MYCOTOXIN SURVEY
OF CHINA NEW HARVEST IN 2016

2016 年奥特奇中国新原料霉菌毒素调查报告

MYCOTOXIN MANAGEMENT

奥特奇®霉菌毒素管理方案

Alltech's 37+ Mycotoxin Analytical Laboratory of analysed new harvested materials from China in 2016. In total 232 samples were analysed including corn, wheat, soybean, cottonseed, silage and DDGS etc. from Jilin, Liaoning, Heilongjiang, Inner Mongolia, Shandong, Henan, Hebei, Shanxi, Shaanxi, Jiangxi, Anhui, Hubei, Hunan, Jiangsu, Gansu, Ningxia, Sinkiang, Yunnan, Guangdong, Guangxi, Guizhou and Sichuan etc.

奥特奇中国37+霉菌毒素分析服务实验室针对2016年新收获饲料原料进行分析检测，共收集来自中国各主产区的样品232份，其中包括吉林，辽宁，黑龙江，内蒙古，山东，河南，河北，山西，陕西，江西，安徽，湖北，湖南，江苏，甘肃，宁夏，新疆，云南、广东、广西、贵州、四川等 22 个省份。重点检测了玉米，小麦，豆粕，DDGS，棉粕，青贮等主要原料。

Generally all materials were contaminated with multiple mycotoxins, and we found each sample was contaminated with 8.1 different mycotoxins on average; Type B Trichothecenes , Zearalenone and Fumonisins were detected in all samples, with the total risk ranks around middle to high in terms of species evaluation which is showed in the chart below:

总体来看，各种原料均污染多种霉菌毒素，平均每个样品污染 8.1 种；从检出频率来看，烟曲霉毒素，单端孢霉烯族化合物 B 型（呕吐毒素类）和玉米赤霉烯酮均为 100%；从不同畜种的风险评估来看，分别处于中度或高度风险，如下图：

Alltech 37+®

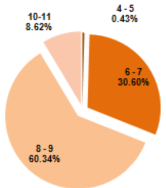
Mycotoxin Contamination of Raw Materials
新收获原料霉菌毒素污染情况

Location(s) 来源地：China 中国
Date Range 收集时间：2016. 9 -12

232 Total Number of Samples
共计 232 份样品

Average of 8.1 Mycotoxins
平均检出 8.1 种霉菌毒素

Number of Mycotoxins per Sam
样品污染霉菌毒素种类百分比



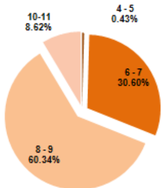
Overall Mycotoxin Assessment
霉菌毒素风险评估

Spieces 畜种	REQ 风险当量	Risk 风险程度
Broiler 肉鸡	125	High 高
Breeders 种鸡	118	High 高
Layers 蛋鸡	118	High 高
Nursery pigs 保育猪	80	High 高
Sows/Gilts 母猪 / 后备母猪	236	high 高
Finishers 生长育肥猪	276	high 高
Dairy Cows 奶牛	182	high 高
Calves/Heifers 犊牛	84	high 高
Beef Cattle 肉牛	120	Medium 中

232 Total Number of Samples
共计 232 份样品

Average of 8.1 Mycotoxins
平均检出 8.1 种霉菌毒素

Number of Mycotoxins per Sam
样品污染霉菌毒素种类百分比



Overall Mycotoxin Assessment
霉菌毒素风险评估

Spieces 畜种	REQ 风险当量	Risk 风险程度
Ducks 鸭	185	High 高
Dogs/Cats 狗 / 猫	66	High 高
Trout 鲑鳟鱼	60	High 高
Catfish 鲶鱼	236	High 高
Carp 鲤鱼	236	high 高
Salmon 三文鱼	50	high 高
Seabass/Seabream 鲈鱼	60	high 高
Shrimp 虾	176	high 高
Tilapia 罗非鱼	236	high 高

Occurence of Each Mycotoxin Group
霉菌毒素检出百分比

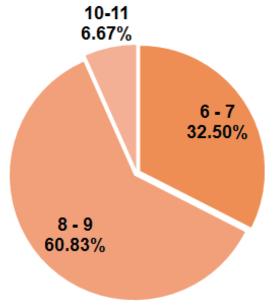
Aflatoxin (B1) 黄曲霉毒素（B1）	29%
Total Aflatoxins 总黄曲霉素	29%
Ochratoxins 赭曲霉毒素	2%
B Trichothecenes 单端孢霉烯化合物 B 型	100%
Fudstic Acid 萎蔫酸	94%
A Trichothecenes 单端孢霉烯化合物 A 型	0%
Fumonisins 烟曲霉毒素	100%
Zearalenones 玉米赤霉烯酮	100%
Other Penicillums 青霉菌毒素	72%
Other Aspergillus 曲霉菌毒素	6.9%
Ergot Toxins 麦角类毒素	81.5%

注： 风险当量（REQ）基于该样品检出的不同霉菌毒素含量和相应的风险因子得出的该样品霉菌毒素总风险

As one of the main ingredients, this survey collected 120 samples of corn & by product, and each sample was contaminated with 8 different mycotoxins on average, with 93% of corn samples containing 6-9 mycotoxins and 4% containing10-11 mycotoxins.

作为最主要的饲料原料，本次检测共抽取了 120 份玉米及副产品样品，均被检出多种霉菌毒素污染。每个样品平均检出 8 种霉菌毒素，其中 93% 的样品污染至少 6-9 种霉菌毒素，还有 4% 的样品污染了 10-11 种霉菌毒素。

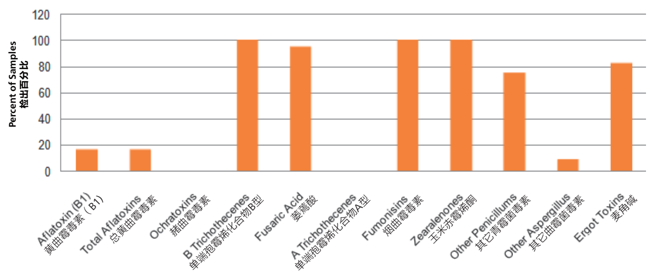
Number of Mycotoxins Contaminating Corn
玉米样品中污染霉菌毒素数量的百分比
(n=120, average 平均值 =7.98)



Type B Trichothecenes, Zearalenone and Fumonisins were found in all samples, 95% of the sample contains fuaric acid and ergot toxins were found in 82.5% of the samples.

对样品中污染的霉菌毒素进行分类，烟曲霉毒素，单端孢霉烯族化合物 B 型和玉米赤霉烯酮最为普遍，100% 的样品中检出这三种毒素。另外，95% 的样品污染了萎蔫酸，还有值得注意的是 82.5% 的样品中污染了麦角类毒素。

Occurence of Mycotoxin in Corn (n=120)
玉米样品霉菌毒素检出频率 (n=120)



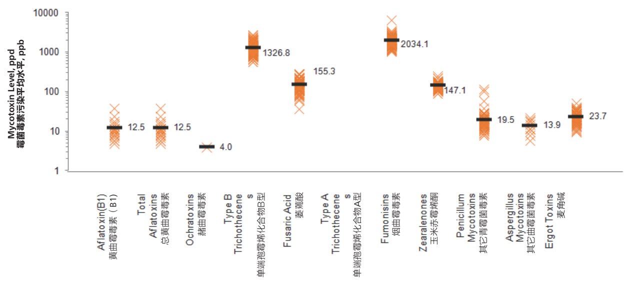
In terms of contamination level of those corn samples, Type B Trichothecenes, Zearalenone and Fumonisins were relatively high and reached 1326.8 ppb, 147.1ppb , 2034.1ppb respectively.

从玉米样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 1326.8 ppb,147.1ppb 和 2034.1ppb.

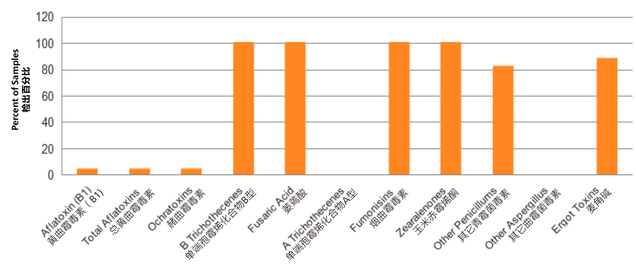
Type B Trichothecenes, Zearalenone, Fuaric Acid and Fumonisins were found in all samples, with 88.2% of the samples containing ergot toxins and Penicillium toxins in 82.4% of the samples.

对样品中污染的霉菌毒素进行分类，烟曲霉毒素，单端孢霉烯族化合物 B 型，玉米赤霉烯酮以及萎蔫酸污染最为普遍，100% 的样品中均含有这四种毒素。另外，88.2% 的样品污染了麦角类毒素，82.4% 的样品污染了青霉菌毒素。

Mycotoxin Contamination of Positive Corn Samples (n=120)
玉米样品霉菌毒素污染平均水平（N=120）



Occurence of Mycotoxin in Wheat (n=17)
小麦样品霉菌毒素检出频率 (n=17)



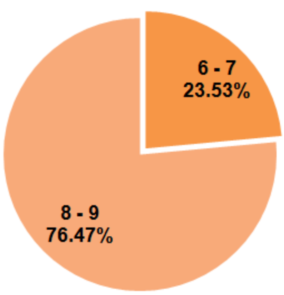
8.1 mycotoxins were found in each of the 17 samples of wheat, with all samples containing 6-9 different mycotoxins.

其次还检测了 17 份小麦及副产品样品，每个样品平均检出 8.1 种霉菌毒素，所有样品都污染了 6-9 种霉菌毒素。

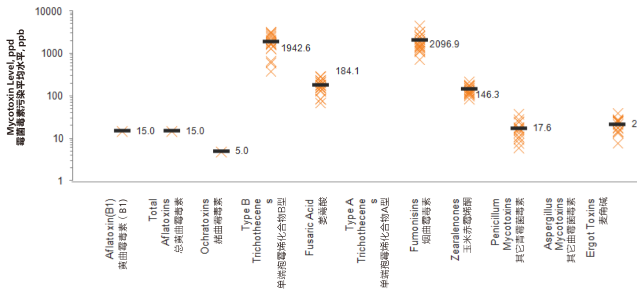
In terms of average contamination level of those wheat samples, Type B Trichothecenes, Zearalenone and Fumonisins were also relatively high and reached 1942.6 ppb,146.3ppb，2096.9ppb respectively.

从小麦样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 1942.6 ppb,146.3ppb 和 2096.9ppb。

Number of Mycotoxins Contaminating Wheat
小麦样品中污染霉菌毒素数量的百分比
(n=17, average 平均值 =8.12)



Mycotoxin Contamination of Positive Wheat Samples (n=17)
小麦样品霉菌毒素污染平均水平（N=17）



MYCOTOXIN MANAGEMENT

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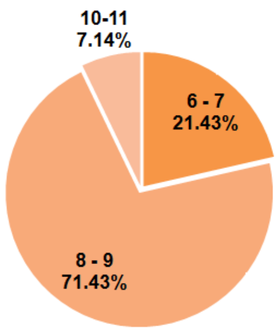
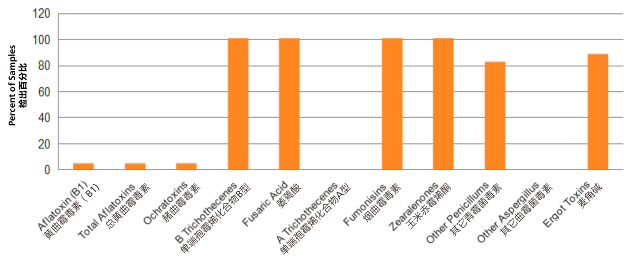
The laboratory also analysed 14 samples of soybean meal. Each sample was contaminated with 8.1 different mycotoxins on average. All samples contained between 6-11 mycotoxins and Type B Trichothecenes, Zearalenone and Fumonisins were found in 93% of the samples and Fusaric Acid and ergot toxins were found in 92.9% of the samples.

同时实验室还抽取了 14 份豆粕样品进行检测。每个样品平均检出 8.1 种霉菌毒素，所有样品均检测出了6-11 种霉菌毒素，所有样品都污染了烟曲霉毒素，单端孢霉烯族化合物 B 型，玉米赤霉烯酮，另外还有 93% 的样品污染了萎蔫酸以及 92.9% 的样品污染了麦角类毒素。

Number of Mycotoxins Contaminating Soybean meal
豆粕样品中污染霉菌毒素数量的百分比
(n=14, average 平均值 =8.14)



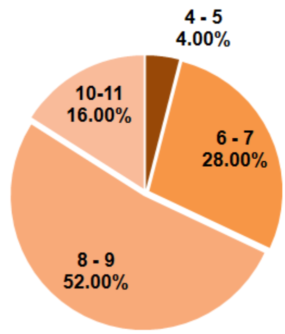
Occurence of Mycotoxin in Soybean meal (n=14)
豆粕样品霉菌毒素检出频率 (n=14)



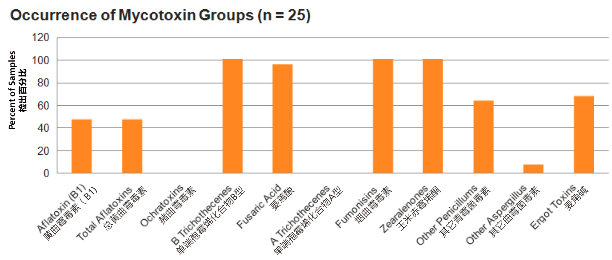
25 samples of DDGS were also analysed for the survey, with each sample contaminated with 8.2 different mycotoxins on average. All samples contained between 4-11 mycotoxins such as Type B Trichothecenes, Zearalenone and Fumonisins. Additionally Fusaric Acid, Penicillium toxins and ergot toxins were found at a relatively high level.

此外实验室还抽取了 25 份 DDGS 样品，每个样品平均检出 8.2 种霉菌毒素，所有样品均检测出了 4-11 种霉菌毒素，所有样品都污染了烟曲霉毒素，单端孢霉烯族化合物 B 型和玉米赤霉烯酮，另外萎蔫酸，麦角类毒素和青霉菌毒素的检出率也相对较高。

Number of Mycotoxins Contaminating DDGS
DDGS 样品中污染霉菌毒素数量的百分比
(n=25, average 平均值 =8.16)



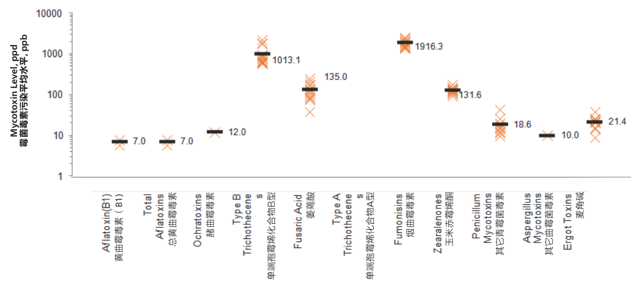
Occurence of Mycotoxin in DDGS (n=25)
DDGS 样品霉菌毒素检出频率 (n=25)



In terms of average contamination level of those soybean meal samples, Type B Trichothecenes, Zearalenone and Fumonisins were relatively High, reaching 1013.1 ppb, 131.6ppb, 1916.3ppb respectively.

从豆粕样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 1013.1 ppb,131.6ppb 和 1916.3ppb。

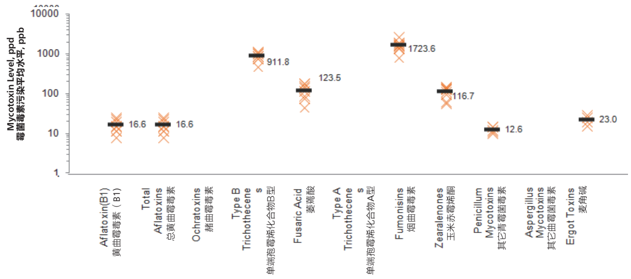
Mycotoxin Contamination of Positive Soybean meal Sample (n=14)
豆粕样品霉菌毒素污染平均水平（N=14）



In terms of average contamination levels of DDGS samples, Type B Trichothecenes, Zearalenone and Fumonisins were much higher, and reached 1689.9 ppb,153.8ppb, 1930.6ppb respectively. More importantly, the average level of Aflatoxins in those samples was 20.6ppb.

从 DDGS 样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 1689.9 ppb,153.8ppb 和 1930.6ppb，此外需要注意黄曲霉毒素平均污染水平为 20.6ppb。

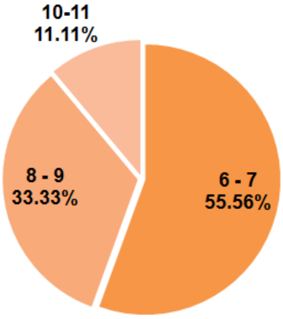
Mycotoxin Contamination of Positive DDGS Samples (n=25)
DDGS 样品霉菌毒素污染平均水平（N=25）



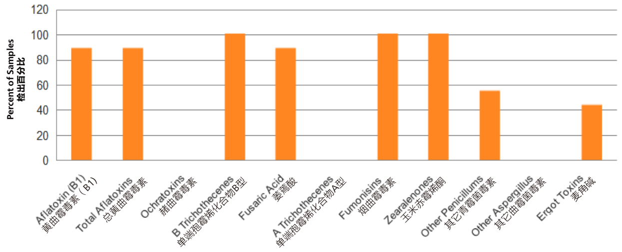
Another 9 samples of cottonseed meal which found to contain 7.7 different mycotoxins on average. All samples contained between 6-11 mycotoxins and Type B Trichothecenes, Zearalenone and Fumonisins were all positive. AdditionallyAflatoxins and Fusaric Acid were all present at a relatively high level.

抽取的样品中还有 9 份棉粕，每个样品平均检出 7.7 种霉菌毒素，所有样品均检测出了 6-11 种霉菌毒素，所有样品都污染了烟曲霉毒素，单端孢霉烯族化合物 B 型和玉米赤霉烯酮，另外 89% 的样品污染了黄曲霉毒素和萎蔫酸。

Number of Mycotoxins Contaminating Cottonseed meal
棉粕样品中污染霉菌毒素数量的百分比
(n=9, average 平均值 =7.67)



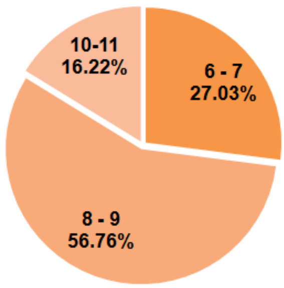
Occurence of Mycotoxin in Cottonseed meal (n=9)
棉粕样品霉菌毒素检出频率 (n=9)



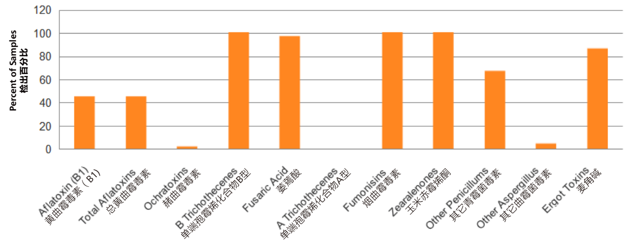
Finally we tested 37 samples of silage which was contaminated with 8.3 different mycotoxins on average. All samples contained between 6-11 mycotoxins with Type B Trichothecenes, Zearalenone and Fumonisins being found. Additionally 46% of the samples contained Aflatoxins and 97% of the samples contained Fusaric Acid. 86.5% contained ergot toxins and Penicillium toxins were found in 67.6% of the samples.

最后实验室还抽检了 37 份青贮样品，每个样品平均检出 8.3 种霉菌毒素，所有样品均检测出了 6-11 种霉菌毒素，所有样品都污染了烟曲霉毒素，单端孢霉烯族化合物 B 型和玉米赤霉烯酮，另外 97% 的样品污染了萎蔫酸，86.5% 的样品污染了麦角类毒素，46% 的样品污染了黄曲霉毒素，67.6% 的样品污染了青霉菌毒素。

Number of Mycotoxins Contaminating Silage
青贮样品中污染霉菌毒素数量的百分比
(n=37, average 平均值 =8.32)



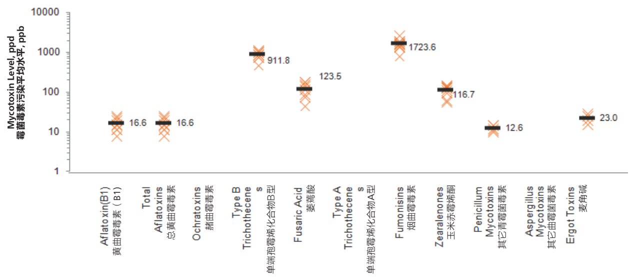
Occurence of Mycotoxin in Silage (n=37)
青贮样品霉菌毒素检出频率 (n=37)



In terms of average contamination level of cottonseed samples, Type B Trichothecenes, Zearalenone and Fumonisins were high and reached 911.8 ppb, 116.7ppb, 1723.6ppb respectively. More importantly, the average level of Aflatoxins in those samples is 16.6ppb.

从棉粕样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 911.8 ppb,116.7ppb 和 1723.6ppb，此外需要注意黄曲霉毒素平均污染水平为 16.6ppb。

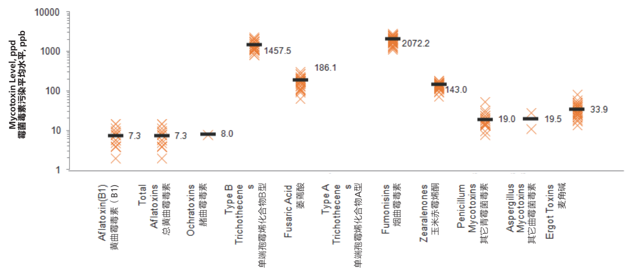
Mycotoxin Contamination of Positive Cottenseed meal Samples (n=9)
棉粕样品霉菌毒素污染平均水平（N=9）



In terms of average contamination level of silage samples, Type B Trichothecenes, Zearalenone and Fumonisins were high and reached to 2072.2ppb,143ppb, 2072.2ppb respectively. More importantly, the average level of Aflatoxins in those samples is 7.3ppb.

从青贮样品的平均污染水平来看，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和烟曲霉毒素也是相应水平较高的，分别达到了 2072.2ppb,143ppb 和 2072.2ppb，此外需要注意黄曲霉毒素平均污染水平为 7.3ppb。

Mycotoxin Contamination of Positive Silage Samples (n=37)
青贮样品霉菌毒素污染平均水平（N=37）



MYCOTOXIN MANAGEMENT

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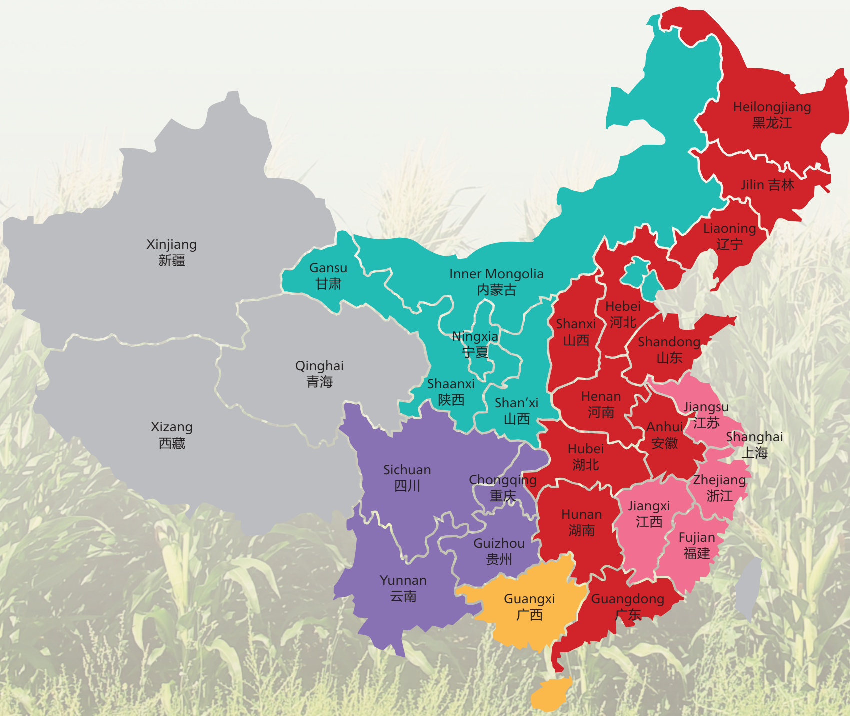
Based on the sample distribution from different regions, we selected the main production areas including Northeast, Huanghuaihai plain, middle and lower reaches of Changjiang River, southern and Northwest China which covers 22 Provinces. This survey shows the changing trend of mycotoxin contamination compared to our 2015, which shows that grain quality declined in terms of increased mycotoxin contamination. Similarly Type B Trichothecenes, Zearalenone, Fumonisins, Fusaric Acid and Ergot toxins are still the main risks. However we can also see the increasing trend of Aflatoxins. Below is the mapping of average contamination level with main mycotoxins in the different region by ppb level.

此外，实验室还检测了 10 份其他样品，包括大麦，大米和高粱等，污染情况大致类似，所有样品均检测出了 6-9 种霉菌毒素不等，其中烟曲霉毒素，单端孢霉烯族化合物 B 型，玉米赤霉烯酮和黄曲霉毒素的检出率较高且风险偏高。

从不同地区样品分布图来看，我们主要选择了粮食主产区包括东北部四省(黑、吉、辽、蒙）、黄淮海三省（冀、鲁、豫）和长江中下游五省（赣、苏、皖、湘、鄂）等省份，此外还选择了南方四省（粤、滇、闽、琼）和西北三省（新、甘、宁）等地的样品。报告显示污染趋势与 2015 年略有不同，原料质量相比去年稍有下降。其中烟曲霉毒素，单端孢霉烯化合物 B 型，玉米赤霉烯酮，萎蔫酸和麦角类毒素依然是检出率较高，污染相对严重的毒素，值得注意的是今年的检测报告中黄曲霉毒素也呈现出了污染上升的趋势。那么从不同区域来看，这几种主要霉菌毒素的污染平均值（ppb）如下图所示：

单位：十亿分之一 ppb 省份 Regions	单端孢霉烯 B 型 Type B Trichothecenes	玉米赤霉烯酮 Zearalenone	烟曲霉毒素 Fumonisins	萎蔫酸 Fuaric Acid	黄曲霉毒素 Aflatoxins
黑吉辽 Jilin, Liaoning, Heilongjiang	1368.9	141.4	1914.7	154.2	15.3
内蒙古，甘肃，宁夏 Inner Mongolia, Gansu, Ningxia	1195.4	136.7	1825.9	164.9	15.3
新疆 Sinkiang	866.7	137.6	1761.6	99.0	13.5
京津冀 Hebei, Beijing, Tianjin	1643.6	153.7	2203.8	175.5	13.4
山西 Shanxi	1411.9	150.7	2253.1	155.3	11.0
山东 Shandong	1257.3	131.0	1921.8	163.7	15.2
河南 Henan	1521.2	145.0	2000.9	166.0	15.2
江苏，安徽，江西，湖南，湖北 Jiangsu, Anhui, Jiangxi, Hunan,Hubei	1265.3	143.3	2043.5	167.3	8.9
广东，云南，海南，福建 Guangdong, Yunnan, Hainan, Fujian	1978.8	161.6	1891.2	174.0	19.0

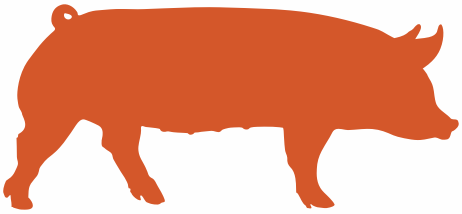
（注：此数据仅来源于收集的样品 Note: The data is just based on collected samples)



Based on the contamination level of those raw Materials, animal producers should view Type B Trichothecenes and Zearalenone as the most important toxins to manage. At the same time we have to consider all the toxins that potentially present in the feed, and the synergistic effects that may happen to animals, as well for further damage to body organs.

根据以上不同原料的霉菌毒素污染情况，单端孢霉烯族化合物 B 型（呕吐毒素类）和玉米赤霉烯酮对于不同畜种动物来说风险偏高，同时动物配合饲料中往往含有多种霉菌毒素，虽然污染水平都相对不高，当各种霉菌毒素共同作用（或协同作用）的时候，霉菌毒素会分别作用于各个靶器官，并最终对动物造成一定的危害。

RISK ANALYSIS FOR DIFFERENT SPECIES BASED ON **THE SURVEY RESULT**
各畜种将面临的**霉菌毒素风险**



1.Type B Trichothecenes can severely decrease feed intake, causing lethargy and vomiting, immune suppression, and damage to the gut resulting in digestive disorders. Type B Trichothecenes have a strong impact on gut health, resulting in damage of the intestine and digestive tract with diarrhea. Pigs may have decreased growth rates which results in weight loss, reduced piglet performance.

Zearalenones impact the reproductive performance of breeding pigs due to their estrogenic activity. The consumption of these mycotoxins can delay sexual maturing, lower conception rates, and cause swelling of the vulva, reddening, and prolapse. Pregnant sows/gilts may have increased abortions, stillbirths, and malformation of foetuses.

Fumonisins can decrease performance, damage the gut, reduce nutrient digestibility, and predispose the gut to E. coli colonization. Fumonisins alter the synthetic cell membrane lipids, which can lead to damage of the lungs (pulmonary edema), heart, liver, digestive tract, kidneys, and brain.

Aflatoxin B1 can decrease feed intake, efficiency, and reproductive performance. Consumption of Aflatoxin B1 can cause digestive disorders with reduced nutrient digestibility and diarrhoea. It can also cause tissue damage and haemorrhaging, as well as immune suppression that can increase sensitivity to diseases and reduce passive immunity to offspring. Milk quality can be reduced and contaminated by the metabolite Aflatoxin M1, which together can impact piglet health.

Penicillium Mycotoxins can affect microbial population in the gut, causing digestive disorders with lower nutrient utilization and increased diarrhoea. They can also cause kidney damage and reduce immunity.

High levels of Ergot Toxins, pigs can develop gangrene of the tail, tongue, and legs. Respiratory issues and diarrhoea may occur. A lack of milk production at farrowing can occur due to a reduction in the release of the hormone prolactin. Conception rates may be lowered. Sows may also have trouble regulating their body temperature due to constriction of blood vessels. Increased mortality is observed.

1. 首先单端孢霉烯族化合物 B 型会影响猪的采食量和生长速度，造成肠道损伤，降低肠壁的完整性和机体免疫力，从而导致机会性感染。需要注意的是萎蔫酸的存在将与单端孢霉烯族化合物 B 型产生协同作用，从而增强单端孢霉烯族化合物 B 型 的毒性，对动物造成更严重的影响。

玉米赤霉烯酮则会影响母猪的繁殖系统，导致繁殖器官疾病，不规则发热，假怀孕和流产；降低仔猪出生体重和断奶体重，进而增加死亡率，影响仔猪生长和表现。

烟曲霉毒素也会影响采食量，导致消化功能紊乱和肺水肿等，其最主要的影响是降低机体免疫反应，造成免疫抑制。

黄曲霉毒素是强毒性毒素，即使是低污染水平的黄曲霉毒素，也会造成动物的肝脏损伤，所以采取一定的防范措施是非常有必要的。

青霉菌毒素会严重影响猪的消化系统，常见症状如腹泻，进而导致采食量降低甚至拒食，影响饲料转化率。

麦角类毒素可导致母猪尾部、舌头和腿部出现坏疽；也可能出现呼吸问题和腹泻，受胎率下降，催乳素释放下降，母猪分娩时产奶量降低；由于血管收缩，母猪不能正常调节体温。

尤其对于保育猪和母猪（后备母猪）来说，需要严格管控霉菌毒素污染。

For example, these samples have an average REQ of 276 ppb for grow finish pigs. At this level of mycotoxin contamination, scientific research shows that average daily gain (ADG) may be decreased by up to -14.5 percent, and feed conversion ratio (FCR) of pigs may be altered by up to 6.8 and 12.7 days to reach the same market weight as non-challenged pigs. Animal health status and productivity level should also be considered and may play a role in observed effects.

例如，所检样品的平均污染水平造成生长猪的生产性能下降，最严重的情况可导致平均日增重下降 14.5%，FCR 增加 6.8%，推迟上市 12.7 天。

Spieces: Growers/Finisher
REQ: 276

Chart 1 . Potential Change in Growers/Finishers Average Daily Gain (ADG) During Challenge with REQ= 276

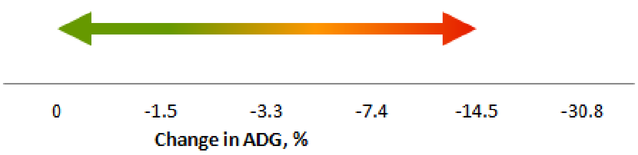
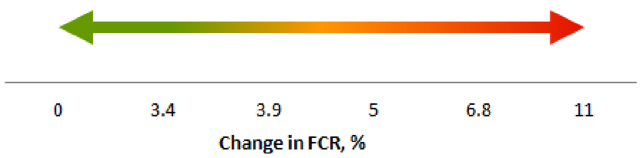
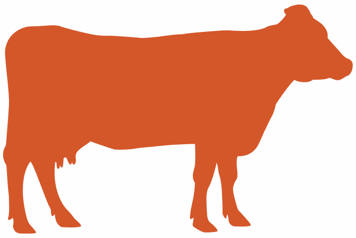


Chart 2 . Potential Change in Growers/Finishers Feed Conversion Rate (FCR) During Challenge with with REQ= 276



P.S. This feedstuff may only be a portion of the total ration. As a result, inclusion rate and feeding duration may change the estimated performance impacts.
注：此图表仅代表特定霉菌毒素污染水平对动物生产性能的潜在影响评估，该评估可根据动物健康状况等因素改变。

RISK ANALYSIS FOR DIFFERENT SPECIES BASED ON **THE SURVEY RESULT**
各畜种将面临的**霉菌毒素风险**



2. Type B Trichothecenes can reduce feed intake, efficiency, and milk production. A decrease in milk fat may be observed, along with increased somatic cell counts. Cows may be lethargic and show signs of digestive disorders and diarrhoea. The immune system may also be suppressed.

Zearalenones impact reproductive performance due to estrogenic properties. The toxicity is characterized by vaginitis, vaginal secretions, abortions, infertility, enlargement of mammary glands in virgin heifers, and total reproductive loss. The breakdown of Zearalenone in the rumen can produce metabolites such as alpha-zearalenol which have greater estrogenic activity than the parent toxin.

Aflatoxins are potent mycotoxins that can reduce feed intake and milk production, alter fiber digestion in the rumen, impact the reproductive system.

The Penicillium Mycotoxins can exert antibiotic like effects on rumen microflora leading to decreased synthesis of volatile fatty acids and microbial protein. Such effects can result in digestive disorders and a decrease in animal performance.

Ergot toxins can cause a sudden drop in feed intake, cause weight loss, and lower milk production. Conception rates are decreased. Respiration rates increase along with intolerance to hot temperatures, and animals develop long, dull hair coats. Cows may also develop gangrene on the extremities. Serum prolactin levels can drop significantly.

2. 对于奶牛来说，首先单端孢霉烯族化合物 B 型会降低干物质采食量和产奶量，降低瘤胃蛋白合成，导致肠道损伤和肝脏功能降低，从而影响牛群免疫力，增加机会性感染，同样的萎蔫酸的存在将与单端孢霉烯族化合物 B 型产生协同作用，从而增强单端孢霉烯族化合物B型的毒性，对动物造成更严重的影响。

玉米赤霉烯酮对反刍动物的毒性作用主要在于影响动物的繁殖性能，包括胚胎成活率下降、初情前的母畜生殖器水肿肥大、年轻公畜因睾酮分泌减少而雌性化，以及不育等症状。

黄曲霉毒素不但影响奶牛生产、破坏奶牛健康，同时还会影响奶品质。

青霉菌毒素可产生与抗生素类似的效果，破坏瘤胃微生物菌群，降低挥发性脂肪酸和微生物蛋白的合成。可进一步导致消化功能紊乱和动物表现性能降低。

麦角类毒素可以引起采食量突然下降，导致体重减轻和产奶量降低，此外还可导致呼吸速率增加以及不耐高温天气，造成四肢坏疽等；血清泌乳素水平显著下降。

同理，对于肉牛及小反刍动物来说，多种霉菌毒素将会影响牛群的生长速度，饲料效率，肠道健康和免疫反应。同样需要整体管控霉菌毒素的风险。

As an example, these samples have an average REQ of 182 ppb for dairy cows. Scientific research shows that milk production may be decreased by up to -0.6 liters per cow per day (-1.4 pounds per cow per day), and somatic cell count may be altered by up to 80 percent due to the presence of mycotoxins. Over time, this may add up to a significant loss to production and profitability. Animal health status and productivity level should also be considered and may play a role in observed effects.

例如，所检样品平均霉菌毒素的污染水平就会影响奶牛的生产性能，最严重的情况可导致日产奶量下降 0.6 升，体细胞数增加 80%。

Spieces: Dairy/Cows
REQ: 182

Chart 1 . Potentional Change in Dairy Cows Milk Production During Challenge with REQ= 182

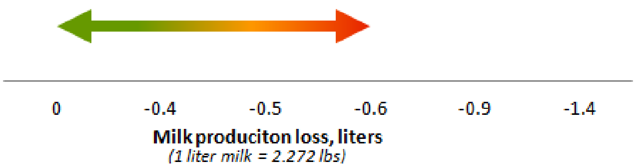
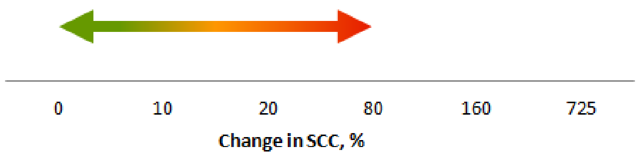
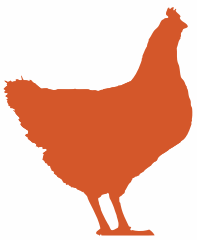


Chart 2 . Potentional Change in Dairy Cows Milk Somatic Cell Count (SCC) During Challenge with REQ= 182



P.S. This feedstuff may only be a portion of the total ration. As a result, inclusion rate and feeding duration may change the estimated performance impacts.
注：此图表仅代表特定霉菌毒素污染水平对动物生产性能的潜在影响评估，该评估可根据动物健康状况等因素改变。



3. Type B Trichothecenes can lower feed intake and growth, and cause digestive disorders. These mycotoxins can compromise the absorption of nutrients due to the negative effects on gut integrity. Increased incidences of gut diseases, such as coccidiosis, necrotic enteritis, colibacillosis, and salmonellosis can also be expected. Suppression of the immune system can also occur.

Zearalenones have an impact on reproductive performance. These mycotoxins may delay sexual maturity, lower egg production and quality, cause malformation of embryos, and result in poor hatchability.

Aflatoxins are potent mycotoxins that can decreased feed intake and gain, leading to poor conception rates, cause liver lesions with hemorrhaging, and lower immunity causing increased susceptibility to diseases.

The Penicillium Mycotoxins can result in digestive disorders and a decrease in animal performance.

Ergot toxins can cause a sudden drop in feed intake, cause weight loss, and lower milk production. Conception rates are decreased. Respiration rates increase along with intolerance to hot temperatures, and animals develop long, dull hair coats. Cows may also develop gangrene on the extremities. Serum prolactin levels can drop significantly. They may cause muscle bruising, liver damage, and lameness. Immune suppression can occur which increases disease susceptibility. Carcass quality may be downgraded.

3. 在家禽生产中烟曲霉毒素可导致肝脏和肾脏肿大，胰腺，嗉囊和肌胃的大小变化不定，淋巴器官萎缩。有研究发现，烟曲霉毒素 B1 还可导致胸腺淋巴系统的耗竭，导致巨噬细胞产生毒性，有丝分裂反应降低。

单端孢霉烯族类霉菌毒素会导致家禽采食量降低和破坏肠道完整性，影响消化道健康。采食后家禽出现口腔黏膜坏死（如 T2 毒素、HT2 毒素等）。单端孢霉烯毒素中毒会导致家禽消化道的急性疾病（如 DON、NIV 等）。

玉米赤霉烯酮可严重影响种禽的繁殖性能。如延迟性成熟，产蛋数量和质量降低，造成胚胎畸形，从而导致孵化率降低。

黄曲霉毒素是强毒性毒素，即使是低污染水平的黄曲霉毒素，也会造成宠物的肝脏损伤，进一步导致免疫力低下并易感疾病。

麦角类毒素可导致家禽采食量减少，生长缓慢，鸡冠，喙和脚趾坏死，出现腹泻。同时鸡冠，肉髯，面部和眼睑出现水泡性皮炎，这在蛋鸡尤为明显。

同样的，青霉菌毒素也会严重影响家禽的消化系统，常见症状如稀便和腹泻等。

As an example, these samples have an average REQ of 125 ppb for broilers. At this level of mycotoxin contamination, scientific research shows that average daily gain (ADG) could be reduced by up to -20.6 percent, and feed conversion rate (FCR) of broilers may be altered by up to 8.4 percent. As a result, it could take an extra 3.9 days to reach the same market weight as non-challenged birds. Animal health status and productivity level should also be considered and may play a role in observed effects.

例如，所检样品平均霉菌毒素的污染水平就会造成家禽的生产性能下降，最严重的情况可导致肉鸡平均日增重下降 20.6%，FCR 增加 8.4%，上市推迟 3.9 天。

Spieces: Poultry/Broilers
REQ: 125

Chart 1 . Potentional Change in Poultry Broilers Average Daily Gain (ADG) During Challenge with REQ= 125

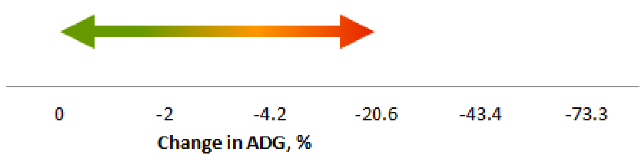
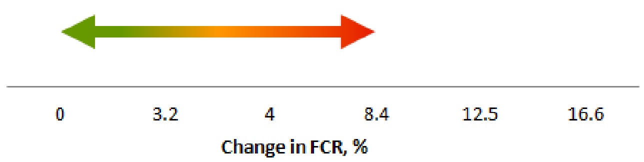


Chart 2 . Potentional Change in Poultry Broilers Feed Conversion Rate (FCR) During Challenge with REQ= 125



P.S. This feedstuff may only be a portion of the total ration. As a result, inclusion rate and feeding duration may change the estimated performance impacts.
注：此图表仅代表特定霉菌毒素污染水平对动物生产性能的潜在影响评估，该评估可根据动物健康状况等因素改变。

RISK ANALYSIS FOR DIFFERENT SPECIES BASED ON **THE SURVEY RESULT**
各畜种将面临的**霉菌毒素风险**

4. Aflatoxins are potent mycotoxins that can decreased feed intake and gain, leading to poor conception rates in general, it causes damage of hepatopancreas in shellfish and lower immunity which leads to increased susceptibility to diseases.

The consumption of type B trichothecenes may lower feed intake, alter feed efficiency, impact gut integrity and alter whole body protein levels. Liver damage and increase oxidative stress could occur. Immune status can be altered leading to an increase in secondary infections.

Zearalenones have an impact on reproductive performance. It damages development of fish eggs and it's metabolites also affect quality and quantity of fish sperm.

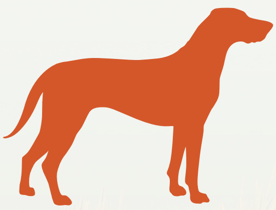
Fumonisins may decrease growth rates, alter feed efficiency and impact liver functions. Fumonisins may also suppress immunity leading to an increase in infection by secondary diseases.

4. 在水产养殖中，由于肝脏解毒系统的不同，虹鳟鱼比其他鱼类对黄曲霉毒素降解能力差，因此其对黄曲霉毒素更为敏感。黄曲霉毒素还会造成甲壳类水产动物的肝胰腺造成损伤，导致虾类生长缓慢，降低日粮消化率，免疫功能受损和易感疾病。

单端孢霉烯族霉菌毒素是另一类对水产动物有毒害作用的霉菌毒素，主要包括 T2 毒素、呕吐毒素（DON）、蛇形毒素（DAS），可造成水产动物免疫力低下。萎蔫酸的存在会与呕吐毒素产生协同作用，从而大大加强呕吐毒素的毒性。

玉米赤霉烯酮可影响繁殖系统，坏破鱼卵发育，其代谢物还会影响鱼类精子的数量和质量。

此外烟曲霉毒素和青霉菌毒素也会造成免疫抑制，影响水产动物的生长速度，提高死亡率。



5. Type B trichothecenes may cause feed refusal, damage the intestinal tract, and cause digestive disorders or diarrhoea. Dogs and cats may become lethargic, and breeding animals may have poor fertility rates or have an increase in the occurrence of stillbirths. Suppression of the immune system may occur.

Fumonisins may cause damage to the liver, digestive tract and kidneys. Fumonisins may also suppress the immune system.

Aflatoxins are potent mycotoxins that can decreased feed intake and gain, leading to poor conception rates, cause liver lesions with hemorrhaging, and lower immunity causing increased susceptibility to diseases.

Zearalenones may impact reproductive performance of breeding dogs and cats, leading to lower conception rates, pseudo pregnancy, abortions, stillbirths and swelling of the reproductive organs. Zearalenones may also alter immunity.

Consumption of mycotoxins by dogs and cats may result in impacts on the intestinal, organ and immune systems resulting in digestive disorders or an increase in susceptibility to diseases. Overall, dogs and cats may have decreased feed intake, show weight loss or become lethargic. Interactions between mycotoxin groups may increase these effects on dogs and cats.

5. 单端孢霉烯族 B 型会造成采食量下降、增重下降，同时破坏肠道上皮完整性，造成消化紊乱和腹泻。同时还会影响毛发的健康生长和宠物的免疫能力。

烟曲霉毒素会影响采食量，导致消化功能紊乱和肺水肿等器官健康问题，其最主要的影响是降低机体免疫反应，造成免疫抑制。

黄曲霉毒素是强毒性毒素，即使是低污染水平的黄曲霉毒素，也会造成宠物的肝脏损伤，进一步导致免疫力低下并易感疾病。

玉米赤霉烯酮则会影响宠物的繁殖性能，导致受精率低下，不孕，流产和死胎等，造成繁殖器官肿胀，进而降低机体免疫力。

Mycotoxin risks exist throughout the new harvest survey in 2016 and we urge all animal producers to act accordingly. Also, this risk increases with the length of time materials are stored, therefore the development of a mycotoxin risk strategy is significant for all producers. As the world leading Mycotoxin Management Solution provider, Alltech has developed the most comprehensive mycotoxin management program:

1. 37+™ Mycotoxin Analytical Service, providing more accurate, more comprehensive reports, evaluations & recommendations;
2. Mycotoxin Hazard Analysis Auditing in feed mills, providing more standardized operating process in the production line by eliminating the risks over critical control points;
3. The best organic mycotoxin absorbent with broad spectrum binding capabilities, providing more effective remedial solution;

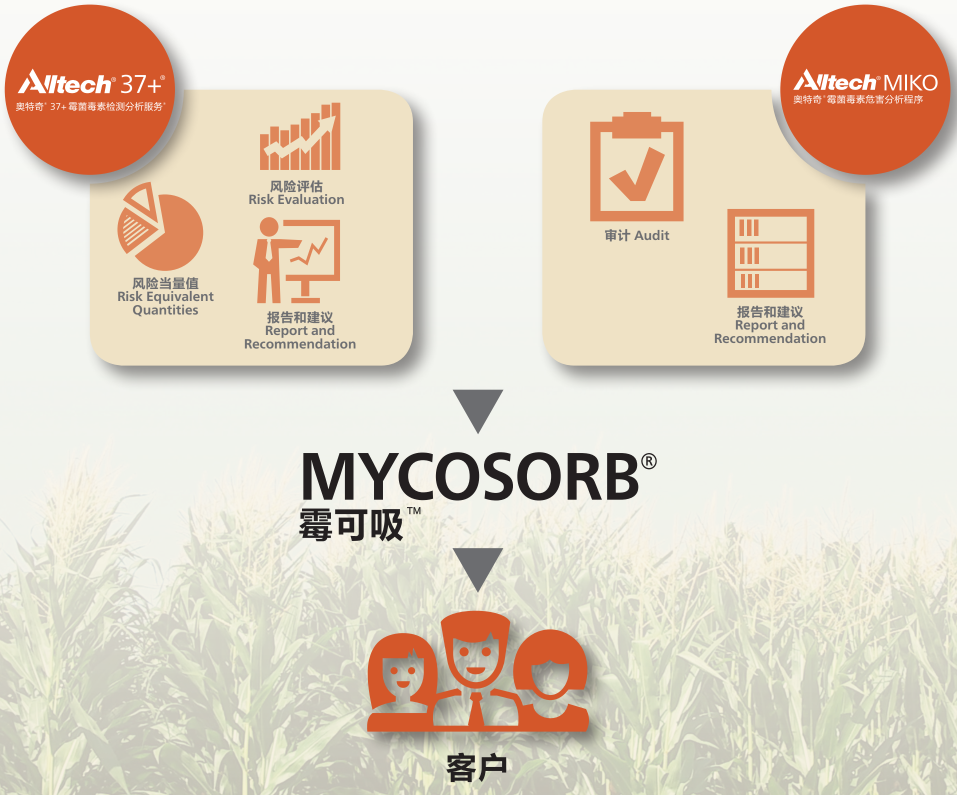
The Alltech Mycotoxin Management Program, with over 20 year's research to fall back on, can help you deal with the mycotoxin challenges with see within the industry!

由此调查结果来看，2016 年收获新原料的霉菌毒素风险不容忽视，生产商仍需应对霉菌毒素挑战。且随着仓储时间的延长，2017 年饲料中霉菌毒素风险还将进一步提高。因此适时调整霉菌毒素管控措施，实施整体霉菌毒素管理方案将更加有助于生产商把控风险。作为最专业的霉菌毒素管理方案提供者，奥特奇开发全新霉菌毒素管理体系：

1. 37+™ 霉菌毒素检测分析方法，提供更全面，更精确的霉菌毒素污染报告及建议；
2. 饲料厂霉菌毒素危害分析审计，提供更规范的实地操作流程以有效地降低饲料生产和动物饲喂过程中的霉菌毒素风险；
3. 配合世界范围内第一品牌的广谱霉菌毒素吸附剂，提供最有效的补救措施。

奥特奇以其超过二十年的研发成果，全面独有的管理方案与行业共同应对霉菌毒素的挑战！

Alltech® MYCOTOXIN MANAGEMENT
奥特奇®霉菌毒素管理方案



Alltech® 37+®
奥特奇® 37+霉菌毒素检测分析服务®

Based in Winchester, Kentucky, Alltech's Analytical Services Laboratory of utilises the very latest LC/MS/MS technology. Alltech's 37+® analytical method is state-of-the-art in its detection and quantification of more than 37 mycotoxins at parts per billion (ppb) and parts per trillion (ppt) levels. Our Analytical Services Laboratory was awarded ISO/IEC 17025:2005 accreditation, an international standard that recognizes the competence of testing laboratories. Alltech China established 37+ Feed Toxicology Analytical Laboratory in BeiJing in 2013.

注：37+® 霉菌毒素检测项目，借助超高液相二级质谱联用（UPLC-MS/MS）技术，可以确保在 15 分钟内，对 1 份待检样品完成超过 37 种不同霉菌毒素的定量检测和超过 50 种霉菌毒素的定性分析，检测精度可以达到兆分之一（PPT）等级。分析服务实验室于 2014 年被授予 ISO/IEC 17025:2005 资格认证，该认证是承认检测实验室能力的一个国际标准。除了在公司总部美国肯塔基州成立检测实验室以外，我们在中国也成立 37+ 饲料毒理学分析实验室。

1. 广谱霉菌毒素吸附剂
A board-spectrum mycotoxin binder

2. 强效吸附玉米赤霉烯酮
One of the best zearalenone binder

3. 不吸附饲料中宝贵营养物质
Without binding valuable nutrients

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