Performance Enhancing Drugs of Abuse

A selective range of ELISA test kits for the detection of anabolic agents in a variety of matrices of animal origin
Anabolic agents stimulate the synthesis of proteins within cells. This results in the build-up of cellular tissue, especially skeletal muscle. In this way, anabolic agents can be used as growth promoters in livestock. The use of anabolic agents to increase animal body mass or enhance performance in competitive sports is forbidden in most countries. The use of these hormones is regulated by National Programs. Council Directive 96/22/EC is the bases for regulation in the EU. Anabolic compounds can be classified according to their structure, i.e. steroids or non-steroids.

The sex steroids include androgens, estrogens and progestagens. A group of non-anabolic steroids is formed by the corticosteroids. The β-agonists represent another group of compounds used as anabolic agents.

The use of anabolics for a long period affects human health resulting in liver, kidney, heart problems and diabetics. Some hormones have been reported to cause cancer.

In cooperation with the CER Groupe in Belgium, an expert centre in the area of hormones, EuroProxima BV offers a selective range of test kits for the detection of anabolic agents in a variety of matrices of animal origin. In this brochure the main characteristics are described. The individual product sheets can be downloaded for further details at: www.europroxima.com

Estrogens

Estrogens, the primary female sex hormones, play an important role in the regulation of the estrous cycle. These hormones participate in the regulation of many physiological processes of the reproductive system, including ovulation and embryo implantation.

Ethinylestradiol (5841ESTR)

Ethinylestradiol is a synthetic alkylated estradiol with a 17α-ethinyl substitution. It has high estrogenic potency when administered orally and is often used as the estrogenic component in oral contraceptives.

Diethylstilbestrol (5081DES)

Diethylstilbestrol (DES), together with dienestrol and hexestrol, belong to the group of anabolics known as stilbenes. Stilbenes are used to increase weight gain by improving feed conversion in livestock.

Zeranol (5081ZER)

Zeranol (α-zearalanol) is a xenobiotic anabolic agent with estrogenic growth promoting activities and is used legally in several countries. However, the EU banned the use of growth promoters in meat production since 1986.

Androgens

Androgen is the generic term for any natural or synthetic steroid hormone that stimulates or controls the development and maintenance of male characteristics by binding to androgen receptors. The group of androgens includes many synthetic molecules in addition to natural testosterone.

Methyltestosterone (5841MTES)

Methyltestosterone (17α-methyltestosterone) is used to treat men with a testosterone deficiency. It is a synthetic androgen used as anabolic agent to increase meat production and is also utilized illegally among bodybuilders.

19-Nortestosterone (5081NOR)

19-Nortestosterone (nandrolone) is also a synthetic produced androgenic steroid. In some cases, 19-nortestosterone is a naturally occurring compound, especially in male pigs and pregnant cows.

Stanozolol (5081STAN)

Stanozol is a synthetic anabolic steroid derived from dihydrotestosterone and is used as a veterinary medicine to improve muscle growth, red blood cell production, increase bone density and stimulate the appetite of debilitated or weakened animals. Stanozol is also used as a doping agent in horse racing.

Trenbolone (5081TREN)

Trenbolone is a xenobiotic anabolic compound with androgenic growth promoting properties which is prohibited for use in the EU.

Progestagens

Progestagens or gestagens are named for their role in preparing for and maintaining pregnancy. Moreover, they are present at other phases of the estrous and menstrual cycles. Progesterone, an endogenous hormone, is analyzed for early diagnosis of pregnancy.

Medroxyprogesterone Acetate (5131MPA)

Medroxyprogesterone acetate (MPA) is a synthetic derivative of progesterone and is called an acetylgestagen. MPA can be used as a growth promoter in meat production, both in cattle and pigs. The use of acetylgestagens as growth promoters leads to a faster growth of the animals and to an increase of feed conversion efficiency. Acetylgestagens are permitted as growth promoters in some countries, e.g. USA. However, within the EU they are banned.
Progesterone (5081PROG)

Progesterone is the major progestagen produced by the corpus luteum in all mammalian species. It plays a key physiological role in animal reproduction. Knowledge of progesterone levels can provide valuable information for reproductive management of dairy cattle. Milk progesterone monitoring offers an accurate and objective measurement of factors associated with postpartum ovarian activity.

Corticosteroids

Natural corticosteroids are steroid hormones that are produced in the adrenal cortex. They are involved in a wide range of physiologic systems. Synthetic corticosteroids are widely used in live-stock breeding. Unlike anabolic steroids, corticosteroids do not affect muscle strength. Livestock farmers use them because they favor water retention and meat tenderness.

Corticosteroid (5081COR)

Synthetic corticosteroids are widely used in live-stock breeding to treat inflammatory diseases. Although some corticosteroids are permitted for use as drugs, corticosteroids find application as growth promoters in meat production.

Triamcinolone (5081TRIA)

Triamcinolone acetonide is a synthetic glucocorticoid which is used as an anti-inflammatory drug. Corticosteroids such as dexamethasone and triamcinolone have growth and performance enhancing properties. Triamcinolone is banned from livestock farming as well as for doping purposes in sports.

β-agonists

β-Agonists are used in human healthcare for the treatment of pulmonary diseases such as asthma. In recent years, it has been established that a number of β-agonistic drugs have repartitioning effects in meat producing animals. Council Directive 96/22/EC prohibits the use of β-agonists in livestock farming in the EU. Nevertheless, there have been reported several incidences of the use of β-agonist drugs in sports as well as in agriculture.

Clenbuterol (5071BAGC)

Clenbuterol is the only authorized β-agonist for specific therapeutic use in the EU. An MRL of 0.1 ppb in muscle from cattle and horses and 0.05 ppb in cow milk has been established.

Ractopamine (5061RACT)

Ractopamine acts as a nutrient repartitioning agent in livestock by diverting nutrients from fat deposition to the production of muscle tissues. Ractopamine as a feed additive is authorized in the US and several other countries for growth promotion of fattening pigs and cattle. In the EU the use of ractopamine is forbidden.

β-Agonist (5061BAG)

The β-agonist ELISA is used for the quantitative analysis of a broad range of β-agonists. The kits have the same high sensitivity for clenbuterol and salbutamol. Extraction procedures for tissue, feed, milk, plasma, bile, faeces, choroid/retina, hair and urine samples are available.

β-Agonist Fast (5061BAGFc)

The β-agonist fast ELISA is used for the quantitative analysis of a wide range of β-agonists including salbutamol. In urine an LOD of 0.2 ppb is realized after a simple 1 : 5 dilution. Also for feed and tissue a simple and fast extraction procedure results in good sensitivity. The assay procedure takes only 60 minutes.

<table>
<thead>
<tr>
<th>Product code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5081DES</td>
<td>Diethylstilbestrol (DES)</td>
</tr>
<tr>
<td>5081ESTR</td>
<td>Ethynylestradiol</td>
</tr>
<tr>
<td>5081MTES</td>
<td>Methyltestosterone</td>
</tr>
<tr>
<td>5131MPA</td>
<td>MedroxyProgesterone Acetate</td>
</tr>
<tr>
<td>5081NOR</td>
<td>Nortestosterone</td>
</tr>
<tr>
<td>5081PROG</td>
<td>Progesterone</td>
</tr>
<tr>
<td>5081STAN</td>
<td>Stanozolol</td>
</tr>
<tr>
<td>5081TREN</td>
<td>Trenbolone</td>
</tr>
<tr>
<td>5081ZER</td>
<td>Zeranol</td>
</tr>
<tr>
<td>5081COR</td>
<td>Corticosteroid</td>
</tr>
<tr>
<td>5081TRIA</td>
<td>Triamcinolone</td>
</tr>
<tr>
<td>5061BAG</td>
<td>Beta-Agonist</td>
</tr>
<tr>
<td>5061BAGFc</td>
<td>Beta-Agonist Fast</td>
</tr>
<tr>
<td>5071BAGC</td>
<td>Clenbuterol</td>
</tr>
<tr>
<td>5061RACT</td>
<td>Ractopamine</td>
</tr>
</tbody>
</table>
Contaminants and Residues

Beta-agonists
- Betaxolol
- Betaxolol Fast
- Clenbuterol
- Ractopamine

Fungicide
- Malachite Green

Anthelmintics
- Ivermectin
- Moxidectin

Anabolic steroids
- Diethylstilbestrol (DES)
- Ethynyl estradiol
- Medroxyprogesterone Acetate
- Nortestosterone
- Progesterone
- Stanozolol
- Trenbolone
- Zeranol

Corticosteroids
- Corticosteroid
- Triamcinolone

Tranquilizers
- Azaperone-Azaperol
- Carazolol
- Promazine (Generic)

Antimicrobial Growth Promoters
- Bacitracin
- Tylosin
- Virginiamycin
- Erythromycin

Shellfish Toxins
- Domoic Acid
- Okadaic Acid
- Saxitoxin

Coccidiostats
- Diclazuril
- Ionophore

Mycotoxins
- Aflatoxin B1
- Aflatoxin B1 sensitive
- Aflatoxin M1 sensitive
- Aflatoxin M1 fast
- Aflatoxin Total
- Deoxynivalenol (DON)
- Fumonisin
- Ochratoxin A
- T-2 toxin
- Zearalenone

Mycotoxins Flow Through Rapid Tests
- Aflatoxin B1 FTR test
- Aflatoxin total FTR test
- Deoxynivalenol (DON) Gold FTR test
- Ochratoxin A FTR test
- Ochratoxin A in wine FTR test
- Zearalenone Gold FTR test

Bisphenol A
- Bisphenol A (BPA)

Antibiotics

Amphenicoles
- Chloramphenicol
- Chloramphenicol Fast
- Florfenicol

Aminoglycosides
- Gentamicin
- Neomycin
- Streptomycin

Sulfonamides
- Dapsone
- Multi-screening Sulfonamides
- Multi-screening Sulfonamides II
- Sulfamethazine

Nitroimidazoles
- Dimetridazole

Tetracyclines
- Tetracycline
- Oxytetracycline

Fluoroquinolones
- Enrofloxacin
- Flumequine
- Fluoroquinolones (Generic)
- Fluoroquinolones II

Nitrofurans
- AHD
- AMOZ
- AOZ
- SEM

Beta-Lactams
- Penicillin

Meat speciation kits
- RAW meat species Kits
- COOKED meat species Kits
- MELISA-TEK® Meat species Kits

Milk proteins
- Bovine Lactoferrin (bLF)
- Milk Fraud/Bovine
- Milk Fraud/Whey

Immunoaffinity chromatography
- Anabolic steroids
- Beta-Agonists
- Corticosteroids
- Antibiotics

Celiac disease
- Gluten-Tec®