



RANDOX

FOOD DIAGNOSTICS

Drug Residues in Meat and Seafood
Premium quality testing



With nearly 30 years' experience in the market and a dedicated research and development team, Randox Food Diagnostics is committed to the development and manufacturing of high quality and reliable screening solutions for the global meat and seafood industries.

Randox Food Diagnostics offer excellent tools for on-site screening of drug residues in food products. At the forefront of our product range is our unique multi-analyte testing platform, the Evidence Investigator, which is leading the way for the future of drug residue testing. Multi-analyte testing will reduce labour costs, increase throughput and guarantee overall productivity improvement.

Overview of Drug Types

The legitimate treatment of disease with drugs such as antibiotics (in clinical doses) reduces mortality in livestock. However, antibiotics along with growth promoting agents are misused to improve production in meat and seafood.

Growth promoting drugs and synthetic steroids are used by the livestock industry to produce leaner, 'better quality' meat.

Anthelmintics are a class of drugs used in veterinary medicine to combat parasitic worms and flukes. Not all drugs are effective against all worms and this can lead to incorrect dosing and the risk of increasing drug resistance.

To combat the abuse of drugs within the food production and animal racing industries, the use of high doses is strictly regulated. Randox Food Diagnostics provides reliable and cost effective screening methods to monitor antimicrobials, growth promoting compounds and anthelmintics.



Multi-Analyte Testing

Randox Food Diagnostics presents the world's only multi-analyte quantitative drug residue screening analyser, the Evidence Investigator. The use of the Evidence Investigator utilises Randox patented Biochip Array Technology allowing simultaneous detection of multiple residues from a single sample.

Randox Food Diagnostics aim to reduce the number of samples our customers send to confirmation laboratories. Samples above the tolerance cut-off levels are identified and confirmed by an accredited laboratory, this cuts down the need for extensive confirmation testing.

Our complete system package for quantitative drug residue screening ensures reliable results that are strongly comparable to LC/MS MS along with consolidated testing, significant savings, improved efficiency and quicker results turnaround.



Benefits of the Evidence Investigator

Higher throughput

- 45 samples assessed in under two hours

Meets regulations

- Conforms to all major regulatory requirements

Consolidation of testing

- Multiple test results from a single sample

Reduced false positives

- Less than 5% false positives and no false negatives

Extensive test menu

- Extensive menu of drug residue tests

Simple sample preparation

- Simple to use with little technical expertise required

Excellent sensitivity

- Quantitative concentration results (ppb) for each analyte

Cost savings


- Significant cost savings compared to confirmatory methods

The complete package

- Investigator unit, PC, software, thermoshaker & barcode scanner



drug residue testing
高品質藥物殘留檢測



Premium quality
高品質藥物殘留檢測

Limits of Detection

Antimicrobial Array I Plus (EV3775)

Assay	Compound	Specificity(%CR)	LOD (ppb)
Sulphadimethoxine	Sulphadimethoxine	100	6.5 ○
Sulphadiazine	Sulphadiazine	100	3 ○
Sulphadoxine	Sulphadoxine	100	3.2 ○
Sulphamethizole	Sulphamethizole	100	3.2 ○
	Sulphachlorpyridazine	13.3	
Sulphachlorpyridazine	Sulphachlorpyridazine	100	2 ○
Sulphamethoxyipyridazine	Sulphamethoxyipyridazine	100	2 ○
	Sulphaethoxyipyridazine	56	
Sulphamerazine	Sulphamerazine	100	2 ○
Sulphisoxazole	Sulphisoxazole	100	2 ○
Sulphathiazole	Sulphathiazole	100	2 ○
	Sulphadiazine	6.2	
Sulphamethazine	Sulphamethazine	100	3.2 ○
Sulphaquinoxaline	Sulphaquinoxaline	100	2 ○
Sulphapyridine	Sulphapyridine	100	3.2 ○
	Sulphasalazine	12.9	
Sulphamethoxazole	Sulphamethoxazole	100	1.6 ○
	Sulphamethizole	92	
	Sulphachlorpyridazine	12.1	
Sulphamonomethoxine	Sulphamonomethoxine	100	10 ○
Trimethoprim	Trimethoprim	100	3 ○

Sample preparation - Tissue (○)

1 : 10 dilution

Antimicrobial Array II (EV3524)

Assay	Compound	Specificity(%CR)	LOD (ppb)
Quinolones	Norfloxacin	100	5.0 ○
	Pefloxacin	84	4.5 ◆
	Enrofloxacin	76	
	Ciprofloxacin	59	
	Ofloxacin	57	
	Pipemidic Acid	36	
	Fleroxacin	32	
	Levofloxacin	32	
	Nadifloxacin	27	
	Orbifloxacin	23	
	Danofloxacin	20	
	Marbofloxacin	16	
	Oxolinic Acid	12	
	Difloxacin	8	
	Pazufloxacin	7	
	Sarafloxacin	6	
	Enoxacin	54	
Ceftiofur	Ceftiofur	100	4.6 ○
	Desfuroyceftiofur	92	3.3 ◆
Thiamphenicol	Florphenicol	100	1.3 ○
	Thiamphenicol	53	0.7 ◆
Streptomycin	Streptomycin	100	14.0 ○
	Dihydrostreptomycin	182	7.0 ◆
Tylosin	Tylosin	100	0.9 ○
	Tilmicosin	37	0.5 ◆
Tetracyclines	Tetracycline	100	4.8 ○
	4-epitetracycline	87	1.3 ◆
	Rolitetracycline	67	
	4-epioxytetracycline	52	
	Oxytetracycline	52	
	Chlortetracycline	51	
	Demeclocycline	41	
	Doxycycline	23	
	4-epichlortetracycline	20	
	Methacycline	11	

Sample preparation - Tissue (○)

1 : 20 dilution

Sample preparation - Urine (◆)

1 : 10 dilution

Antimicrobial Array III (EV3695)

Assay	Compound	Specificity(%CR)	LOD (ppb)
AOZ	4-NP-AOZ	100	0.06 ○
	Furazolidone	8	0.06 △
AMOZ	4-NP-AMOZ	100	0.08 ○
	Furaltadone	41	0.08 △
AHD	4-NP-AHD	100	0.08 ○
	Nitrofurantoin	42	0.08 △
SEM	4-NP-SEM	100	0.4 ○
	Nitrofurazone	14	0.2 △
Chloramphenicol	Chloramphenicol	100	0.25 ○
	Chloramphenicol	75.1	0.1 △
	Glucuronide		

Sample preparation - Tissue (○) : Prawn/Shrimp (△)

Derivatisation step and ethyl acetate extraction

Antimicrobial Array III CAP only (EV3738)

Assay	Compound	Specificity(%CR)	LOD (ppb)
Chloramphenicol	Chloramphenicol	100	0.01 ○
	Chloramphenicol	75.1	
	Glucuronide		

Sample preparation - Tissue (○)

Simple ethyl acetate extraction with isooctane/chloroform clean-up

Zilpaterol (EV3907)

Assay	Compound	Specificity(%CR)	LOD (ppb)
Zilpaterol	Zilpaterol	100	0.08 ○

Sample preparation - Tissue (○)

Acetonitrile / Methanol extraction

Anthelmintics (EV3770)

Assay	Compound	Specificity(%CR)	LOD (ppb)
Benzimidazoles (BZS)	Albendazole	100	1 ○
	Albendazole Sulphoxide	99	
	Albendazole Sulphone	178	
	Fenbendazole	10	
	Oxfendazole	40	
	(Fenbendazole sulphoxide)		
	Oxibendazole	48	
	Mebendazole	18	
	Oxfendazole Sulphone	14	
	(Fenbendazole sulphone)		
	Parbendazole	30	
	Carbendazim	10	
	Flubendazole	29	
	Hydroxy Flubendazole	2	
	Hydroxy Mebendazole	1	
Amino Benzimidazoles (ABZ)	Albendazole 2-amino sulphone	100	0.15 ○
	Amino-flubendazole	99	
	Amino-mebendazole	141	
Levamisole (LVM)	Levamisole	100	6.5 ○
Avermectins (AVM)	Ivermectin	100	0.75 ○
	Abamectin	178	
	Doramectin	75	
	Emamectin Benzoate	254	
	Eprinomectin	191	
Thiabendazole (TBZ)	Thiabendazole	100	1.2 ○
	5-Hydroxythiabendazole	91	
	Cambendazole	800	
Moxidectin (MXD)	Moxidectin	100	1.6 ○
Triclabendazole (TCBZ)	Triclabendazole	100	0.8 ○
	Triclabendazole Sulphoxide	40	
	Keto-triclabendazole	150	
	Triclabendazole Sulphone	1	

Sample preparation - Tissue (○)

Acetonitrile extraction

Coccidiostats (EV3772)

Assay	Compound	Specificity (%CR)
Lasalocid	Lasalocid	100
Nicarbazin	Dinitrocarbanilide Nicarbazin	100
Imidocarb	Imidocarb	100
Toltrazuril	Toltrazuril Sulphone Toltrazuril Sulphoxide Toltrazuril	100 40.7
Maduramicin	Maduramicin	100
Nifurasol Metabolite	3,5 Dinitrosalicylic Acid Hydraside Nifurasol 3,5 Dinitrosalicylic Acid	100 925 39
Salinomycin	Salinomycin Narasin	100 130
Clopidol	Clopidol	100
Monensin	Monensin Monensin A	100 89
Robenidine	Robenidine	100
Decoquinat	Decoquinat	100
Halofuginone	Halofuginone	100
Diclazuril	Diclazuril Clazuril	100 12

Synthetic Steroids (EV3694)

Assay	Compound	Specificity (%CR)	LOD (ppb)
17 β Clostebol	4-Chloro-androsten-3, 17-dione (CLAD)	100	0.95 \diamond 0.40 \blacktriangle
	17 β - Clostebol	34.8	
Ethinylestradiol	Ethinylestradiol	100	0.41 \diamond 0.37 \blacktriangle
Gestagens	Chlormadinone acetate	100	0.84 \diamond
	Medroxyprogesterone acetate	149.3	0.92 \blacktriangle
	Megestrol acetate Melengestrol acetate	105.1 56.9	
Methyltestosterone	Methyltestosterone	100	0.82 \diamond
	Methylboldenone	40.7	0.63 \blacktriangle

Sample preparation - Equine (\diamond) : Bovine (\blacktriangle)

C18 extraction

Growth Promoter Multiple Matrix Screen (EV3726)

Assay	Growth Promoter	Specificity(%CR)	LOD (ppb)
β -Agonists	Clenbuterol	100	0.2 \blacklozenge
	Mapenterol	113	0.2 \circ
	Carbuterol	104	8 \bullet
	Salbutamol	70	
	Cimbuterol	54	
	Mabuterol	41	
	Terbutaline	22	
	Methyl-clenbuterol	20	
	Pirbuterol	15	
	Boldenone	17 β Boldenone	100
1,4 Androstadiene-3,17-dione		55	0.5 \circ
17 α Boldenone		15	140 \bullet
Boldenone glucuronide		15	
Corticosteroids	Dexamethasone	100	0.2 \blacklozenge
	Betamethasone-21-acetate	133	0.4 \circ
	Flumethasone	57	10 \bullet
	Betamethasone	31	
	Dexamethasone-21-acetate	27	
Nandrolone	19-Nortestosterone (17 β)	100	2 \blacklozenge
	19-Nor-4 androstene,3,17-dione	143	1.4 \circ
	Trenbolone Acetate	109	170 \bullet
	17 β Trenbolone	70	
	19-Nortestosterone	55	
	(17 β) sulphate		
	19-Nortestosterone (17 α)	27	
19-Nortestosterone β glucuronide	26		
Ractopamine	Ractopamine	100	0.2 \blacklozenge
	Ractopamine hydrochloride	100	0.3 \circ 2 \bullet
Stanozolol	Stanozolol	100	0.4 \blacklozenge
	16 β Hydroxystanozolol	45	0.4 \circ 9 \bullet
Stilbenes	Hexestrol	100	0.4 \blacklozenge
	Diethylstilbestrol glucuronide	289	0.9 \circ
	Diethylstilbestrol Dienestrol	105 72	25 \bullet
Trenbolone	17 β Trenbolone	100	0.4 \blacklozenge
	17 α Trenbolone	21	0.1 \circ 8 \bullet
Zeranol	Zeranol	100	0.8 \blacklozenge
	α - Zeranol	10	0.3 \circ
	β - Zeranol	5.3	15 \bullet
	Zearalenone	<1.4	
	Zearalanone	<0.4	

Sample preparation - Urine (\blacklozenge) : Tissue (\circ)

IAC extraction

Sample preparation - Feed (\bullet)

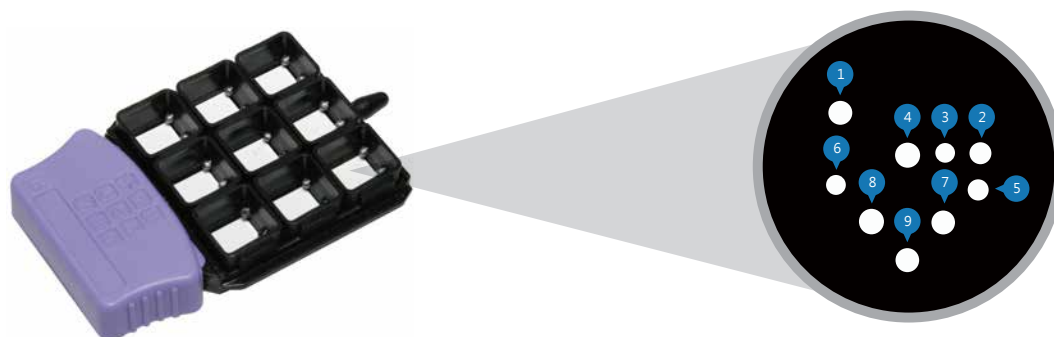
Methanol extraction

Analysis Times

Assay	Cat. No	Samples Per Kit	Sample Preparation	Incubation & Assay Time	Max Total Time
Antimicrobial Array I Plus	EV3775	45	20 mins	2 hrs	2 hrs 20 mins
Antimicrobial Array II	EV3524	45	20 mins	2 hrs	2 hrs 20 mins
Antimicrobial Array III	EV3695	45	3 hrs 30 mins	2 hrs	5 hrs 30 mins
Antimicrobial Array III (CAP only) *	EV3738	45	1 hr 30 mins	2 hrs	3 hrs 30 mins
Zilpaterol *	EV3907	45	1 hr 30 mins	2 hrs	3 hrs 30 mins
Anthelmintics	EV3770	45	1 hr 30 mins	2 hrs	3 hrs 30 mins
Coccidiostats	EV3772	45	1 hr 30 mins	2 hrs	3 hrs 30 mins
Synthetic Steroids	EV3694	45	3 hrs	2 hrs	5 hrs
Growth Promoter Multiple Matrix Screen	EV3726	45	3 hrs	2 hrs	5 hrs

Analysis times based on 20 samples

* Antimicrobial Array III (CAP Only) and Zilpaterol offered as single analyte kit for those customers choosing not to run additional analytes.



Example : Antimicrobial Array II (EV3524)

Discrete test sites on each biochip for individual analytes

- | | | | | | |
|---|-----------------|---|---------------|---|-----------------|
| 1 | Reference spot | 4 | Ceftiofur | 7 | Tylosin |
| 2 | Correction spot | 5 | Thiamphenicol | 8 | Tetracyclines |
| 3 | Quinolones | 6 | Streptomycin | 9 | Correction spot |

Evidence Investigator process



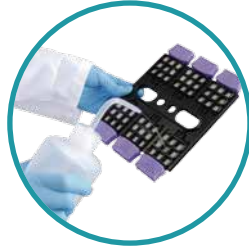
1 Adding reagents

Multiple results can be obtained simultaneously from as little as 25µl of sample. Up to 45 samples and nine calibrators can be analysed per run.



2 Thermoshaker

The customised thermoshaker provides the optimum heating environment for samples.



3 Washing Biochips

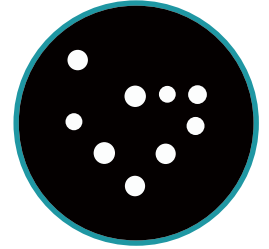
The washing procedure is then quickly and easily completed over a 10 minute period.



4 Load carrier

Signal reagent is added to each biochip before imaging.

It only takes two minutes for the CCD camera to image each biochip carrier.



5 Discrete test regions

The light signals generated from each of the discrete test regions on the biochip are simultaneously detected.

Evidence Investigator package



Biochip imaging module



PC & imaging software



Barcode scanner



Thermoshaker



Biochip carrier handling tray

Support Plan

Radox Food Diagnostics is offering full customer support with a 3-5 day installation plan included in the Evidence Investigator package at no extra cost.

This plan includes :

- » Full set up of equipment
- » Training on sample preparation
- » Training on assay procedure and imaging
- » Training on software and results reporting
- » Training on basic troubleshooting

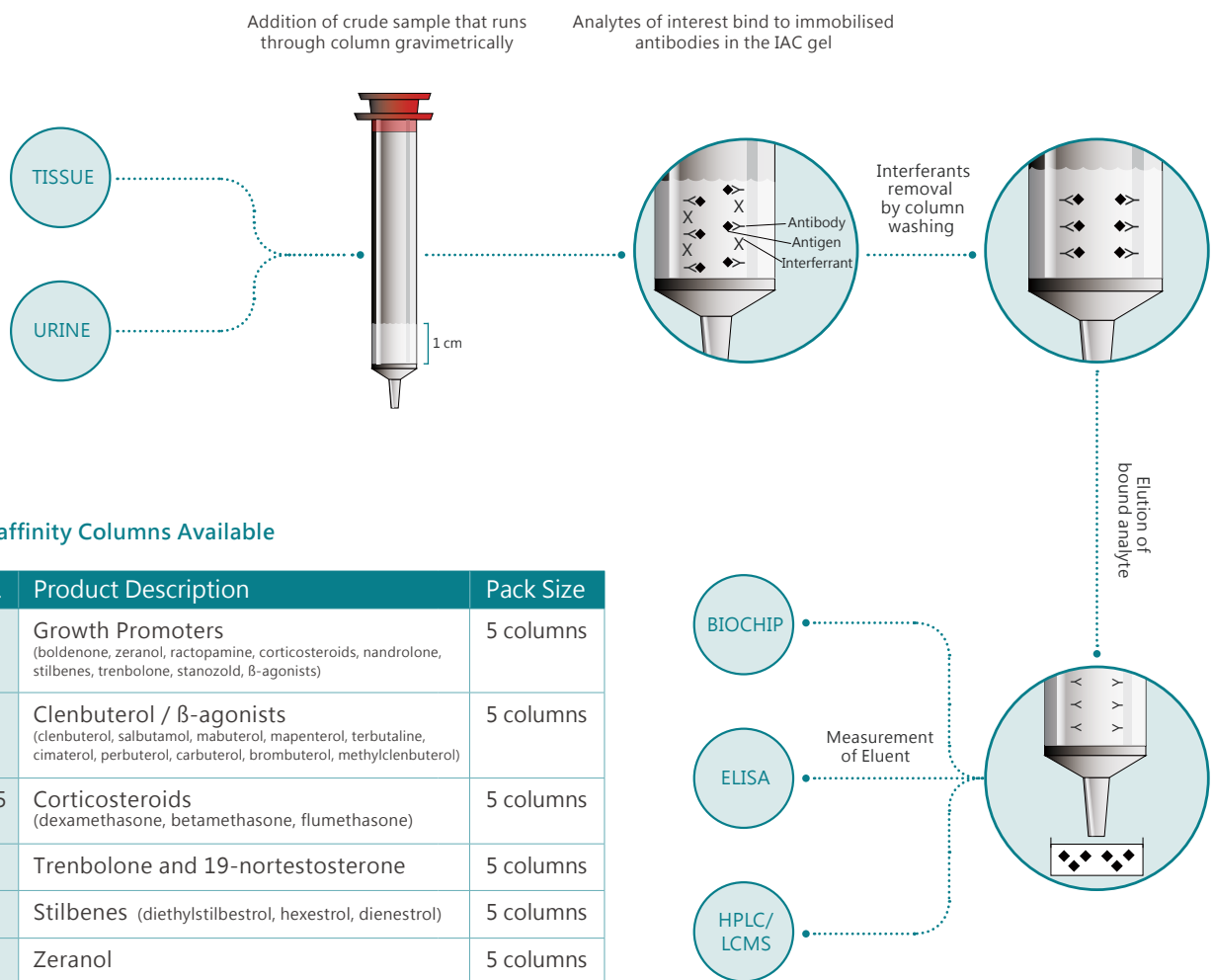
This package also includes 1 year's full warranty, 1 year of 24 hour support and the ability to perform online trouble shooting (internet connection required), if necessary. Additional warranty plans are also available – Protection Plan 'Lite' & Protection Plan 'Pro' (up to four years).



Immunoaffinity Columns

Sample clean up is an essential part of drug residue testing, whether it is performed by ELISA, confirmatory methods or any other technique.

To complement the range of ELISAs for measuring drug residues, Radox Food Diagnostics offer a wide range of Immunoaffinity Columns for sample purification.



Immunoaffinity Columns Available

Cat No.	Product Description	Pack Size
GP1821	Growth Promoters (boldenone, zeranol, ractopamine, corticosteroids, nandrolone, stilbenes, trenbolone, stanozolol, β -agonists)	5 columns
CB2184	Clenbuterol / β -agonists (clenbuterol, salbutamol, mabuterol, mapenterol, terbutaline, cimaterol, perbuterol, carbuterol, brombuterol, methylclenbuterol)	5 columns
DM2185	Corticosteroids (dexamethasone, betamethasone, flumethasone)	5 columns
TB2186	Trenbolone and 19-nortestosterone	5 columns
SJ2154	Stilbenes (diethylstilbestrol, hexestrol, dienestrol)	5 columns
ZR2420	Zeranol	5 columns

ELISA Test Kits

Randox Food Diagnostics ELISA test kits are used for the screening of drug residues in various matrices and show favourable comparison with confirmatory methods.

ELISA test kits offer a cost effective screening method for meat and seafood analysis in lower volume throughput laboratories.

ELISA Test Kit Benefits

- » **Single sample preparation across various ELISA kits**
Consolidates testing, reduces labour time and cost
- » **Excellent generic antibodies for several ELISAs**
Quinolones – detects 17 analytes
β-Lactams – detects 11 analytes
- » **Rapid analysis**
40 samples can be analysed in 90 mins
- » **Lower set up costs**
No expensive equipment required
- » **Precision**
Intra and Inter assay precision typically <10%
- » **Simplified set up**
Biotek plate readers and software offered for initial laboratory set up if necessary

ELISA Kits Available

Cat. No	Drug Residue	Format
CN1469	Chloramphenicol	96 tests
SZ3471	Sulphamethoxazole	96 tests
STP3468	Streptomycin	96 tests
SQ2145	Sulphaquinolaxaline	96 tests
SZ2147	Sulphadiazine	96 tests
SM2146	Sulphamethazine	96 tests
BL3448	Beta Lactam	96 tests
QL3454	Quinolones	96 tests
NF3465	AOZ	96 tests
NF3462	AMAZ	96 tests
NF3463	AHD	96 tests
NF3461	SEM	96 tests
TB2106	Trenbolone	96 tests
NT2105	19 Nortestosterone/Trenbolone	96 tests
RT3451	Ractopamine	96 tests
CB1418	Clenbuterol	96 tests
SU2148	Beta Agonist	96 tests
SJ2152	Stilbenes	96 tests
ZR2421	Zeranol	96 tests
DM2156	Corticosteroids	96 tests
ZP3483	Zilpaterol	96 tests

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250+

laboratories using Radox
Food Diagnostics technology