results of the analysis. ■



THE EDITOR: WHO IS QS?

QS ensures food safety – from the farm to shop. 95 percent of the pork and poultry meat from German production today comes from QS-certified businesses and the equivalent figure is 90 percent for beef. Approximately 75,000 livestock farmers participate directly in the QS scheme and 48,500 livestock farmers participate by using mutual recognitions with other standard owners. 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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