

Feed & Cereals Analysis



Better Science, Safer Food

Company Introduction

Mycotoxin Decision Levels

Biochip Array Technology

Drug Residue Testing



Drug Residue Decision Levels



Technical Support





Helping Improve the Agricultural Industry

Commitment to research and development is the driving force behind our innovative technology, allowing Randox Food Diagnostics to become a global leader in screening for toxins and residues within cereals and cereal based feeds. With a comprehensive range of testing solutions and validations across a range of matrices, we are changing the face of food safety and quality worldwide.

Over 35 years, Randox Food Diagnostics has developed a specific product portfolio including ELISA and Randox's patented Biochip Array Technology to suit the needs for cereal and feed screening. Putting the food and agricultural industries at the forefront of what we do has allowed Randox Food to become the industries trusted supplier of the most innovative technology within feed and cereal screening. Biochip Array Technology allows users to save time, consolidate costs and gain accurate results.

We offer screening solutions within feed and cereals for the following:

- Mycotoxins
- Coccidiostats
- Growth Promoters
- Antimicrobials

Biochip Array Technology

Randox's patented Biochip Array Technology (BAT) provides multiple results from a single sample. Accurate, repeatable and trusted results on a 9mm x 9mm ceramic chip. Our unique technology is at the forefront of testing and provides a large number of results in less time when compared to other methods.

Randox's comprehensive test menus allow for the screening of multiple sample types, providing quantitative results. These versatile arrays are ideal for the screening of feeds and cereals, giving you the ability to accurately detect toxins and residues using a single platform. This technology ultimately provides a more informed decision on confirmatory analysis required.

Benefits



The Biochip

Each single 9x9mm Biochip acts as the reaction well for a single sample, replacing multiple ELISA tests.

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Consolidation

Each Biochip well provides the user with up to 44 individual results from a single sample.

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Excellent Accuracy

Users will be provided with quantitative results (ppb) for each analyte depending on the kit used.

Evidence Investigator Process



Evidence Investigator Package









Evidence Investigator

Thermoshaker

PC software

Barcode scanner

Mycotoxins

Mycotoxins are a group of naturally occurring toxins produced as secondary metabolites by certain moulds. They can occur in a variety of different crops and are estimated to be responsible for losses of 5-10% of crop production globally. Consumption of mycotoxins can result in significant adverse health effects in humans and animals and, as a result, international food standards recommend that food producers conduct regular routine screening for mycotoxins.

Why test for Multiple Mycotoxins?

Recent, reliable studies have been published showing that, when 18,000 samples of multiple crops where tested, the majority of samples contained multiple mycotoxins.



95% of samples contained 10 or more mycotoxins and metabolites

Mycotoxin Biochip Arrays

Randox Food Diagnostics have developed a range of screening arrays to allow multiple detection of groups of mycotoxins from a single sample. All Randox Food's mycotoxin tests are simple to use and require *a single generic liquid to liquid extraction method*.

	Cereal based animal Feed (complete)	Barley
Evaluated Matrices	Sugar Beet	Buckwheat
	Corn / Maize	Cotton Seed
following matrices for the full Myco array	Distillers Grain	Hay
Biochip range.	Millet	Mustard Seed
	Palm Kernel	Rapeseed
	Rice	Rye
	Silage	Soya
	Sunflower	Wheat
	Grass	Whey
	Linseed	Feed Pea
	Vetches (vica)	Oat

Advantages of Multiplex Testing

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- Combined mycotoxins have different adverse effects depending on animal species, causing lowered production and economic losses
- Studies prove that mycotoxins occur in multiples, not individually
- Comparative costs per sample
- Simple and easy to use technology requiring basic laboratory skills

FAPAS

Randox Food Diagnostics is a regular participant in the FAPAS proficiency testing scheme for mycotoxins, which provides an independent check of a laboratory's procedures to ensure the delivery of quality results. FAPAS is the largest and most comprehensive analytical chemistry proficiency testing scheme in the food sector. The scheme has more than 2000 participants in over 100 countries.

Proficiency testing is an independent, confidential check of a laboratory's procedures and usually involves participating laboratories running a number of 'blind' samples that are provided by the proficiency testing company. Each laboratory is given a number as their reference.

The aim is to get as close a score as possible on the Z-score scale, which is a perfect 0.

Case Study

Test material from the scheme was assessed with Randox Food Diagnostics' mycotoxin Biochip Array for ochratoxin A (OTA)

An assigned value was determined for the analyte and, in conjunction with the standard deviation for proficiency, was used to calculate a z-score for a result.

With 35 laboratories participating in this study, Randox Food Diagnostics achieved a perfect score of 0, scoring higher than the majority of participants.

Results

Analyte	Z-Score	Assigned Value (ppb)	Result (ppb)	LOD (ppb)
OTA*	0	57.8	57.2	3.125

*FAPAS sample number 17146

Z-Scores for OTA



Myco 10

The presence of mycotoxins within feed and cereals varies per region, climate and crop variety. Studies have demonstrated that multi mycotoxin contamination in crops is a common occurrence.

Randox Food Diagnostics have solved an issue in the industry by developing the Myco 10 array for Biochip. Myco 10 allows for the simultaneous screening of 10 different groups of mycotoxins from each sample of raw material or mixed feeds. The Myco 10 array consolidates the detection of all common mycotoxins, saving significant time and labour costs. Reported results are presented in ppb.

	LOD SD $^{\Delta}$ (ppb)	LOD ML [†] (ppb)		%CR
Aflatoxin BI	0.25	3.125	Aflatoxin B1*	100
			Aflatoxin B2	30
			Aflatoxin G I	17
			Aflatoxin G2	4
Aflatoxin GI	0.5	6.25	Aflatoxin GI*	100
			Aflatoxin G2	56
			Aflatoxin B1	9
			Aflatoxin B2	4
Deoxynivalenol	100	1250	DON*	100
			3-Acetyl-DON	844
			I 5-Acetyl-DON	10
Diacetoxyscirpenol	25	312.5	Diacetoxyscirpenol*	100

*Each LOD (ppb) standardised to this compound

^ALimit of Detection (ppb) – Sensitive Detection Method

[†]Limit of Detection (ppb) – Monitory Level Method

Myco 10 Array

Catalogue No - EV3941A/B Samples per kit - 54 Sample Prep - 30 mins Assay Time - 2 hours Kit format - Biochip

Assay	LOD SD $^{\Delta}$ (ppb)	LOD ML^\dagger (ppb)		%CR
Ergot Alkaloids	10	125	Ergotamine*	100
			Ergosine	138
			Ergosinine	121
			Ergocristine	85
			Ergocristinine	43
			Dihydroergocristine	57
			Ergocryptine	87
			Ergocryptinine	70
			Ergocornine	180
			Ergocorninine	151
			Ergotaminine	80
			Ergovaline	311
			Ergometrine	475
			Ergometrinine	350
			Agroclavine	231
			Lysergic acid	351
			LSD	351
			iso-LSD	585
			Lysergol	532
Fumonisins	10	125	Fumonisin B1*	100
			Fumonisin B2	70
			Fumonisin B3	70
Ochratoxin A	0.25	3.125	Ochratoxin A*	100
			Ochratoxin B	2
Pavilline	50	625	Pavilline*	100
		025		100
T2 toxin	5	62.5	12 toxin*	100
			HT2 toxin	3/
			l 2 triol	3
Zearalenone	2.5	31.25	Zearalenone*	100
			α-Zearalenol	112
			β-Zearalenol	64
			Zearalanone	59
			α-Zearalanol	45
			β-Zearalanol	47

*Each LOD (ppb) standardised to this compound

 $^{\Delta}$ Limit of Detection (ppb) – Sensitive Detection Method

[†]Limit of Detection (ppb) – Monitory Level Method

	LOD SD [∆] (ppb)	LOD ML [†] (ppb)		%CR
Aflatoxin BI	0.25	3.125	Aflatoxin B1*	100
			Aflatoxin B2	30
			Aflatoxin GI	17
			Aflatoxin G2	4
Aflatoxin GI	0.5	6.25	Aflatoxin GI*	100
			Aflatoxin G2	56
			Aflatoxin BI	9
			Aflatoxin B2	4
Deoxynivalenol	100	1250	DON*	100
			3-Acetyl-DON	844
			I 5-Acetyl-DON	10
Fumonisins	10	125	Fumonisin B1*	100
			Fumonisin B2	70
			Fumonisin B3	70
Ochratoxin A	0.25	3.125	Ochratoxin A*	100
			Ochratoxin B	2
T2 toxin	5	62.5	T2 toxin*	100
			HT2 toxin	37
			T2 triol	3
Zearalenone	2.5	31.25	Zearalenone*	100
			α-Zearalenol	112
			β-Zearalenol	64
			Zearalanone	59
			α-Zearalanol	45
			β-Zearalanol	47

*Each LOD (ppb) standardised to this compound

 ${}^{\vartriangle}\text{Limit}$ of Detection (ppb) – Sensitive Detection Method

[†]Limit of Detection (ppb) – Monitory Level Method

Myco 7 Array

Catalogue No - EV4065 A/B Samples per kit - 54 Sample Prep - 30 mins Assay Time - 2 hours Kit format - Biochip

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Catalogue No - EV4137 A/B Samples per kit - 54 Sample Prep - 30 mins Assay Time - 2 hours Kit format - Biochip

Assay	LOD SD $^{\Delta}$ (ppb)	LOD ML^\dagger (ppb)		%CR
Aflatoxin BI	0.25	3.125	Aflatoxin B1*	100
			Aflatoxin B2	30
			Aflatoxin GI	17
			Aflatoxin G2	4
Aflatoxin GI	0.5	6.25	Aflatoxin GI*	100
			Aflatoxin G2	56
			Aflatoxin BI	9
			Aflatoxin B2	4
Deoxynivalenol	100	1250	DON*	100
			3-Acetyl-DON	844
			I 5-Acetyl-DON	10
Ochratoxin A	0.25	3.125	Ochratoxin A*	100
			Ochratoxin B	2
Zearalenone	2.5	31.25	Zearalenone*	100
			α-Zearalenol	112
			β -Zearalenol	64
			Zearalanone	59
			α-Zearalanol	45
			β-Zearalanol	47

*Each LOD (ppb) standardised to this compound

 $^{\Delta}$ Limit of Detection (ppb) – Sensitive Detection Method

 $^{\dagger}\text{Limit}$ of Detection (ppb) – Monitory Level Method

MycoFlex

Select any combination of toxins from the 10 groups of toxins in the list below (minimum of three) and our production team will manufacture your test menu onto a customised chip.

This flexibility allows you to accommodate any changes in your screening requirements. LODs as specified under Myco10.

Customisable Array	Aflatoxin B1/B2	Diacetoxyscirpenol
	Aflatoxin G1/G2	T2 toxin
	Ochratoxin A	Ergot Alkaloids
	Fumonisins	Zearalenone
	Deoxynivalenol	Paxilline

Mycotoxin ELISA kits

With extensive experience in food safety that stretches over 30 years, Randox Food Diagnostics has translated this knowledge into premium quality ELISA kits that combine confidence with convenience.

Ergot Alkaloids ELISA

Catalogue No - EA3491 Limit of Detection - <10 ppb Ergot Alkaloids are produced by the fungi group, Claviceps, developed during prolonged periods of moisture and cold temperatures. Increased unpredictable climates have led to cases of contamination and affected animals being reported globally. At present, the EU commission is deliberating on an established MRL for an acceptable level of Ergot Alkaloids in cereal and feed due to an increase in the demand for testing.

Randox currently offer an Ergot alkaloid ELISA, for flour and grass seed, which detects the six main predominantly present ergot alkaloids, i.e. ergometrine, ergotamine, ergosine, ergocristine, ergocryptine and ergocornine and their related -inines.

Aflatoxin BI ELISA

Catalogue No - AFB3511 Limit of Detection - 1 ppb Aflatoxins are mycotoxins produced by two species of Aspergillus, a fungus which is especially found in areas with hot and humid climates. Among the 18 different types of aflatoxins identified, aflatoxin B1 is predominant among food products. Aflatoxins have a wide occurrence in different kinds of matrices, such as cereals including wheat, barley, rice and corn. They can also occur in products of animal origin such as meat, milk and eggs.

The Randox Food Diagnostics Aflatoxins B1 ELISA provides a fast, reliable method to detect the presence of Aflatoxin B1 in cereal and feed samples.

Drug Residue for Feed & Ce

Coccidiostats

Coccidiosis is a parasitic disease of animal intestinal tracts caused by coccidian protozoa. Symptoms usually include bloody droppings, weight loss and mortality in young chickens. To prevent infection, farmers may administer prophylactic antiprotozoal coccidiostats in feed, which increases the chance that coccidiostat residues are retained in both poultry, meat and eggs.

Randox Food Diagnostics now offers one of the most comprehensive tests on the market for the detection of coccidiostat residues. The coccidiostats array for Biochip provides screening and quantitative detection of 12 different coccidiostats from a single sample of premixed and medicated final feed including the detection of 20 anticoccidials across 12 assays.

Testing eals

Growth Promoters

Growth promoters have been used by the livestock industry for over 30 years to improve an animal's ability to more efficiently utilize nutrients and produce leaner meat. Anabolic steroids along with ractopamine and other growth promoting steroids must also be monitored very carefully in meat and animal feed. Insufficient withdrawal periods, once an animal has been fed with feeds containing these drugs, can lead to contaminated meat entering the food chain.

As a result, the use of growth-promoting hormones in livestock production is either prohibited (European Union) or strongly regulated (e.g. USA, Canada and Australia). Compliance with these regulations is monitored by national monitoring programmes.

Antimicrobials

Antimicrobial compounds have been used in food production to treat and prevent infections and to function as growth promoters. However, serious health concerns exist about the presence of antimicrobial compounds in food and the development of antibiotic resistant strains of micro-organisms due to inappropriate use. As a result of these concerns, many countries have banned or limited the use of antimicrobials in food producing animals and have set maximum residue limits (MRLs).

Randox Food Diagnostics offer both Biochip Array Technology and ELISA test kits for the detection of antimicrobials in feed.



Cat no: EV4169 A/E

Assay			%CR
Quinolones	10	Norfloxacin*	100
		Pefloxacin	84
		Enrofloxacin	76
		Ciprofloxacin	59
		Ofloxacin	57
		Enoxacin	54
		Pipemidic Acid	36
		Fleroxacin	32
		Levofloxacin	32
		Nadifloxacin	27
		Orbifloxacin	23
		Danofloxacin	20
		Marbofloxacin	16
		Oxolinic Acid	12
		Difloxacin	8
		Pazufloxacin	7
		Sarafloxacin	6
Ceftiofur	15	Ceftiofur*	100
		Desfuroylceftiofur	92
Thiamphenicol	15	Florfenicol*	100
		Thiamphenicol	53
Streptomycin	80	Streptomycin*	100
		Dihydrostreptomycin	99
Tylosin	10	Tylosin*	100
		Tilmicosin	37
Tetracyclines	10	Tetracycline*	100
		4-epitetracycline	87
		Rolitetracycline	67
		4-epioxytetracycline	52
		Oxytetracycline	52
		Chlortetracycline	51
		Demeclocycline	41
		Doxycycline	23
		4-epichlortetracycline	20
		Methacycline	11

*Each LOD (ppb) standardised to this compound

Growth Promoter (Multiple Matrix Screen) *Cat no:* EV3726

Assay	LOD (ppb)	Compound	%CR
Beta-Agonists	8	Clenbuterol*	100
		Mapenterol	113
		Carbuterol	104
		Brombuterol	88
		Salbutamol	70
		Cimbuterol	54
		Mabuterol	41
		Terbutaline	22
		Methyl-clenbuterol	20
		Pirbuterol	15
Boldenone	I 40 ∆	I7β - Boldenone*	100
		1,4-Androstadiene-3,17-dione	55
		l7α - Boldenone	15
		Boldenone Glucuronide	15
Corticosteroids	10	Dexamethasone*	100
		Betamethasone 21 Acetate	133
		Flumethasone	57
		Betamethasone	31
		Dexamethasone 21 Acetate	27
Nandrolone	I70 ∆	19-Nortestosterone (17β)*	100
		19-Nor-4-Androstene,3,17-Dione	143
		Trenbolone Acetate	109
		Trenbolone (17β)	70
		19-Nortestosterone (17β)	55
		Sulphate	27
		19-Nortestosterone (17a)	26
		19-Nortestosterone β Glucuronide	
Ractopamine	2	Ractopamine*	100
		Ractopamine Hydrochloride	100
Stanozolol	9	Stanozolol*	100
		l 6β-Hydroxystanozolol	45
Stilbenes	25	Hexestrol*	100
		Diethylstilbestrol Glucuronide	289
		Diethylstilbestrol	105
		Dienestrol	72
Trenbolone	8	I7β-Trenbolone	100
		I7α-Trenbolone	21
Zeranol	15	Zearanol*	100
		α-Zearalenol	10
		β-Zearalanol	5.30

*Each LOD (ppb) standardised to this compound

 Δ Further dilution may be required for quantification

Coccidiostats (Premixed Feed)

Cat no: EV4131A

Assay			%CR
Clopidol	125.000	Clopidol*	100
		Nequinate	135
Decoquinate	39.125	Decoquinate*	100
Diclazuril	5.500	Diclazuril*	100
		Clazuril	12
Halofuginone	1.625	Halofuginone*	100
Lasalocid	7.875	Lasalocid*	100
Maduramicin	2.375	Maduramicin*	100
Monensin	1.125	Monensin*	100
		Monensin A	89
Nicarbazin	0.625	Dinitrocarbanilide*	100
		Nicarbazin	98
Robenidine	25.000	Robenidine*	100
Salinomycin	2.000	Salinomycin*	100
		Narasin	130

*Each LOD (ppm) standardised to this compound

*LODs obtained using 5000 fold dilution. Futher dilution can be applied.

Coccidiostats (Medicated / Non-Medicated Final Feed) Cat no: EV4131A

Assay		Compound	%CR
Clopidol	1.000	Clopidol*	100
		Nequinate	135
Decoquinate	0.313	Decoquinate*	100
Diclazuril	0.044	Diclazuril*	100
		Clazuril	12
Halofuginone	0.013	Halofuginone*	100
Lasalocid	0.063	Lasalocid*	100
Maduramicin	0.019	Maduramicin*	100
Monensin	0.009	Monensin*	100
		Monensin A	89
Nicarbazin	0.005	Dinitrocarbanilide*	100
		Nicarbazin	98
Robenidine	0.200	Robenidine*	100
Salinomycin	0.016	Salinomycin*	100
		Narasin	130

*Each LOD (ppm) standardised to this compound

*LODs obtained using 40 fold dilution. Futher dilution can be applied.

Chloramphenicol ELISA

Cat no: CN1017

	LOD (ppb)	
Chloramphenicol FAST	0.20	Chloramphenicol FAST

Growth Promoter ELISAs

Assay	LOD (ppb)	Compound
β-Agonists (SU2148)	5 5.80	Clenbuterol Salbutamol
Clenbuterol (CB1418)	5	Clenbuterol
Ractopamine (RT3451)	2	Ractopamine

Local Engineers, Global Coverage.

Randox Food Diagnostics provide customers with an unrivalled support service. A team of highly trained specialists are on-hand to deal with any technical and service issues you may have.







We offer the ultimate support with tailored service packages to suit your available budget





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