national milk laboratories

InfiniPlex for Milk - Full Guidance Notes

InfiniPlex test result interpretation for residues in milk

CONTENTS

Result Interpretation

Results are reported as **positive** (analyte present above the decision level) or **not-detected** (**n/d**) (analyte not present or present below the decision level).

This is a *qualitative* test, not a *quantitative* test, so it does not indicate the concentration level of a detected substance.

The Certificate of Analysis lists the **analytes** which were detected in the sample (positive results). A Quick Guide to interpretation is included on each certificate.

Definitions

For the purposes of this guide and the assay, the following definitions are used:

Analyte

The test is a multiple-array *immunoassay*. In effect, it is a series of different antibody tests, similar to an ELISA (enzyme-linked immunosorbent assay) which detects 43 different *antigens*. These are the analytes. An analyte may be specific for a single compound (e.g. Lincomycin and Novobiocin, two antibiotics), or have several analogous compounds which are antigenically similar so cannot be distinguished by this test (e.g. beta lactam analyte, which includes 14 different antibiotic compounds).

Compound

Tables 1 to 4 list the different compounds which each analyte includes. Some analytes have up to 22 different antigenically similar compounds which cannot be distinguished from each other, whilst other analytes are specific for a single medicinal compound.

Decision Level

Shown in parts per billion (ppb), this is the concentration of compound above which the assay will show a **positive** result. These decision levels have been derived from prior validation of the test. Control samples run as part of each test ensure the decision levels remain accurate.

The Decision Level (DL) is a value where there is 95% confidence that a sample containing that concentration of compound will give a **positive** on the test. Tables 1 to 4 list the decision levels for each compound.

Where a compound has not been detected, the result is given as **n/d** (not detected).

Multiple compounds which are present within a single analyte group may have an additive effect. Taking for example Tylosin analyte, which includes the antibiotic compounds Tylosin A and Tilmicosin, the decision level for Tylosin A is 7.5 ppb and the decision level for Tilmicosin is 50ppb. If both compounds are present below these levels in a sample, they may combine to give a positive result for the Tylosin analyte.

Maximum Residue Limit (MRL)

The maximum residue limit (quoted in ppb) is the level above which a permitted medicine or compound must not be present in the milk of an *individual cow* whose milk is intended for human consumption.

Tables 1 to 4 list the EU (European Union) MRLs (milk) for each compound which the test can detect. In many instances, the Infiniplex test can be **positive** at levels below the compound's MRL.

Only pharmacologically active substances which are listed in an EU commission Table of Allowed Substances (compiled by the European Medicines Agency) are allowed to be used in food producing animals. These will have an MRL established, except in certain circumstances where it has been deemed that no MRL is required (e.g. some hormones which are indistinguishable from those which might be naturally occurring in milk). Some medicinal compounds do not have an established MRL, are not allowed for use in animals producing milk for human consumption, and should not be present *at any detectable level*. These compounds are indicated in Tables 1 to 4.

Reference Tables

The following tables should be used to understand the results. They list the different analytes and associated compounds which are included in the test. For each compound, the decision level of the test is given, above which the result will be *positive*. The Maximum Residue Level (MRL) in milk for each compound is also given, where possible.

Table 1 Antibiotic compounds
Table 2 Anti-inflammatory compounds
Table 3 Flukicide
Table 4 Other residue compounds

Effort has been made to ensure that the figures presented in these tables are correct at the time of distribution. However, please note that the decision level for an individual compound may be subject to re-validation and that MRL data may also be subject to change. Please contact the laboratory if you need to discuss further.

Data presented from Randox Infiniplex for Milk Array Validation Report EV4076 (Dec 2016).

TABLE 1 - LIST OF ANTIBIOTIC COMPOUNDS

Analyte	Compound	IPM Decision Level (ppb)	EU MRL (ppb) - milk
AMPHENICOLS	Chloramphenicol	0.22	None
	Florphenicol	0.40	None
	Thiamphenicol	1.60	50
APRAMYCIN	Apramycin	6.00	None
BACITRACIN	Bacitracin	2.00	100
BAQUILOPRIM	Baquiloprim	3.00	30
BETALACTAMS	Amoxicillin	2.40	4
	Ampicillin	2.00	4
	Benzylpenicillin (Penicillin G)	0.88	4
	Cefacetril	10.0	125
	Cefalonium	0.35	20
	Cefapirin	5.00	60
	Cefazolin	18.00	50
	Cefoperazone	3.80	50
	Cefquinome	6.30	20
	Ceftiofur	25.00	100
	Cloxacillin	1.30	30
	Dicloxacillin	2.00	30
	Naficillin	3.00	30
	Oxacillin	1.40	30
	Penicillin V	0.15	None
CEFUROXIME	Cefuroxime	8.50	30
CEFALEXIN	Cefalexin	23.00	100
DAPSONE	Dapsone	1.70	None
	Sulfaethoxypyridazine	120.00	100
	Sulphadiazine	60.00	100
	Sulphadimethoxine	7.00	100
	Sulphadoxine	To be determined	100
	Sulphamerazine	25.00	100
	Sulphameter	10.00	100
	Sulphamethazine	30.00	100

	Sulphamethizole	50.00	100
	Sulphamethoxazole	100.00	100
	Sulphamethoxypyridazine	85.00	100
	Sulphamonomethoxine	48.00	100
	Sulphanitran	210.00	100
	Sulphapyridine	200.00	100
	Sulphaquinoxaline	5.00	100
	Sulphathiazole	70.00	100
	Sulphisomidine	16.00	100
ERYTHROMYCIN	Erythromycin	2.50	40
	Gamithromycin	32.00	None
	Oleandomycin	60.00	None
	Tulathromycin	50.00	None
GENTAMICIN	Gentamicin	22.00	100
HYGROMYCIN B	Hygromycin B	7.50	None
KANAMYCIN	Kanamycin A	4.00	150
LINCOMYCIN	Lincomycin	6.50	150
NEOMYCIN	Framycetin	7.50	1500
	Neomycin	9.00	1500
	Paromomycin	3.00	None
NOVOBIOCIN	Novobiocin	12.50	50
PIRLIMYCIN	Pirlimycin	11.00	100
POLYMIXINS	Colistin	1.30	50
	Polymixin B	0.50	None
QUINOLONES	Ciprofloxacin (CIP)	13.80	100
	Danofloxacin (DAN)	11.30	30
	Difloxacin	20.00	None
	Enrofloxacin (ENR)	12.50	100
	Flumequine (FLU)	22.50	50
	Marbofloxacin	22.50	75
	Oxolinic Acid	15.00	None
RIFAXIMIN	Rifaximin	1.00	60
SPECTINOMYCIN	Spectinomycin	3.0	200
SPIRAMYCIN	Neospiramycin	To be determined	None

	Spiramycin	1.00	200
STREPTOMYCIN	Dihydrostreptomycin	20.00	200
	Streptomycin	32.00	200
SULFAGUANIDINE	Sulphaguanidine	50.00	100
SULPHAMETHAZINE	Sulphamerazine	25.00	100
	Sulphamethazine	1.20	100
	Sulphamoxol	174.00	100
SULPHAPYRIDINE	Sulphaethoxypyridazine	30.00	100
	Sulphamethoxypyridazine	30.00	100
	Sulphamonomethoxine	80.00	100
	Sulphamoxol	28.50	100
	Sulphanitran	60.00	100
	Sulphapyridine	0.90	100
	Sulphasalazine	1.20	100
	Sulphathiazole	50.00	100
SULPHONAMIDES	Sulfphabenzamide	0.56	100
	Sulphacetamide	2.40	100
	Sulphachlorpyridazine	1.80	100
	Sulphadiazine	14.00	100
	Sulphadimethoxine	1.60	100
	Sulphadoxine	2.50	100
	Sulphaethoxypyridazine	30.00	100
	Sulphaisoxazole	0.75	100
	Sulphamerazine	22.00	100
	Sulphameter	6.00	100
	Sulphamethizole	6.00	100
	Sulphamethoxazole	1.60	100
	Sulphamethoxypyridazine	40.00	100
	Sulphamonomethoxine	0.76	100
	Sulphamoxol	88.00	100
	Sulphanitran	46.00	100
	Sulphaphenazole	4.60	100
	Sulphapyridine	110.00	100
	Sulphaquinoxaline	4.50	100

	Sulphathiazole	24.00	100
	Sulphatroxazole	0.75	100
	Sulphisomidine	13.00	100
TETRACYCLINES	Chlortetracycline	6.30	100
	Doxycycline	50.00	100
	Oxytetracycline	18.80	100
	Tetracycline	10.00	100
TOBRAMYCIN	Tobramycin	7.00	None
TRIMETHOPRIM	Trimethoprim	13.00	50
TYLOSIN	Tilmicosin	50.00	50
	Tylosin A	7.50	50
VIRGINIAMYCIN	Virginiamycin M1	0.75	None

TABLE 2 - LIST OF ANTI-INFLAMMATORY COMPOUNDS

Analyte	Compound	Notes	IPM Decision Level (ppb)	EU MRL (ppb) - milk
DEXAMETAHSONE	Betamethasone		To be determined	0.3
	Dexamethasone		0.20	0.3
HYDROXYFLUNIXIN	5-hydroxy flunixin		0.25	40
	Flunixin		0.36	40
MELOXICAM	Meloxicam		6.00	15
METAMIZOLE	4-methylamino antipurine	Also known as Dipyrone	24.00	50
METHYLPREDNISOLONE	Methylprednisolone		0.40	None
	Prednisolone		1.40	6
PHENYLBUTAZONE	Oxyphenbutazone		1.50	None
	Phenylbutazone		1.25	None
TOLFENAMIC ACID	Tolfenamic acid		1.60	50

TABLE 3 - LIST OF FLUKICIDE COMPOUNDS

Analyte	Compound	IPM Decision Level (ppb)	EU MRL (ppb) - milk
NITROXYNIL	Nitroxynil	1.50	None

TABLE 4 - LIST OF OTHER RESIDUE COMPOUNDS

Analyte	Compound	Notes	IPM Decision Level (ppb)	EU MRL (ppb) - milk
AFLATOXIN M1	Aflatoxin M1	Mycotoxin, from contaminated feedstuffs, which can be concentrated in milk.	0.038	0.05
CHLORMADINONE	Chlormadinone	Synthetic oral progesterone; no licensed products in UK.	1.20	2.5
MELAMINE	Melamine	Trimer of cyanamide; 67% Nitrogen by mass; potentially abused for protein adulterations. No MRL set in EU.	625.00	None
RACTOPAMINE	Ractopamine	Growth promoter (for lean muscle). Not licensed in EU.	0.32	None

NEXT STEPS

Always consult your veterinary surgeon for help in interpreting results

WHAT TO DO IN THE CASE OF AN INFINIPLEX *POSITIVE* RESULT

The InfiniPlex for Milk assay is usually used once a milk sample has already failed a screening test, such as the Delvotest®. Inhibitory substance screening tests are not specific for any individual residue, failing whenever inhibitory substances are present in the milk above certain levels. The InfiniPlex test can be useful to identify the medicine(s) most likely to have caused the failure. Sometimes additional residues are detected, which would not necessarily have caused the failure of the initial screening test.

Investigating the reason for a residue failure is a specialist task and should be done methodically. Vets are advised to use the BCVA (British Cattle Veterinary Association) Investigation of Inhibitory Substances in Milk checklist, a copy of which is included in the MilkSure workbook (see below).

Previous studies have found that the actual reason for a bulk tank milk residue failure is different to the initially presumed reason in around 50% of cases. The InfiniPlex test is a valuable tool to help identify the veterinary medicinal product which was involved in a residue test failure.

Whenever medicines are used, there is always a risk of residue failures occurring. Certain practices are higher risk than others:

EXAMPLES OF LOW RISK MEDICINE USE:

1. Animal history and medication is well recorded and available to check.
2. Administration of licensed products, following the product data sheet recommendations for dosage, route of administration and duration of therapy. The recommended minimum withdrawal period is used.
3. Avoiding combination of several different medicines during treatment.
4. Following the exact written protocols devised by your vet.
5. Clear identification of treated animal and separation until the withdrawal period is complete.

EXAMPLES OF HIGH RISK MEDICINE USE:

1. History of treatments is not well recorded or reported to the person responsible on farm: communication errors.
2. Animal identification is poor (e.g. freeze brands are not clear): mis-identification errors.
3. Route of administration, duration of treatment or dosage were not as prescribed or as recommended on the product data sheet.
4. Combination of products administered together e.g. intra-mammary tube and injection together. Often a *minimum* 7 day milk withdrawal is necessary, unless products are specifically licensed for use in combination.

5. The medicines used were not licensed for lactating cows e.g. a medicine licensed for respiratory disease in beef cattle/ calves.
6. Minimum withdrawal period not followed as directed (particularly for off-label cascade use).
7. Poor security of medicine storage; malicious contamination does sometimes occur.
8. Illegal use of medicines without specific veterinary instruction, e.g. using a medicine or a combination of medicines in any way different to the product data sheet.

These lists do not by any means cover all risks. All farms should work in combination with their own vet to do their own risk-assessment based on individual circumstances.

MilkSure is a training course for dairy farmers and their employees. Training is provided by vets for their own clients, using a workbook and other learning materials. The course covers all the technical and practical aspects necessary to safeguard residue free milk. Farmers are encouraged by milk buyers to undertake the training, and it is likely to become mandatory for many farmers who have a residue failure detected.

A Certificate of Achievement is awarded to those who complete the training and pass an online test.

A risk assessment and action plan is devised for the farm to reduce the risk of medicine residue failures occurring.

For more information see http://milksure.co.uk/about-milksure/.

ABOUT THE DIFFERENT RESIDUES WHICH CAN BE DETECTED

ANTIBIOTICS PRESENCE

The presence of one or more antibiotic residues are the most likely reason for a residue screening test failure. Likely sources include administration of antibiotic products to the cows supplying the bulk tank. Consultation with your veterinary surgeon is essential to determine the reason for the antibiotic residue being found in the bulk sample. The most common finding is antibiotics from the beta-lactam group, particularly from intramammary tubes, but others can also be implicated. Antibiotics should only be used on veterinary advice and prescription.

WHAT IS A BETA-LACTAM ANTIBIOTIC?

Beta-lactam antibiotics are a class of broad-spectrum antibiotics, consisting of all antibiotic agents that contain a beta-lactam ring in their molecular structures. This includes penicillins and penicillin derivatives such as cephalosporins. Beta lactams have been widely used in veterinary medicine for more than 30 years and are one of the most frequently used families of antibiotics in dairy cattle. They are commonly used for treating mastitis and for dry cow therapy.

WHAT IS A CEPHALOSPORIN?

The cephalosporins are the largest and most diverse family of antibiotics of the beta-lactam group. They are structurally and pharmacologically related to the penicillins. A cephalosporin is a group of antibiotics commonly found in certain intra-mammary products and injectable products indicated for lameness and post calving infections in cattle. Third and fourth generation cephalosporins are classed as high priority critically important antibiotics. This means that increasingly they should only be used after sensitivity tests indicate they are the best option. Examples of third and fourth generation cephalosporins include Ceftiofur and Cefquinome.

WHAT IS A QUINOLONE ANTIBIOTIC?

A quinolone is a family of synthetic broad-spectrum antibiotic drugs used in both people and animals. They are all now classed as high priority critically important antibiotics. This means that increasingly they should only be used after sensitivity tests indicate they are the best option. Examples of a quinolone antibiotic are Enrofloxacin and Marbofloxacin.

WHAT IS AN AMPHENICOL

Amphenicols are a group of antibiotics that are used for treating respiratory infections in cattle. Examples of amphenicols include chloramphenicol, thiamphenicol and florfenicol. Florfenicol is not licensed for use in animals from which milk is produced for human consumption and Chloramphenicol was banned for use in food producing animals many years ago.

WHAT IS A SULPHONAMIDE?

Sulfonamides are bacteriostatic; they inhibit growth and multiplication of bacteria, but do not kill them. They are typically used for the treatment of foot infections, intestinal infections and some mastitis cases.

What is a Streptomycin?

Streptomycin is an aminoglycoside antibiotic and it is often combined with penicillin to provide broad spectrum cover for various cattle conditions. Streptomycin is found both in intra-mammary and injectable products.

What is a Tetracycline?

Tetracyclines have a broad spectrum of antibiotic action. Included in this group are Chlortetracycline and Oxytetracycline. They are found in injectable products, topical sprays and intra-uterine pessaries.

What is a Macrolide?

Macrolides are a group of antibiotics including Tylosin, which is a commonly used injectable antibiotic. Tilmicosin, if used in dairy cattle (dry cows or heifers) according to data sheet instructions, has a particularly long milk withdrawal period.

What is an Anti-inflammatory product?

An anti-inflammatory medicine is used to reduce pain, inflammation and pyrexia (high temperatures). They are very useful medicines to be used alone, or in conjunction with antibiotics. Sources of residues in milk may include administration of anti-inflammatory products to cows supplying the bulk tank. Consultation with your veterinary surgeon is essential to ascertain the reason for the anti-inflammatory residue being found in the bulk sample.

What is a Flukicide product?

Flukicides are used in the control of liver fluke, which is an important and costly parasitic disease of cattle, including dairy cattle in certain locations and circumstances. There are very few licensed flukicides for dairy cattle; those that are are drenches. Nitoxynil is an injectable flukicide which, whilst licensed for beef cattle and dairy youngstock, must not be used in dairy cattle including dry cows and in-calf heifers within three months of calving. Consultation with your veterinary surgeon is essential to determine the reason for the flukicide residue being found in the bulk sample.

Toxins and other residues

Alflatoxin M1 is a mycotoxin which can be concentrated in milk. Sources are most likely to be contaminated feedstuffs.

Chlormadinone is an oral synthetic progesterone used for oestrus synchronisation. It is not licensed for use in UK.

Melamine is a trimer of cyanamide and, due to its very high nitrogen content, has been associated with adulteration of feed to artificially raise protein test levels. In the past, there have been scandals over melamine adulterated pet food and milk. Melamine is a by-product of the coal industry but is found in many products; its source in bulk milk may be from direct adulteration or residues from certain pesticides and fertilisers.

Ractopamine is a similar drug to clenbuterol (used by asthma sufferers). It is licensed as a growth promoter in USA but is illegal in the EU and many other regions. Consultation with your veterinary surgeon is essential to determine the cause of the presence of any of these residues in the bulk sample.

ANNEX 1: TABLE OF VETERINARY PRODUCTS WHICH CONTAIN THE TEST COMPOUNDS

Every effort has been taken to ensure the list of products is complete and accurate at the time of distribution. However, it is intended as a guide only and as product names regularly change, new products become licensed and some products are withdrawn. Readers are advised to consult up-to-date VMD product lists, which can be found on the VMD website.

LIST OF ANTIBIOTIC PRODUCTS

Analyte	Compound	Product list
AMPHENICOLS	Chloramphenicol	n/a
	Florphenicol	Fenflor Flordofen Florfenikel Florgane Florinject Florkem Keforil Mycoflor Nifenicol Norfencol Nuflor Nuflorgold Resflor Selectan Shotaflor
	Thiamphenicol	TAF spray
APRAMYCIN	Apramycin	n/a
BACITRACIN	Bacitracin	n/a
BAQUILOPRIM	Baquiloprim	n/a
BETALACTAMS	Amoxicillin	Amoxycare LA&inj Amoxypen LA&inj Betamox LA&inj Bimoxyl LA Clamoxyl LA&Inj Clavamox LC Combiclav range Combimox Duphamox LA&Inj Nisinject Noroclav range Synuclav Synulox range Vetrimoxin LA
	Ampicillin	Amfipen LA Bovoclox DC & DC extra Kloxerate Gold DC Lactoclox IM Norobrittin Inj Sheptaclox DC

	Benzylpenicillin (Penicillin G)	Caremast Vet LC Crystapen Depocillin Duphapen & Strep Duphapen Inj Duphapen forte Multiject IM Multishield DC Nafpenzal DC Neopen inj Norocillin Inj & LA Pen & Strep Penacare Procapen IM Streptacare Tetra Delta Ubro Red DC Ubrostar DC Ultrapen LA
	Cefacetril	n/a
	Cefalonium	Cefshot DC Cepravin DC Kepravine DC
	Cefapirin	Mastiplan LC Metricure
	Cefazolin	n/a
	Cefoperazone	Pathocef Pathozone
	Cefquinome	Ceffect inj & LC Cefimam DC & LC Cefquinor LC Cephaguard DC Cobactan MC & Injs Qivitan inj
	Ceftiofur	Actionis Cefavex Cefenil Cefokel Ceftiocyl Ceftiosan Cemay Cevaxel RTU Curacef Duo Eficur Excenel Naxcel Readycef
	Cloxacillin	Bovaclox DC & DC extra Kloxerate Gold DC Lactoclox IM Noroclox DC & extra Orbenin DC,DC extra & LA

		Orbolan LC Sheptaclox DC
	Dicloxacillin	n/a
	Naficillin	Nafpenzal DC
	Oxacillin	n/a
	Penicillin V	n/a
CEFUROXIME	Cefuroxime	n/a
CEPHALEXIN	Cephalexin	Ceporex inj
DAPSONE	Dapsone	n/a
	Sulfaethoxypyridazine	n/a
	Sulphadiazine	Duofast IM Duphatrim IS Lactatrim MC Norodine 24 Tribrissen 48% Trimacare
	Sulphadimethoxine	n/a
	Sulphadoxine	Bimotrim co
	Sulphamerazine	n/a
	Sulphameter	n/a
	Sulphamethazine	n/a
	Sulphamethizole	n/a
	Sulphamethoxazole	n/a
	Sulphamethoxypyridazine	n/a
	Sulphamonomethoxine	n/a
	Sulphanitran	n/a
	Sulphapyridine	n/a
	Sulphaquinoxaline	n/a
	Sulphathiazole	n/a
	Sulphisomidine	n/a
ERYTHROMYCIN	Erythromycin	n/a
	Gamithromycin	Zactran
	Oleandomycin	n/a
	Tulathromycin	Draxxin
GENTAMICIN	Gentamicin	n/a
	Gentamycin C1	n/a
	Gentamycin C1a	n/a
	Gentamycin C2	n/a
HYGROMYCIN B	Hygromycin B	n/a
KANAMYCIN	Kanamycin A	Ubrolexin IM
LINCOMYCIN	Lincomycin	Albiotic im Lincocin inj Lincoject
NEOMYCIN	Framycetin	Framomycin Inj Ubro Red DC Ubro Yellow Ubrostar DC
	Neomycin	Albiotic Multiject IM Multishield DC Neopen inj

		Tetra Delta
	Paromomycin	Parofor powder
NOVOBIOCIN	Novobiocin	Tetra Delta
PIRLIMYCIN	Pirlimycin	Pirsue
POLYMIXINS	Colistin	n/a
	Polymixin B	n/a
QUINOLONES	Ciprofloxacin	n/a
	Danofloxacin	Advocin 180
	Difloxacin	n/a
	Enrofloxacin	Baytril Enroxil Enrocare Enrotron Fenoflox Norotril Quinoflox Unisol
	Flumequine	n/a
	Marbofloxacin	Actimarb Boflox Forcyl Marbiflox Marbim Marbocare Marbocyl Marbokem Marbonor marbosyva Marbox Quiflor Ubiflox
	Oxolinic Acid	n/a
RIFAXIMIN	Rifaximin	n/a
SPECTINOMYCIN	Spectinomycin	Spectam
SPIRAMYCIN	Neospiramycin	n/a
	Spiramycin	Spirovet inj
STREPTOMYCIN	Dihydrostreptomycin	Depomycin D Duphapen & strep Nafpenzal DC Pen & strep Procapen IM Streptacare inj Tetra Delta Ubro Yellow
	Streptomycin	Devomycin Devomycin D Multiject IM
SULFAGUANIDINE	Sulphaguanidine	n/a
SULPHAMETHAZINE	Sulphamerazine	n/a

	Sulphamethazine	n/a
	Sulphamoxol	n/a
SULPHAPYRIDINE	Sulphaethoxypyridazine	n/a
	Sulphamethoxypyridazine	n/a
	Sulphamonomethoxine	n/a
	Sulphamoxol	n/a
	Sulphanitran	n/a
	Sulphapyridine	n/a
	Sulphasalazine	n/a
	Sulphathiazole	n/a
SULPHONAMIDES	Sulfphabenzamide	n/a
	Sulphacetamide	n/a
	Sulphachlorpyridazine	n/a
	Sulphadiazine	Bimamix Duphatrim IS Duofast IM Lactatrim MC Tribrissen 48% Trimacare Norodine
	Sulphadimethoxine	n/a
	Sulphadoxine	Bimotrim Co
	Sulphaethoxypyridazine	n/a
	Sulphaisoxazole	n/a
	Sulphamerazine	n/a
	Sulphameter	n/a
	Sulphamethizole	n/a
	Sulphamethoxazole	n/a
	Sulphamethoxypyridazine	n/a
	Sulphamonomethoxine	n/a
	Sulphamoxol	n/a
	Sulphanitran	n/a
	Sulphaphenazole	n/a
	Sulphapyridine	n/a
	Sulphaquinoxaline	n/a
	Sulphathiazole	n/a
	Sulphatroxazole	n/a
	Sulphisomidine	n/a
TETRACYCLINES	Chlortetracycline	Alamycin spray Animedazon spray Cyclospray CTC spray
	Doxycycline	n/a
	Oxytetracycline	Alamycin Inj & LA Cyclosol LA Duphacycline Engemycin range Hexasol LA Oxycare Oxytetrin Terramycin

		Tetroxyvet Vetroxyl LA
	Tetracycline	Bovocycline pessaries
TOBRAMYCIN	Tobramycin	n/a
TRIMETHOPRIM	Trimethoprim	Bimotrim co Duphatrim IS Tribrissen 48% Norodine
TYLOSIN	Tilmicosin	Apotil Hymatil Micotil Tilmodil
	Tylosin A	Bilovet Tylan Tylucyl
VIRGINIAMYCIN	Virginiamycin M1	n/a

LIST OF ANTI-INFLAMMATORY PRODUCTS

Analyte	Compound	Product list
DEXAMETAHSONE	Betamethasone	n/a
	Dexamethasone	Colvasone Dexadresson Dexafort Dexaject Duphacort Rapidexon Voren
HYDROXYFLUNIXIN	Flunixin	Allevinix Cronyxin Finadyne Fluninixin Hexasol LA Meflosyl Norixin Pyroflam Resflor
MELOXICAM	Meloxicam	Animeloxan Contacera Emdocam Fendicam Inflacam Loxicam Meloxidyl Melovem Meloxidolar Metacam Novem Recocam Rheumocam

METAMIZOLE	Dipyrone	Buscopan Co Spasmium Co
METHYLPREDNISOLONE	Methylprednisolone	n/a
	Prednisolone	Clavamox LC Combiclav LC Mastiplan LC Multiject IM Noroclav LC Synulox LC Tetra Delta Ubro Yellow MC Ubro Red Ubrostar
PHENYLBUTAZONE	Oxyphenbutazone	n/a
	Phenylbutazone	Equipalazone Pro-Dynam
TOLFENAMIC ACID	Tolfenamic acid	Tolfine

LIST OF FLUKICIDE PRODUCTS

Analyte	Compound	Product list
NITROXYNIL	Nitroxynil	Trodax

national milk laboratories

For further information, please contact:

National Milk Laboratories
Tel 01902 749920
Email milk@nationalmilklabs.co.uk
www.nationalmilklabs.co.uk