

# Examination of Residues in Live Animals and Animals Products

– Results of the Control 2003

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**LIVSMEDELS  
VERKET**

NATIONAL FOOD  
ADMINISTRATION, Sweden

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# Introduction

This is the annual report produced by the National Food Administration with results of the Swedish national programme for residues in live animals and animal products. It includes also a commentary covering sampling, analytical methods, laboratories, legislation, toxicology and follow-up investigations which are undertaken on “positive samples”, an overview of the plan for 2003 and research and development work.

Consumers expect that foods of animal origin do not contain residues that can involve any risk to their health. However, animals that have a disease need to be treated with medicines to avoid unnecessary suffering. This is a balance between health and welfare of the animals. The setting of Maximum Residue Limits (MRLs) and withdrawal periods for the use of veterinary medicines play a major role to avoid unacceptable residues in food and in consumers protection. Together with an effective control programme, MRLs and withdrawal periods are a powerful safeguard for consumers.

The national programme is based on Council Directive 96/23/EC and covers for Sweden around 15 000 samples from bovine, pigs, lambs, horses, eggs, milk, farmed and wild game, poultry and honey. The control of antibiotics has a long tradition in Sweden. If bacteria become resistant, the antibiotics become ineffective. Because of the risk for increasing antibiotic-resistant bacteria in humans and in domestic food-producing animals it is essential to have an effective control of antibiotics in animal products. The programme covers a higher rate of antibiotic samples than stipulated in the control directive.

The report shows that all analysed samples were free of hormones and other prohibited substances and more than 99 % of all samples were free of detectable veterinary residues. All samples analysed for environmental contaminants contained no detectable levels or low levels of residues that are unlikely to cause a health risk to consumers. The programme continues to show that residues occur in very few samples and that the health risk to consumers is minimal.

Sweden had also a random programme for control of residues in animal products from third countries. The 2003 third country programme for residues included 137 samples tested with chemical methods on poultry and shrimps from the main import countries. The sampling was done at the border inspection post. Detectable levels of sulphathiazol not allowed to use in honey production was found in one honey sample from Romania. Cloramphenicol, a prohibited substance within EU, was found in one consignment with crayfish from China. The consignment with crayfish was destructed. The findings was reported through EU:s Rapid Alert System to warn other Member States.

# Glossary

## **ACCEPTABLE DAILY INTAKE (ADI)**

An ADI is an estimate of the amount of a veterinary medicine, normally expressed on a body weight basis that can be ingested daily over a lifetime in the practical certainty, on basis of all known facts, that no harm will result.

## **AFLATOXINS**

Aflatoxins are toxic metabolites produced by many strains of *Aspergillus flavus* (a fungus), growing on many vegetables and on feed.

## **ANTHELMINTICS**

Anthelmintics kill and control internal parasites such as liver fluke, tapeworms and roundworms and are used to treat disease caused by parasitic worm infestations

## **ANTIMICROBIALS**

Antimicrobials (including antibiotics) are substances that kill or suppress the growth of micro organisms such as bacteria. These substances are used to treat bacterial infections such as respiratory conditions, enteritis and mastitis.

## **β-AGONISTS**

A group of veterinary medicines that act, inter alia, on the nervous system. Clenbuterol, a β-agonist, is allowed for treatment of horses and as an aid to calving under strict conditions. Treatment of animals for growth promoting purposes is illegal. It has been reported, from other countries, that residues of β-agonists in meat consumed by humans have caused increased pulse rate and palpitation.

## **COCCIDIOSTATS**

Products which control coccidiosis, a disease which can cause diarrhoea and dysentery especially in the poultry industry. Coccidiostats are given prophylactic to poultry to prevent the disease from developing.

## **CVMP**

Committee for Veterinary Medical Products. The Committee is responsible for recommending MRLs in the European Union.

**EMEA**

European Agency for the Evaluation of Medical Products

**HEAVY METALS**

Metals with a moderate to a high atomic weight. Heavy metals, which include lead and cadmium, are found in environment and if absorbed over a long period of time may accumulate in animal tissue, especially kidney. They are generally present in low concentrations in food. If humans are exposed to moderate or high level of cadmium over a long time the kidney function will deteriorate.

**HORMONES**

Hormones include both naturally occurring and synthetic substances. The use of all hormones to increase growth rate in food producing animals is banned. Natural hormones include testosterone and oestradiol. Synthetic hormones include stilbenes, gestagens and thyrostatics.

**LIMIT OF DETECTION (LOD)**

The smallest amount of a substance that shows that the substance is present.

**LIMIT OF QUANTIFICATION (LOQ)**

The smallest analyte concentration for which the method has been validated with specified accuracy and precision.

**MATRIX**

Sample, for example liver or muscle, analysed for presence of the analyte.

**METABOLITE**

Any substance entering the body is usually converted into other chemicals, which are known as metabolites. The change occurs as part of the metabolism.

**MRL**

Maximum Residue Limit: the maximum concentration of residue from a substance that is legally permitted or recognised as acceptable in or on a food.

(See page 7)

**NFA**

National Food Administration.

**NRL**

National Reference Laboratory: NFA is the National Reference Laboratory for residues in live animals and animal products according to Commission Decision 98/536/EC.

**PCBs**

Polychlorinated biphenyl's (PCBs), were used in industry but was banned in Sweden and in many other countries in 1970's. PCBs are found in low concentrations in the environment and in food. Exposed to very high levels over a long time, PCBs have cancerogenic and teratogenic effects.

**“POSITIVE”**

A “positive” sample is a sample which after confirmatory analysis shows the presence of an unauthorised substance or a concentration of an authorised substance above MRL or action level. The expression “positive” samples are not used for environmental substances and natural hormones unless they exceed abnormal levels or above MRL.

**RESIDUE**

The portion of a substance present in tissues, body fluids, products or excreta from a treatment of the animal or caused by pollution of the environment.

**SBA**

The Swedish Board of Agriculture is the Government's expert authority in the field of agricultural policy and the authority responsible for the sectors agriculture, horticulture and reindeer husbandry. Its responsibility therefore includes monitoring, analysing and reporting to the Government on developments in these areas and implementing policy decisions within its designated field of activities.

**WITHDRAWAL PERIOD**

The withdrawal period is the time following the last administration of a drug to the time when the concentrations of residues have deleted below the established MRLs. During the withdrawal period an animal or its products should not be used as food.

# Results

## Introduction

In this report, the results are divided into three groups: prohibited substances, veterinary medicines and environmental substances.

Substances such as hormones for growth promotion or prohibited substances are not allowed to use in treatment of food producing animals or in animal products. These substances are analysed with very sensitive methods to confirm misuse. The marker residue in a veterinary medicine has got an MRL. What are MRLs and how are they set? MRL stands for Maximum Residue Limit and is the maximum concentration of the marker residue in an animal product that is legally permitted according to EU or other international regulation. The MRL is based on the ADI. ADI is an estimate of the amount of a veterinary medicine that can be ingested daily over a life time without causing any harm. A company that wants to introduce a new product on the market must provide the official authorities with toxicological data and residue data from studies showing that the active substance is of minimal risk to humans.

The National Food Administration is responsible for setting the withdrawal periods for veterinary drugs in Sweden and the withdrawal periods are based on the MRLs.

The legal use of veterinary drugs in food producing animals is regulated by the EU-regulation 2377/90, also called the MRL-regulation. These MRL-values are granted by the Committee for Veterinary Medicinal Products (CVMP) of EMEA (The European Agency for the Evaluation of Medicinal Products). Thus, all veterinary drugs are judged and classified in four different Annexes (substances evaluated with final MRL-values; substances not subjected to MRL-values (no need for an MRL-value); substances with provisional MRL-values; and substances not permitted to use in food producing animals). The horse is considered as a food-producing animal in all EU-countries. In Sweden, a horse can be treated with non-approved drugs by introducing signed declarations guaranteeing that the horse will never enter the food chain.

A proper use of drugs and respect for the withdrawal periods should render the therapeutic use of drugs safe for the consumers.

Environment pollutants are often ubiquitous and are generally present in low concentration in foods. In this report, all results of residues from environmental substances are presented in Appendix 4.

In 2003, very few samples of food were found to contain residues above MRL. No banned substances were found and the levels of environmental residues were foreseen and in most cases very low.

The control programmes showed very few cases of misuse of veterinary medicines. The carcasses found with residues above MRL were condemned and did not reached the consumers.

# Summary and comments

The control programme 2003 contained 14 900 samples. Out of these samples, 12 000 samples were examined for veterinary drugs, 2 000 for anabolic substances and prohibited substances and 1000 for environmental contaminants.

## **Bovine, pig, sheep and horse**

### **Anabolic and prohibited substances**

2 192 samples were tested. All samples from live animals and red meat were free from detectable residues of anabolic or prohibited substances.

### *Veterinary medicines*

10 116 samples were tested. Seven samples (0.1 %) contained residues above MRL:

Three bovine kidney samples contained residues of penicillins above MRL.

Two bovine kidney sample contained residues of tetracyclines above MRL.

One pig kidney samples contained residues of penicillins above MRL.

One horse kidney samples contained residues of penicillins above MRL.

Carcasses that contained residues above MRL were condemned.

### *Contaminants*

274 samples were tested. The levels of contaminants were foreseen and were generally not detectable or very low.

## **Farmed and wild game**

### *Anabolic and prohibited substances*

18 reindeer and 5 ostrich samples were tested. All samples from reindeer and ostrich were free from detectable residues of anabolic or prohibited substances.

### ***Veterinary medicines***

38 reindeer and 16 ostrich samples were tested. All samples were free from detectable residues of veterinary medicines.

### ***Contaminants***

17 sample from reindeer and 67 kidney and liver sample from elk were tested. The levels of organochlorine compounds were low. Heavy metals accumulate in kidney throughout life as a result of environmental contamination. The levels of cadmium were higher in elder animals than in younger ones. A frequent consumption of kidney from elk and reindeer is not recommended.

## **Poultry**

### ***Anabolic and prohibited substances***

247 samples were tested. All samples from poultry were free from detectable residues of anabolic or prohibited substances.

### ***Veterinary medicines***

239 samples were tested. All samples were free from detectable residues of veterinary medicines.

### ***Contaminants***

81 samples were tested. All samples contained no detectable levels or very low levels of contaminants.

## **Milk**

### ***Prohibited and unauthorised substances***

213 samples were tested. All samples were free of detectable residues.

### ***Veterinary medicines***

1 428 samples were tested for veterinary medicines. No samples contained penicillin-G or tetracyclines above MRL and no detectable levels of fenylbutazon were found. Each sample is taken from a milk tanker and represents milk from 5-10 farms or directly on the farm. All samples can be traced back to the farm.

### ***Contaminants***

45 milk samples were tested. All samples contained no detectable levels or very low levels of contaminants.

## **Egg**

### ***Prohibited substances***

140 samples were tested. The same samples were also tested for veterinary medicines.

All samples were free of detectable residues.

### ***Veterinary medicines***

140 samples were tested. (same samples were tested for several substances).

A total of 315 analyses were tested for veterinary medicines in egg.

All 140 samples were tested for coccidiostats and very low levels of narasin were found in 35 samples.

### ***Narasin***

In the end of 1999 the use of a newly developed LC-MS-MS method for the determination of narasin in egg was implemented. The limit of detection is 0.03 ng/g and the limit of quantification 0.5 ng/g, consequently, it is a very sensitive method. In 1999 with the new method, narasin was found in 50 % of the samples analysed. The levels were very low and make no health risk to consumer, but since no coccidiostats are allowed to laying hens the matter was investigated between the Swedish Board of Agriculture and the feed industry. The reason was found

to be cross-contamination of broiler feed by the feed intended for laying hens. During 2003 samples have been taken for analysis during autumn. A summary of the results is shown in table on page 13.

The results indicate that the feed industry still have problems with crosscontamination but the number of samples with levels of narasin has decreased between 2002 and 2003. The highest level of narasin found has also decreased over the last two years. The only solution to totally solve the problem is to consider to split the production of medicated feed from non-medicated feed which will be very costly for the industry.

### ***Contaminants***

25 samples were tested. All samples contained no detectable levels or very low levels of contaminants.

## Narasin in eggs, summary of results 1999 – 2003

	1999	2000	2001	2002	2003
Narasin not detected or not confirmed	12 (50 %)	70 (48 %)	69 (49 %)	35 (25 %)	105 (75 %)
Narasin detected, levels below LOQ (0.5 µg/kg)	2 (8 %)	41 (28 %)	39 (28 %)	41 (30 %)	28 (20 %)
Narasin detected, levels at or above LOQ (0.5 µg/kg)	10 (42 %)	35 (24 %)	32 (23 %)	63 (45 %)	7 (5 %)
Highest value found (µg/kg)	10.6	10.8	10.7	8.5	3.4
<b>Total</b>	<b>24</b>	<b>146</b>	<b>140</b>	<b>139</b>	<b>140</b>

## Honey

### *Prohibited substances*

10 samples were tested. All samples from honey were free from detectable residues of anabolic or prohibited substances.

### *Veterinary medicines*

50 samples were tested. All samples were free from detectable residues of veterinary medicines.

### *Contaminants*

40 samples were tested. All samples contained no detectable levels of contaminants.

## **Farmed fish**

### ***Anabolic and prohibited substances***

30 samples were tested. All samples from farmed fish were free from detectable residues of anabolic or prohibited substances.

### ***Veterinary medicines***

30 samples were tested. All samples were free from detectable residues of veterinary medicines.

### ***Contaminants***

12 samples were tested for malachitgreen. Malachitgreen is a chemical substance that is not allowed to use and is not registrated as veterinary drug. No maximum limit (MRL) is established.

25 other samples were tested for other contaminants such as heavy metals, organochlorin compounds and mycotoxins.

The samples contained no detectable levels or very low levels of contaminants.

## **Animal products from Third Countries**

### ***Anabolic and prohibited substances and veterinary medicines***

137 samples of honey, shrimps and poultry samples from main import countries were tested for several different substances. (See Appendix 3 page 57)

The samples contained no detectable levels of veterinary medicines or anabolic or prohibited substances except for two samples, one honey sample from Romania and one crayfish sample from China . The honey sample contained sulphathiazole which is not allowed to use on bees according to EU legislation. The consignment was traced on the Swedish market but the honey was already sold and consumed. The crayfish sample contained detectable levels of the prohibited substance chloramphenicol. The consignment was destructed and the product did not reach the Swedish market.

# Residue Control Programme

## History

The control of veterinary drugs in Sweden started in 1966 with control of antibiotics at the slaughterhouses. In the beginning of 1980s, because partly of demands from importing countries, the control of red meat was expanded to certain synthetic hormones and other drugs. The first directive concerning control of residues for all member states in the European Union was introduced in 1986 and covered live animals and meat from bovine, pigs and lambs. This directive also effected countries that exported meat to the European Union.

The current control directive in force for residues is Council Directive 96/23/EC. This directive covers both live animals and animal products. The control of farmed fish, wild and farmed game and milk started 1998 and control of eggs and honey 1999.

## What is it?

The Swedish residue control programme for 2003 was based on Council Directive 96/23/EC. All Member States have to carry out the programme laid down in the directive annually. The programme covers red meat, poultry, farmed fish, milk, eggs, wild and farmed game and honey.

## Who decides how many samples to be tested?

The minimum number of samples all Member States are obliged to analyse is set in Council Directive 96/23/EC. The control of antibiotics in Sweden in red meat is prescribed in Swedish legislation (SLV FS 1996:32). The number of antibiotic samples to test for meat is higher than in Council Directive 96/23/EC. The Swedish Control plan includes the national legislation as well as the Council Directive.

The number of samples in Council Directive 96/23/EC is based on production data, see Appendix 1, and on fixed proportions of animals and animal products. The production figures in Sweden were achieved from The National Food Administration and the Swedish Board of Agriculture.

### **Who decides what to test the samples for?**

All Member States are obliged to look for certain groups of substances defined in Council Directive 96/23/EC. For the Swedish control plan, the National Food Administration consults annually veterinarians and other experts from different institutions and authorities to discuss the choice of individual substances within each group. The experts discuss what substances are most important to control from a risk perspective and take in consideration both toxicological data and how much the different substances are used. The national plan is then decided by NFA and presented for a Commission Working Group and adopted by the EU's Standing Veterinary Committee.

### **Sampling**

Samples were collected in accordance with the Council decision 98/179/EC. The decision is implemented into Swedish legislation in NFA Ordinance on sampling regarding control of residues in animal and animal products SLV FS 1998:8. The aim of sampling is to find out use of illegal treatment of substances with anabolic effects or prohibited substances and reveal if the maximum residue limits for veterinary drugs and contaminants have been exceeded. The inspectors were requested to take samples from animal and animal products, according to a sampling programme for residues and target the sampling against animals suspected to have been treated with veterinary drugs or anabolic substances.

### **Quality Assurance Measures**

A sampling schedule, sampling material and written instructions were sent to the inspectors and appointed staff by NFA. The samples were sealed before they were sent in to the laboratory.

## **Who collects the samples?**

### ***Meat and Poultry***

Veterinary meat inspectors from the meat inspection service, NFA, collected the samples from carcasses at slaughterhouses. Staff appointed by NFA collected samples from live animals at 117 cattle farms, 19 poultry farms and 41 pig farms.

### ***Farmed Fish***

Staff from the health fish programme supported by the Swedish Board of Agriculture for farmed fish was appointed by NFA and collected samples at fish farms.

### ***Egg***

Staff appointed by NFA collected eggs. Eggs were taken in egg packing houses.

### ***Milk***

Staff appointed by NFA collected milk. Milk was collected from milk tankers containing milk from 5-10 farms or directly on the farm in the farm milk tank.

### ***Honey***

Honey samples were taken by plant inspectors from the Board of Agriculture.

### **How are samples analysed?**

With a large number of samples to analyse, fast and effective methods are needed. First, all samples are analysed with different screening methods. The screening methods are rapid and include chemical, microbiological and immunochemical assays. They are relatively low-cost with a high sample throughput, and are optimised to minimise the number of samples falsely reported as negatives. Any “positive” sample found at this stage would be subjected to confirmatory analysis. Confirmation methods are methods by which the identity of the analyte and its concentration are determined. These methods include chemical methods such as high performance liquid chromatography (HPLC), gas chromatography (GC) and mass spectrometry (MS). They are relatively high-cost methods and are optimised for both sensitivity and selectivity.

### **Who does the analyses and with what methods?**

Some of the screening analyses are done at contracted laboratories and some are done at laboratories at The National Food Administration. (Appendix 3). All methods used are listed in Appendix 2. The laboratories are officially accredited for a number of analytical methods by the Swedish accreditation authority SWEDAC.

### **What action is taken on “positive” samples?**

Follow-up action is taken by NFA on every sample that contains residues of authorised substances above the MRL. Actions on samples with prohibited substances such as hormones are taken on basis of results confirmed above the detection limit for the method.

When concentrations of residues are found above the MRL for antibiotics in red meat, the county veterinarian, according to Swedish legislation, *SLV FS 1996*, does an investigation and reports to NFA. The veterinary surgeon and the farmer are contacted and the county veterinarian tries to establish the source of the residue. All carcasses at slaughterhouses for red meat are hold until results from

the antibiotic analyses are given. If a carcass has residues above MRL, the carcass is discarded.

The Swedish legislation prohibits all use of growth promoting substances, including antibiotics and antibiotic like substances. A total ban of these substances is defined in Council Directive 96/22/EC through legislation from SBA (SFS 1988:539; § 28). If banned substances are found, the case will be handed over to the SBA. An investigation will be done at the farm and further samples will be taken. Prosecution actions would be sought.

A discussion between NFA and SBA is in progress to further strengthen the legislation against farmers using banned substances or in cases when concentrations of authorised substances are found above MRL.

### **To whom are results reported?**

Results from screening laboratories are reported each month to NFA. If a laboratory finds a “positive sample”, the sample is immediately sent to NFA for confirmation. The confirmed result for antibiotics will be sent to the meat inspector officer at the slaughterhouse within three days. The results for red meat and poultry are reported to individual slaughterhouses once a year. Detailed results are reported annually to the European Commission.

### **Who pays?**

Industry pays most of the cost for the Swedish residue control programme. The Council Directive 96/43/EC obliges the Member States to charge the industry for the costs of the residue control programme, which in Sweden in 2003 amounted to 8.5 million SEK. The charges for each sector are defined in the directive, implemented in Swedish legislation and paid directly to NFA. The bee keeping industry is very small and has small production units. NFA will continue to pay for costs of the honey control programme. The charges according to Council Directive 96/43 from the farm fish industry are very low and the Swedish farmed fish industries contain many small farms and have a small production. The administration expenses would have been higher than the fee itself. NFA has decided to continue to pay the costs for the fish control programme.

**What are the charges?**

Slaughterhouses, raw milk collection establishments and egg packing houses are charged for the 2002 control programme according to Council Directive 96/43/EC as follows:

Bovine 1.35 EUR/11.73 SEK per tonne

Pigs 1.35 EUR/11.73 SEK per tonne

Sheep 1.35 EUR/11.73 SEK per tonne

Poultry 1.35 EUR/11.73 SEK per tonne

Game 1.35 EUR/11.73 SEK per tonne

Milks 0.02 EUR/0.17 SEK per tonne

Eggs fixed fee depending on the size of the establishment plus 6 SEK per tonne

Honey no fee

Fish no fee

# Control programme for 2004

The residue control programme will continue. The plan for year 2004 is in accordance with Council Directive 96/23/EC and Council Decision 97/747/EC. The plan is based on the production of animals and animal products (Appendix 1). The control of antibiotics in Sweden in red meat is prescribed in Swedish legislation (SLV FS 1996:32). 0.2 % of all slaughtered horses, bovine, pigs and sheep will be tested for antibiotics which is more tests than prescribed in EU regulations. The samples will be collected throughout the year but some of the samples will be collected seasonally depending on when the substance is mostly used. If samples are collected a certain month the current year, they will be collected another month next year.

<b>Control programme</b>	<b>Year 2003 No of Samples</b>	<b>Year 2004 No of Samples</b>
Red meat	12 000	11 200
Farmed game	114	100
Wild game	100	100
Poultry	561	515
Milk	1 545	1545
Eggs	200	200
Fish	100	130
Honey	100	105
<b>Total 000</b>	<b>14 720</b>	<b>13 895</b>

The programme is based on production data for the previous year. The production for red meat is decreasing and that is the reason for less sample in 2004. Some of the samples will be tested for more than one substance, for example, in eggs and milk.

# Research and Development

## Background

Antibacterial substances have been analysed in connection with the slaughter since 1978. The microbiological method is still in use at the slaughterhouses. However, the method is not specific and has to be supplemented with a method for con-firmation of the positive results. From the beginning, this was achieved with a chemical inactivation method. Analysis of veterinary drugs has been carried out at the National Food Administration since the beginning of the eighties. At that time, we analysed antibiotics in fish and coccidiostats in chicken with microbiological and TLC techniques. The synthetic hormone diethylstilbestrol (DES) was analysed by the use of TLC and immunochemical methods.

Later on, the use of HPLC and GC were introduced as analytical techniques for veterinary drugs for instance for ivermectin, levamisole, chloramphenicol and clopidol.

The residue control of veterinary drugs increased rapidly in the middle of the eighties on account of demands from USDA on further analysis of specific substances in meat which was exported to the USA. The export of meat to the EEC was exposed to a similar control and included the synthetic hormones zeranol, trenbolone and stilbenes, as well as thyreostatics.

The control of veterinary residues was further increased during the nineties, particularly in connection with the Swedish membership of the European Communities. At that time analytical techniques as ELISA and GC-MS had also been introduced and later on LC-MS/MS.

Today, the Swedish control plan is based on directive 96/23/EC. The analytical methods used in the control programme cover about sixty compounds from all of the substance groups in the directive.

## Method development 2003

During 2003, the method development programme at the National Food Administration has still been focused on the use of LC-MS/MS for analysis of veterinary drug residues. Besides this, we still set up new screening methods. Three screening method have been developed and validated, one for beta-agonists in liver with biosensor-technique, and two methods using a dipstick test based on receptor binding (Tetrasensor), for tetracyclines in honey and egg, respectively.

An LC-MS/MS method for the analysis of CAP in honey has been developed and validated. Besides this, three confirmation methods using LC-MS/MS have

been developed and validated, for trenbolone in urine, for oxytetracycline in milk, and for oxytetracycline and sulfathiazole in honey.

### **EU-Funded Research**

Two EU-funded research projects have been finished during 2003, the project “Synthetic Glucocorticoids” as well as the “Poultry-Check Project”.

### **Plans for 2004**

The method development will continue by development of a method for the non steroid anti-inflammatory drugs (NSAIDS), acetylsalicylic acid in milk with LC-MS/MS. Other priority projects are to set up and validate analytical methods using LC-MS/MS for several veterinary drugs e.g. tetracyclines in egg, thyreostatics in urine and serum, corticosteroids in liver, streptomycin in honey, as well as  $\beta$ -boldenon in urine. NFA will also develop and validate confirmation methods using LC-MS/MS for enrofloxacin, danofloxacin and ciprofloxacin in muscle, and nortestosteron in chicken liver.

Finally, NFA are working with revalidation of our older methods for forbidden substances in order to follow the EU-directive (2002/657).

## Appendix 1

### NUMBER OF ANIMALS SLAUGHTERED AND PRODUCTION FIGURES OF CERTAIN ANIMAL PRODUCTS

Period 2002 – 2003

COUNTRY: SWEDEN

CATEGORIES	Total number of slaughtered animals (approved carcasses) in the country	
	2002	2003
Sheep	197 000	191 800
Horses	5 400	5 300
Bovine animals	506 600	485 300
Porcine animals	3 282 200	3 304 200
Deer	2 797	2174
Reindeer	58 172 (1629 tonnes)	55144 (1544 tonnes)
<b>Production 2002-2003</b>		
Farmed fish	9 000 tonnes	8 116 tonnes
Milk	3 226 000 tonnes	3 206 000 tonnes
Broilers	101 565 tonnes	98 099 tonnes
Turkeys	4 254 tonnes	4641 tonnes
Hens and Broiler parent	4 764 tonnes	3 764 tonnes
Geese	95 tonnes	110 tonnes
Ducks	179 tonnes	81 tonnes
Eggs	94 000 tonnes	92 300 tonnes
Honey	3000 tonnes (2001)	3750 tonnes (2002)

Source: Statistics from the National Food Administration and the Swedish Board of Agriculture

## Appendix 2

### METHODS FOR ANALYSES OF RESIDUES IN LIVE ANIMALS AND ANIMAL PRODUCTS FOR THE YEAR 2003

Group of substances	Compounds	Laboratory method	Matrix	Detection Limit	Maximum Residue Limit (MRL)
A 1 Stilbenes	Diethylstilbestrol Hexoestrol Dienoestrol	GC-MS	Urine Liver Muscle	2 µg/kg DES 2 µg/kg hexoestrol 2 µg/kg dienoestrol	Prohibited substances
A 2 Thyreostatics	Methylthiouracil Propylthiouracil Thiamazol	LC- MS-MS	Urine	25 µg/kg 25 µg/kg 50 µg/kg	Prohibited substances
A 3 Substance with androgenic action	Trenbolone	ELISA LC-MS MS	Urine	1 µg/kg	Prohibited substance
A 3 Natural hormones	Testosteron Estradiol 17-β	DELFI GC-MS	Serum	500 ng/kg 13 ng/kg	Only for medical purposes See Council Regulation 2377/90
A 4 Substance with oestrogenic action	Zeranol	GC-MS	Urine Liver Muscle	2 µg/kg	Prohibited substance
A 5 Beta-agonists	Clenbuterol Salbutamol Mabuterol Brombuterol	ELISA GC-MS Biosensor	Liver Urine	0.5-1 µg/kg 0.5-1 µg/kg 0.5-1 µg/kg 0.5-1 µg/kg	Only for medical purposes See Council Regulation 2377/90
A 6 Chloramphenicol	Chloramphenicol	ELISA LC MS-MS	Urine Muscle Egg, Milk Honey	0.5 µg/kg in urine 0.3 µg/kg all others matrixes	Prohibited substance
A 6 Nitrofurans	Metabolites of Furazolidone Furaltadone Nitrofurantoin Nitrofurazone	LC MS-MS	Muscle	0.5-1.0 µg/kg	Prohibited substances
B 1 Antibacterial substances	Microbiological test for antibacterial substances	Bacillus subtilis test	Kidney	Inhibition zone 2 mm Screening test	To be confirmed, see methods below
B 1	Penicillin-G	Beta-Star HPLC	Milk	2-4 µg/kg 1 µg/kg	4 µg/kg milk
B 1	Penicillin-G	LC-MS MS	Kidney	15 µg/kg	50 µg/kg
B 1	Oxytetracycline Tetracyclines Oxytetracycline Chlortetracycline	CHARM II HPLC LC-MS MS	Milk Egg Kidney	100 µg/kg 50 µg/kg (LOQ) 28 µg/kg OTC 7 µg/kg CTC	100 µg/kg 200 µg/kg 600 µg/kg 600 µg/kg
	Oxytetracycline Tetracyclines	LC-MS MS HPLC	Honey Muscle	4 µg/kg OTC 100-200 µg/kg (LOQ)	Not established 100 µg/kg
B 1	Sulphonamides	TLC HPLC- DAD	Kidney Muscle Egg	50 µg/kg 25 µg/kg	100 µg/kg for tissues. No MRL for eggs is established
	Sulphathiazol	LC-MS MS	Honey	8 µg/kg	Not established
B1	Sulphonamides	LC-MS MS	Kidney	0.4-1.5 µg/kg	100 µg/kg

Methods for analyses (continue...)

Group of substances	Compounds	Lab. method	Matrix	Detection limit	Maximum Residue Limit (MRL)
B1 Quinolones	Enrofloxacin Ciprofloxacin Danofloxacin	HPLC	Muscle	10 µg/kg 10 µg/kg 1 µg/kg	100 µg/kg 100 µg/kg 100 µg/kg
B 1	Oxolinic acid Flumequin	HPLC	Muscle	10 µg/kg 20 µg/kg	100 µg/kg 600 µg/kg
B 2a Anthelmintics	Ivermectin Doramectin Moxidectin	HPLC	Liver	4 µg/kg	Different See Council Regulation 2377/90
B 2a	Bensimidazoles	HPLC	Muscle Egg	9-22 µg/kg 20-30 µg/kg	Flubendazol 50 µg/kg in muscle, 400 µg/kg in eggs Others not established
B 2b Coccidiostats	Narasin Salinomycin Monensin	LC-MS- MS	Egg Liver Muscle	Narasin:0.03 µg/kg egg, Monensin, Salinomycin 0.25 µg/kg liver 0.1 µg/kg muscle	Not established
B 2 c Carbamates and pyrethroides	Carbaryl Pyrethrins Cyfluthrin Cypermethrin Deltamethrin Esfenvalerate Fenpropathrin tau-Fluvalinate Cyhalothrin-lambda Permethrin Deltamethrin Cyfluthrin Cypermethrin Permethrin	GC-FPD         GC-ECD GC-ITD	Honey          Muscle	0.1 mg/kg 0.2 mg/kg 0.05 mg/kg 0.2 mg/kg 0.05 mg/kg 0.05 mg/kg 0.1 mg/kg 0.2 mg/kg 0.05 mg/kg 0.2 mg/kg 0.01 mg/kg 0.01 mg/kg 0.02 mg/kg 0.01 mg/kg	MRL for each compound according to 2377/90 and according to directive 86/363 /EG
B 2 d Sedatives	Acepromazin	ELISA GC-MS	Urine	0.1 µg/kg 1 µg/kg	Not established
B 2 e Non-steroidal anti-inflammatory substances	Fenylbutazon	GC-MS	Serum Milk	10 µg/kg serum 25 µg/kg milk	Not established
B 2 f Others	Dexametazon Betametazon Flumetazon	ELISA LC-MS	Urine	2 µg/kg urine	Prohibited as a growth promoter MRL for medical purposes 2377/90 in tissues

Methods for analyses (continue...)

Group of substances	Compounds	Lab. method	Matrix	Detection limit	Maximum Residue Limit (MRL)
B 3 a Contaminants: Chlorinated hydrocarbons	HCB HCH-alfa Lindane	GC-ECD	Fat	<b>LOQ</b>	<b>Bovine, porcine, ovine farmed game, poultry</b> 0.2 mg/kg 0.2 mg/kg 0.02 mg/kg 0.7 mg/kg (lambs) 0.2 mg/kg 1.0 mg/kg 0.1 mg/kg (PCB-153) <b>milk (whole milk)</b> 10 µg/kg 4 µg/kg 1 µg/kg 40 µg/kg PCB 153 1 µg/kg * <b>farmed fish (fresh weight)</b> not established not established not established not established PCB 153 0.1 mg/kg <b>egg (fresh weight)</b> 0.02 mg/kg 0.02 mg/kg 0.1 mg/kg 0.05 mg/kg PCB 153 0.1 mg/kg fat
				0.001 mg/kg fat	
				0.001 mg/kg fat	
	Dieldrin DDTs PCB congeners		Milk	0.001 mg/kg fat	
				0.003 mg/kg fat	
				0.008 mg/kg fat	
	HCB HCH-alfa Lindane DDTs PCB congeners		Milk	0.001 mg/kg fat	
				0.03 µg/kg whole milk	
				0.03 µg/kg whole milk	
	HCB HCH-alfa Lindane DDTs PCB congeners		Muscle	0.01 µg/kg whole milk	
				0.08 µg/kg whole milk	
				0.01 µg/kg whole milk	
HCB HCH-alfa Lindane DDTs PCB congeners	Muscle	0.1 µg/kg fresh weight			
		0.25 µg/kg fresh weight			
		0.25 µg/kg fresh weight			
HCB HCH-alfa Lindane DDTs PCB congeners	Yolk	2.0 µg/kg fresh weight			
		0.25 µg/kg fresh weight			
		0.2 µg/kg fat			
HCB HCH-alfa Lindane DDTs PCB congeners	Yolk	0.2 µg/kg fat			
		0.2 µg/kg fat			
		0.2 µg/kg fat			
HCB HCH-alfa Lindane DDTs PCB congeners	Yolk	1.6 µg/kg fat			
		0.2 µg/kg fat			
		0.2 µg/kg fat			

\* 1 µg/kg (PCB 153) fat content <2 %, 20 µg/kg fat (PCB-153) fat content ≥2 %

Methods for analyses (continue...)

Group of substances	Compounds	Laboratory method	Matrix	Detection limit	Maximum Residue Limit (MRL)
B 3 b Organophosphorus compounds in bovine, pigs and lambs	Dichlorvos Acephate Chlorpyrifos-methyl Pirimiphos-methyl Chlorpyrifos Malathion Malathion-O-analog Phoxim Diazinon Azametiphos	GC-FPD	Muscle	1 0 µg/kg 20 µg/kg 10 µg/kg 10 µg/kg 10 µg/kg 1 0 µg/kg 20 µg/kg 10 µg/kg 20 µg/kg 50 µg/kg	Not established 20 µg/kg 10 µg/kg 10 µg/kg 10 µg/kg not established not established 20 µg/kg pigs, 50 µg/kg lambs 20 µg/kg not established
In honey	Azinphos-methyl Coumaphos		Honey Honey	0.05 mg/kg 0.05 mg/kg	not established not established
B 3 c Contaminants: Trace elements	Pb	AAS	Kidney Liver Muscle	0.013 mg/kg	Meat and poultry 500 µg/kg kidney 500 µg/kg liver 100 µg/kg muscle See Regulation 466/01 EG
	Cd	AAS	Kidney Liver Muscle	0.005mg/kg	Meat and Poultry 1000 µg/kg kidney 500 µg/kg liver 50 µg/kg muscle See Regulation 466/01 EG
	Pb	AAS	Honey Fish muscle	0.004 mg/kg 0.003 mg/kg	Not established 200 µg/kg
	Cd	AAS	Honey Fish muscle	0.002 mg/kg 0.002 mg/kg	Not established 50 µg/kg
B3 d Mycotoxines	Aflatoxin M1 Ochratoxin	HPLC HPLC	Milk Kidney	0.005 µg/kg 1 µg/kg	0.050 µg/kg milk Not established
B3 e Others	Malachitgreen Leuco- Malachitgreen	HPLC	Fish muscle	1 µg/kg 1 µg/kg	Not established

ABBREVIATIONS:

HPLC: HIGH PERFORMANCE LIQUID CHROMATHOGRAPHY

GC-MS: GAS CHROMATHOGRAPHY MASS SPECTROMETRY

ELISA: ENZYME LINKED IMMUNOASSAY

TLC: THIN LAYER CHROMATHOGRAHY

GC-ECD: GAS CHROMATHOGRAPHY-ELECTRON CAPTURE DETECTOR

GC-FPD: GAS CHROMATHOGRAPHY- FLAME PHOTOMETRIC DETECTOR

GC-NPD: GAS CHROMATHOGRAPHY NITROGEN PHOSPHORUS DETECTOR

AAS: ATOMIC ABSORBTION SPECTROMETRY

PB: LEAD

CD: CADMIUM

## Appendix 3

### Laboratories in Sweden for analyses of residues in live animals and animal products for the year 2003

Name and address of laboratory	Substances
<i>A. National Reference Laboratory</i>	
National Food Administration Box 622 SE-751 26 Uppsala Sweden	all substances
<i>B. Laboratories approved by National Food Administration and contracted for screening analyses stipulated</i>	
National Veterinary Institute Uppsala Sweden	acepromacin sulphonamides trenbolone ochratoxin heavy metals
Steins Laboratorium Jönköping Sweden	beta-lactams in milk
AB AnalyCen Lidköping Sweden	organochlorine compounds organophosphorus compounds
Institutet for vet.medicine Helsingfors Finland	tetracyclines in eggs
Institutet for Fødevarerdirektoratet Søborg Denmark	malachitgreen and leuco malachitgreen in fish
Hormonlaboratory Aker sykehus, Oslo Norway	hormones in fish
Avdelningen for restkoncentrationer Fødevarerdirektoratet Ringsted Denmark	bensimidazoles in poultry
Norges Veterinær Høgskole Oslo Norge	bensimidazoles in eggs

9 laboratories are approved by the National Food Administration for analyses of antimicrobials in kidney

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Appendix 4**

**Species: Bovines**

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Number of samples above action level	
<b>Anabolic and prohibited substances</b>							
<b>Synthetic hormones</b>	Stilbenes	cattle<2 year	on farm	urine	100	0	
	Stilbenes	cattle<2 year	slaughterhouse	urine	54	0	
	Zeranol	cattle<2 year	on farm	urine	62	0	
	Zeranol	cattle<2 year	slaughterhouse	urine	65	0	
	Trenbolone	cattle<2 year	on farm	urine	197	0	
<b>Natural hormones</b>	17- Oestradiol	cattle<2 year	slaughterhouse	serum	99	0	
	Testosterone	cattle<2 year	slaughterhouse	serum	99	0	
<b>Thyrostats</b> Methylthiouracil Propylthiouracil Thiamazol	Thyrostats	cattle<2 year	on farm	serum	33	0	
		cattle<2 year	slaughterhouse	serum	39	0	
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol Brombuterol	Beta-agonists	cattle<2 year	on farm	urine	153	0	
		cattle<2 year	slaughterhouse	liver	201	0	
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	cattle<2 year	on farm	urine	97	0	
		cows	slaughterhouse	muscle	103	0	
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>	
<b>Antibacterial substances</b>	Animicrobial screen	bovine	slaughterhouse	kidney	1240	5*	
	Enrofloxacin	young bovine	slaughterhouse	muscle	64	0	
	Ciprofloxacin	cows	slaughterhouse	muscle	73	0	
	Danofloxacin						
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	young bovine	slaughterhouse	liver	61	0	
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	young bovine	slaughterhouse	liver	5	0	

\* Two samples contained oxytetracycline and three samples contained penicillin-G above MRL

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Bovines continued**

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Number of samples above action level
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	bovine	slaughterhouse	muscle	28*	0
<b>Sedatives</b>	Acepromazin	bovine	slaughterhouse	urine	63	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	cows	slaughterhouse	serum	53	0
<b>Others</b> <b>Corticosteroids</b> Dexametazon Betametazon	Corticosteroids	cows	slaughterhouse	urine	63	0

\* Same samples are also analyzed for group carbamates and pyrethroids

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Bovines continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>				
<b>Residues examined in each sample:</b>		<b>LOQ</b>	<b>MRL</b>			
		<b>mg/kg fat</b>	<b>mg/kg fat</b>			
HCB		0.001	0.2			
HCH-alfa		0.001	0.2			
Lindane		0.001	0.02			
Dieldrin		0.003	0.2			
sum DDT+DDE+DDD		0.008	1.0			
CB 28		0.001	not established			
CB 52		0.001	not established			
CB101		0.001	not established			
CB118		0.001	not established			
CB153		0.001	0.1			
CB138		0.001	not established			
CB180		0.001	not established			
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
bovine	slaughterhouse	fat	27			0
<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>				
HCB	27 samples	0 samples				
HCH-alfa	27 samples	0 samples				
Lindane	27 samples	0 samples				
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>				
Dieldrin	27 samples	0 samples				
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>				
sum DDT+DDE+DDD	26 samples	1 samples				
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>				
PCB 153	26 samples	1 samples				

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Bovines continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>		<b>det.limit µg/kg</b>	<b>MRL µg/kg</b>		
Dichlorvos		10	not established		
Diazinon		20	10		
Acephate		20	20		
Phoxim		10	not established		
Chlorpyrifos-methyl		10	10		
Pirimiphos-methyl		10	10		
Chloropyrifos		10	10		
Malathion		10	not established		
Malathion-O-analog		20	not established		
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below detection limit</b>	<b>Samples above MRL</b>
Bovine	slaughterhouse	muscle	28	28	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Bovines continued**

<b>Contaminants:</b>		<b>Heavy metals</b>			
<b>Residues examined in each sample:</b>		<b>det.limit</b>	<b>MRL</b>		
Kadmium (Cd)		mg/kg kidney	mg/kg		
Lead (Pb)		0.005	1.0 mg/kg		
		0.013	0.5 mg/kg		
Species/Age	Substance	sampling target	Matrix	Number of samples	Samples above MRL
Cows	Kadmium Lead	slaughter-house	kidney	35	0

Residue	< 0.005 mg/kg	0.005-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.0 mg/kg
Cadmium	0	9	13	12	1
Residue	< 0.013 mg/kg	0.013-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.0 mg/kg
Lead	4	31	0	0	

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>Detection limit</b>	<b>Action level</b>	<b>MRL</b>		
Ochratoxin		µg/kg kidney	µg/kg kidney	mg/kg		
		1	5	not established		
Species/Age	Sampling target	Matrix	Number of samples	Below det. limit	1- 5 ug/kg kidney	Samples above MRL
Young bovine	slaughterhouse	kidney	10	10	0	0

## Residues in live animals and animal products 2003

### Summary of 2003 Sweden results

#### Species:Pigs

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Samples above action level
<b>Anabolic and prohibited substances</b>						
<b>Synthetic hormones</b>	Stilbenes	fattening pigs	on farm	urine	41	0
	Stilbenes	fattening pigs	slaughterhouse	urine	51	0
	Zeranol	fattening pigs	slaughterhouse	urine	69	0
	Trenbolone	fattening pigs	slaughterhouse	urine	100	0
<b>Thyrostats</b> Methylthiouracil Propylthiouracil Thiamazol	Thyrostats	fattening pigs	slaughterhouse	serum	39	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol Brombuterol	Beta-agonists	fattening pigs	slaughterhouse	liver	386	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	pigs>6 months	slaughterhouse	muscle	127	0
		fattening pigs	slaughterhouse	muscle	34	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Animicrobial screen	pigs	slaughterhouse	kidney	6818	1*
	Sulphonamides	fattening pigs	slaughterhouse	muscle	22	0
	Enrofloxacin	fattening pigs	slaughterhouse	muscle	150	0
	Ciprofloxacin					
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	pigs>6months	slaughterhouse	liver	16	0
		fattening pigs	slaughterhouse	liver	196	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	fattening pigs	slaughterhouse	muscle	10	0
<b>Pyrethroids</b> Deltametrin Cyflumetrin Cypermethrin Permethrin	Pyrethroids	fattening pigs	slaughterhouse	muscle	22	0
<b>Sedatives</b>	Acepromazin	fattening pigs	slaughterhouse	urine	77	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	sows	slaughterhouse	serum	10	0

\* One sample contained penicillin-G above MRL

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Pigs continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>				
<b>Residues examined in each sample:</b>		<b>LOQ</b>	<b>MRL</b>			
		<b>mg/kg fat</b>	<b>mg/kg fat</b>			
HCB		0.001	0.2			
HCH-alfa		0.001	0.2			
Lindane		0.001	0.02			
Dieldrin		0.003	0.2			
sum DDT+DDE+DDD		0.008	1.0			
CB 28		0.001	not established			
CB 52		0.001	not established			
CB101		0.001	not established			
CB118		0.001	not established			
CB153		0.001	0.1			
CB138		0.001	not established			
CB180		0.001	not established			
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
Fattening pigs	slaughterhouse	fat	26			0

<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
HCB	26 samples	0 sample		
a-HCH	26 samples	0 sample		
g-HCH	26 samples	0 sample		
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>		
Dieldrin	26 samples	0 samples		
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>		
sum DDT+DDE+DDD	26 samples	0 samples		
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
PCB153	26 samples	0 samples		

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Pigs continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>	<b>det.limit µg/kg</b>	<b>MRL µg/kg</b>			
Dichlorvos	10	not established			
Diazinon	20	10			
Acephate	20	20			
Phoxim	10	not established			
Chlorpyrifos-methyl	10	10			
Pirimiphos-methyl	10	10			
Chloropyrifos	10	10			
Malathion	10	not established			
Malathion-O-analog	20	not established			

  

<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below detection limit</b>	<b>Samples above MRL</b>
Fattening pigs	slaughterhouse	muscle	22	22	0

<b>Contaminants:</b>		<b>Heavy metals</b>			
<b>Residues examined in each sample:</b>	<b>det.limit mg/kg kidney</b>	<b>MRL mg/kg</b>			
Kadmium (Cd)	0.005	1.0 mg/kg			
Lead (Pb)	0.013	0.5 mg/kg			

  

<b>Species/Age</b>	<b>Substance</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Samples above MRL</b>
Fattening pigs	Kadmium Lead	slaughterhouse	kidney	53	0

<b>Residue</b>	<b>&lt;0.005 mg/kg</b>	<b>0.005-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>
Cadmium	0	34	17	2	0

  

<b>Residue</b>	<b>&lt;0.013 mg/kg</b>	<b>0.013-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>
Lead	50	3	0	0	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Pigs continued**

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>Detection limit</b>	<b>Action level</b>	<b>MRL</b>		
Ochratoxin		$\mu\text{g/kg kidney}$	$\mu\text{g/kg kidney}$	<b>mg/kg</b>		
		1	5	not established		
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below det. limit</b>	<b>1- 5 ug/kg kidney</b>	<b>Samples above MRL</b>
Fattening pigs	slaughterhouse	kidney	45	43	2	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Sheep**

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Samples above action level
<b>Anabolic and prohibited substances</b> <b>Synthetic hormones</b>	Stilbenes	sheep	slaughterhouse	urine	6	0
	Zeranol	sheep	slaughterhouse	urine	3	0
	Trenbolone	sheep	slaughterhouse	urine	4	0
<b>Thyrostats</b> Methylthiouracil Propylthiouracil Thiamazol	Thyrostats	sheep	slaughterhouse	serum	5	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol	Beta-agonists	sheep	slaughterhouse	liver	6	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	sheep	slaughterhouse	muscle	8	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Animicrobial screen	sheep	slaughterhouse	kidney	390	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	sheep	slaughterhouse	liver	20	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	sheep	slaughterhouse	liver	5	0
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	sheep	slaughterhouse	muscle	8	0
<b>Sedatives</b>	Acepromazin	sheep	slaughterhouse	urine	5	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	sheep	slaughterhouse	serum	5	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Sheep continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>	
<b>Residues examined in each sample:</b>		<b>LOQ mg/kg fat</b>	<b>MRL mg/kg fat</b>
HCB		0.001	0.2
HCH-alfa		0.001	0.2
Lindane		0.001	0.7
Dieldrin		0.003	0.2
sum DDT+DDE+DDD		0.008	1.0
CB 28		0.001	not established
CB 52		0.001	not established
CB101		0.001	not established
CB118		0.001	not established
CB153		0.001	0.1
CB138		0.001	not established
CB180		0.001	not established

<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
Sheep	slaughterhouse	fat	5			0

<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg f fat</b>	
HCB	5 samples	0 samples	
a-HCH	5 samples	0 samples	
g-HCH	5 samples	0 samples	
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>	
Dieldrin	5 samples	0 samples	
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>	
sum DDT+DDE+DDD	5 samples	0 samples	
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>	
PCB153	5 samples	0 samples	

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Sheep continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>		<b>det.limit µg/kg</b>	<b>MRL µg/kg</b>		
Dichlorvos		10	not established		
Diazinon		20	10		
Acephate		20	20		
Phoxim		10	not established		
Chlorpyrifos-methyl		10	10		
Pirimiphos-methyl		10	10		
Chloropyrifos		10	10		
Malathion		10	not established		
Malathion-O-analog		20	not established		
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below detection limit</b>	<b>Samples above MRL</b>
Sheep	slaughterhouse	muscle	8	8	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Sheep continued**

Contaminants:		Heavy metals			
Residues examined in each sample:		det.limit	MRL		
Kadmium (Cd)		mg/kg kidney	mg/kg kidney		
Lead (Pb)		0.005	not established		
		0.013	0.5 mg/kg		
Species/Age	Substance	Sampling target	Matrix	Number of samples	Samples above MRL
Sheep	Kadmium Lead	slaughter-house	kidney	5	0

Residue	<0.005 mg/kg	0.005-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.00 mg/kg
Cadmium	0	3	2	0	
Residue	<0.013 mg/kg	0.013-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.00 mg/kg
Lead	3	2	0	0	

Contaminants:		Mycotoxines				
Residues examined in each sample:		Det.limit	Action level	MRL		
Ochratoxin		µg/kg kidney	µg/kg kidney	mg/kg kidney		
		1	5	not established		
Species/Age	Sampling target	Matrix	Number of samples	Below det. limit	1- 5 ug/kg kidney	Samples above MRL
Sheep	slaughterhouse	kidney	5	5	0	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Horses**

Substance group	Substances analysed in the sample	Species/Age	Sampling random	Matrix	Number of samples	Samples above MRL or action level
<b>Veterinary drugs</b>						
<b>Antibacterial substances</b>	Animicrobial screen	horse	slaughterhouse	kidney	610*	1**
	Sulphonamides	horse	slaughterhouse	muscle	22	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	horse	slaughterhouse	liver	25	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	horse	slaughterhouse	serum	45	0
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	horse	slaughterhouse	muscle	5	0
<b>Sedatives</b>	Acepromazin	horse	slaughterhouse	urine	5	0

\* includes also emergency slaughtered horses on farm

\*\* One sample contained penicillin-G above MRL

**Contaminants: Organophosphorus compounds**

**Residues examined in each sample:**

	det.limit µg/kg	MRL µg/kg
Dichlorvos	10	not established
Diazinon	20	10
Acephate	20	20
Phoxim	10	not established
Chlorpyrifos-methyl	10	10
Pirimiphos-methyl	10	10
Chloropyrifos	10	10
Malathion	10	not established
Malathion-O-analog	20	not established

Species/Age	Sampling target	Matrix	Number of samples	Below detection limit	Samples above MRL
Horses	slaughterhouse	muscle	5	5	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed and wild game**

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Samples above action level
<b>Anabolic and prohibited substances</b>						
<b>Synthetic hormones</b>	Stilbenes	reindeer	slaughterhouse	urine	2	0
	Zeranol	reindeer	slaughterhouse	urine	4	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol Brombuterol	Beta-agonists	reindeer	slaughterhouse	liver	10	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	ostrich	slaughterhouse	muscle	5	0 0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Animicrobial screen	reindeer	slaughterhouse	muscle	10	0
		ostrich	slaughterhouse	muscle	11	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	reindeer	slaughterhouse	liver	25	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	reindeer	slaughterhouse	liver	3	0
<b>Pyrethroids</b> Deltametrin Cyflumetrin Cypermethrin Permethrin	Pyrethroids	ostrich	slaughterhouse	muscle	5	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	ostrich	slaughterhouse	serum	2	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed and wild game continued**

<b>Contaminants:</b>	<b>Chlorinated hydrocarbons incl. PCBs</b>	
<b>Residues examined in each sample:</b>	<b>LOQ mg/kg fat</b>	<b>MRL mg/kg fat</b>
HCB	0.001	0.2
HCH-alfa	0.001	0.2
Lindane	0.001	0.02
Dieldrin	0.003	0.2
sum DDT+DDE+DDD	0.008	1.0
CB 28	0.001	not established
CB 52	0.001	not established
CB101	0.001	not established
CB118	0.001	not established
CB153	0.001	0.1
CB138	0.001	not established
CB180	0.001	not established

<b>Species/Age</b>	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
Reindeer	slaughterhouse	fat	5			0

<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
HCB	4 samples	1 samples		
a-HCH	5 samples	0 samples		
g-HCH	5 samples	0 samples		
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>		
Dieldrin	5 samples	0 samples		
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>		
sum DDT+DDE+DDD	5 samples	0 samples		
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
PCB153	5 samples	0 samples		

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed and wild game continued**

<b>Contaminants:</b>		<b>Heavy metals</b>				
<b>Residues examined in each sample:</b>		<b>det.limit</b>	<b>MRL</b>			
		<b>mg/kg kidney</b>	<b>mg/kg</b>			
Kadmium (Cd) Reindeer		0.005	not established			
Lead (Pb) Reindeer		0.013	0.5 mg/kg			
Kadmium (Cd) Elk		0.002				
Lead (Pb) Elk		0.008				
<b>Species/Age</b>	<b>Substance</b>	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>		<b>Samples above MRL</b>
Reindeer	Cd, Pb	slaughter-house	kidney	12		0
Elk	Cd, Pb	wild	kidney liver	67 67		0 0
<b>Residue Reindeer</b>	<b>&lt;0.005-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>	<b>1.0-2.5 mg/kg</b>	<b>above 2.51 mg/kg</b>
Cadmium	0	0	0	2	2	8
<b>Residue</b>	<b>&lt;0.013-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>	<b>1.0-2.5 mg/kg</b>	<b>above 2.51 mg/kg</b>
Lead	9	3	0	0	0	0
<b>Residue Elk</b>	<b>&lt;0.002-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>	<b>1.0-2.5 mg/kg</b>	<b>above 2.51 mg/kg</b>
Cadmium kidney	2	4	5	15	22	19
liver	7	12	24	19	5	0
<b>Residue</b>	<b>&lt;0.008-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	<b>0.51-1.00 mg/kg</b>	<b>1.0-2.5 mg/kg</b>	<b>above 2.51 mg/kg</b>
Lead kidney	67	0	0	0	0	0
liver	67	0	0	0	0	1

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Poultry**

Substance group	Substances analysed in the sample	Species/Age	Sampling random	Matrix	Number of samples	Samples above action level
<b>Anabolic and prohibited substances</b>						
<b>Synthetic hormones</b>	Stilbenes	broiler chicken	on farm	liver	16	0
	Stilbenes	broiler chicken	slaughterhouse	liver	20	0
	Zeranol	broiler chicken	on farm	liver	14	0
	Zeranol	broiler chicken	slaughterhouse	liver	15	0
	Nortestosterone	broiler chicken	on farm	liver	6	0
	Nortestosterone	broiler chicken	slaughterhouse	liver	15	0
<b>Beta-agonists</b>	Beta-agonists	broiler chicken	slaughterhouse	liver	99	0
Clenbuterol						
Salbutamol						
Mabuterol						
Brombuterol						
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	broiler chicken	slaughterhouse	muscle	31	0
	Nitrofurans	broiler chicken	slaughterhouse	muscle	31	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Oxytetracycline	broiler chicken	slaughterhouse	muscle	35	0
		turkey	slaughterhouse	muscle	20	0
		hens	slaughterhouse	muscle	10	0
	Sulphonamides incl. Suphaklozin	turkey	slaughterhouse	muscle	8	0
		hens	slaughterhouse	muscle	10	0
<b>Anthelmintics</b>	Fenbendazol	hens	slaughterhouse	liver	10	0
Bensimidazoles	Flubendazol					0
	Mebendazol					0
	Oxfendazol					0
	Oxfendazolsulfon					0
	Oxibendazol					0
<b>Coccidiostats</b>	Narasin	broiler chicken	slaughterhouse	liver	102	0
		hens	slaughterhouse	liver	10	0
<b>Pyrethroids</b>	Pyrethroids	broiler chicken	slaughterhouse	muscle	30	0
Deltamethrin						
Cyflumethrin						
Cypermethrin						
Permethrin						
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	turkey	slaughterhouse	serum	4	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Poultry continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>			
<b>Residues examined in each sample:</b>		<b>LOQ</b>	<b>MRL</b>		
		<b>mg/kg fat</b>	<b>mg/kg fat</b>		
HCB		0.001	0.2		
HCH-alfa		0.001	0.2		
Lindane		0.001	0.02		
Dieldrin		0.003	0.2		
sum DDT+DDE+DDD		0.008	1.0		
CB 28		0.001	not established		
CB 52		0.001	not established		
CB101		0.001	not established		
CB118		0.001	not established		
CB153		0.001	0.1		
CB138		0.001	not established		
CB180		0.001	not established		
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>		<b>Samples above MRL</b>
Broiler chicken	slaughterhouse	fat	24		0
Hens	slaughterhouse	fat	8		0
			<b>Total 32 samples</b>		
<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>			
HCB	32 samples	0 sample			
a-HCH	32 samples	0 sample			
g-HCH	32 samples	0 sample			
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>			
Dieldrin	32 samples	0 samples			
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>			
sum DDT+DDE+DDD	32 samples	0 samples			
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>			
PCB153	32 samples	0 samples			
<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>		<b>det.limit</b>	<b>MRL</b>		
		<b>µg/kg</b>	<b>µg/kg</b>		
Dichlorvos		10	not established		
Diazinon		20	10		
Acephate		20	20		
Phoxim		10	not established		
Chlorpyrifos-methyl		10	10		
Pirimiphos-methyl		10	10		
Chloropyrifos		10	10		
Malathion		10	not established		
Malathion-O-analog		20	not established		
<b>Species/Age</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below detection limit</b>	<b>Samples above MRL</b>
Broiler chicken	slaughterhouse	muscle	27	27	0



**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Poultry continued**

Contaminants:		Heavy metals			
Residues examined in each sample:		det. limit mg/kg	MRL mg/kg		
Kadmium (Cd)	liver	0,005	0.5 mg/kg		
	muscle	0,004	0,05		
Lead (Pb)	liver	0.013	0.5 mg/kg		
	muscle	0,013	0,1		
Species/Age	Substance	sampling random	Matrix	Number of samples	Samples above MRL
Broiler chicken	Cadmium	slaughter- house	muscle	16	0
	Lead		liver	16	0

Residue broiler chicken	<0.005 mg/kg	0.005-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.00 mg/kg	
Cadmium muscle	10	6	0	0		
liver	0	16	0	0		
Residue broiler chicken	<0.013 mg/kg	0.013-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	0.51-1.00 mg/kg	
Lead muscle	15	1	0	0	0	
liver	16	0	0	0	0	

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Poultry continued**

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>det.limit</b>	<b>Action level</b>	<b>MRL</b>		
Ochratoxin		<b>µg/kg muscle</b>	<b>µg/kg+D810 mus</b>	<b>mg/kg muscle</b>		
		1	5	not established		
<b>Species/Age</b>	<b>sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below det. limit</b>	<b>1- 5 ug/kg muscle</b>	<b>Samples above MRL</b>
Broiler chicken	slaughterhouse	muscle	6	6	0	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Product: Milk**

Substance group	Substances analysed in the sample	Species/Age	Sampling random	Matrix	Number of samples	Samples above action level
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	raw milk	on farm	milk	213	0
<b>Veterinary drugs</b>						<b>Samples above MRL</b>
<b>Antibacterial substances</b>	Benzyl-penicillin Oxytetracycline	raw milk	milk tankers on farm	milk milk	928 500	0 0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	raw milk	on farm	milk	213	0

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>				
<b>Residues examined in each sample:</b>		<b>LOQ</b>	<b>MRL</b>			
		<b>µg/kg whole milk</b>	<b>µg/kg whole milk</b>			
HCB		0.03	10			
HCH-alfa		0.03	4			
Lindane		0.01	1			
sum DDT+DDE+DDD		0.08	40			
CB 28		0.01	not established			
CB 52		0.01	not established			
CB101		0.01	not established			
CB118		0.01	not established			
CB153		0.01	1*			
CB138		0.01	not established			
CB180		0.01	not established			
	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
	on farm	raw milk	25			0
<b>Residue</b>	<b>whole milk</b>	<b>whole milk</b>				
	<b>&lt;1 µg/kg</b>	<b>1-5 µg/kg</b>				
HCB	25 samples	0 samples				
HCH-alfa	25 samples	0 samples				
Lindane	25 samples	0 samples				
<b>Residue</b>	<b>&lt;2 µg/kg</b>	<b>2-5 µg/kg</b>				
sum DDT+DDE+DDD	25 samples	0 samples				
<b>Residue</b>	<b>&lt;10 µg/kg fat</b>	<b>10-20 µg/kg fat</b>				
PCB153	25 samples**	0 samples				

\* for fat content < 2 %. MRL for fat content equal or above 2 % is 20 µg/kg fat.

\*\* fat content above 2 %

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Milk continued**

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>detection limit µg/kg milk</b>	<b>Action level µg/kg milk</b>	<b>MRL µg/kg milk</b>		
Aflatoxin M1		0.005	0.050	0.050		
	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below 0.005 ug/kg</b>	<b>0.005-0.050 ug/kg</b>	<b>Samples above MRL</b>
	on farm	raw milk	20	20	0	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Product: Eggs**

Substance group	Substances analysed in the sample	Species	Sampling random	Matrix	Number of samples	Samples above action level
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	hens	packing houses	eggs	140	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Oxytetracycline Tetracycline Chlortetracycline	hens	packing houses	eggs	90	0
	Sulphamethine Sulphaclozine	hens	packing houses	eggs	69	0
<b>Anthelmintics</b> Bensimidazoles	Albendazol Albendazol-sulfon Fenbendazol Oxfendazol Oxfendazolsulfon	hens	packing houses	eggs	10	0
<b>Coccidiostats</b>	Narasin	hens	packing houses	eggs	140	0

\* Narasin above quantification level were found in 35 samples. The levels were very low and make no health risk to consur  
 More information is given in the Summary of this report

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Product: Eggs continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>				
<b>Residues examined in each sample:</b>		<b>LOQ µg/kg fat</b>	<b>MRL mg/kg fat</b>			
HCB		0.2	0.2			
HCH-alfa		0.2	0.2			
Lindane		0.2	1.0			
sum DDT+DDE+DDD		1.6	0,5			
CB 28		0.2	not established			
CB 52		0.2	not established			
CB101		0.2	not established			
CB118		0.2	not established			
CB153		0.2	0.1			
CB138		0.2	not established			
CB180		0.2	not established			
<b>Species/Age</b>	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>			<b>Samples above MRL</b>
Eggs	packing house	yolk	25			0

<b>Residue</b>	<b>&lt; 2 µg/kg fat</b>	<b>2-5 µg/kg fat</b>		
HCB	23 samples	2 samples		
HCH-alfa	25 samples	0 samples		
Lindane	25 samples	0 samples		
<b>Residue</b>	<b>&lt;5 µg/kg fat</b>	<b>5-10 µg/kg fat</b>	<b>11-40 µg/kg fat</b>	
sum DDT+DDE+DDD	22 samples	0 samples	3 samples	
<b>Residue</b>	<b>&lt;5 µg/kg fat</b>	<b>5-10 µg/kg fat</b>	<b>11-20 µg/kg fat</b>	
PCB153	23 samples	2 samples	0 samples	

## Residues in live animals and animal products 2003

### Summary of 2003 Sweden results

#### Product: Honey

Substance group	Substances analysed in the sample	sampling target	Matrix	Number of samples	Below detection limit	Samples above MRL or action level
Prohibited substances According to Regulation (ECC) 2377/90 Annex IV	Chloramphenicol	on farm	honey	10	10	0
Veterinary drugs						
Antibacterial substances	Oxytetracycline Tetracycline Chlortetracycline	on farm	honey	30	30	0
Pyrethroids	Carbaryl Pyrethrins Cyfluthrin Cypermethrin Deltamethrin Esfenvalerate Fenpropathrin tau-Fluvalinate Cyhalothrin-lambda Permethrin	on farm	honey	50*	50	0

#### Contaminants:

Residues examined in each sample:	Substance group	Detection limit mg/kg honey	MRL mg/kg honey
Lindane	org.chlor.subst.	0.02	not established
Azinphos-metyl	org.phos.subst	0.05	not established
Coumaphos	org.phos.subst.	0.05	not established

  

Product	Sampling target	Number of samples	Below detection limit	Samples above MRL
Honey	on farm	50*	50	0

\* same samples are tested for both pyrethroids and org.chlor and org.phos.substances

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Product: Honey continued**

<b>Contaminants:</b>		<b>Heavy metals</b>			
<b>Residues examined in each sample:</b>		<b>det. limit</b>	<b>MRL</b>		
		<b>mg/kg honey</b>	<b>mg/kg honey</b>		
Kadmium (Cd)		0.002	not established		
Lead (Pb)		0.004	not established		
<b>Product</b>	<b>Substance</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Samples above MRL</b>
Honey	Cadmium Lead	on farm	honey	10	0
<b>Residue</b>	<b>&lt;0.002 mg/kg</b>	<b>0.002-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	
Cadmium	10	0	0	0	
<b>Residue</b>	<b>&lt;0.004 mg/kg</b>	<b>0.004-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	
Lead	6	4	0	0	

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed fish**

Substance group	Substances analysed in the sample	Species/Age	Sampling target	Matrix	Number of samples	Samples above action level
<b>Anabolic and prohibited substances</b> <b>Synthetic hormones</b>	Nortestosteron	rainbow trout	on farm	muscle	10	0
	Nortestosteron	char	on farm	muscle	1	0
	Beta-agonists	rainbow trout	on farm	muscle	9	0
<b>Prohibited substances</b> <b>According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	rainbow trout	on farm	muscle	5	
	Nitrofurans	rainbow trout	on farm	muscle	5	0
<b>Veterinary drugs</b>						<b>Samples above MRL</b>
<b>Antibacterial substances</b>	Oxytetracycline Tetracycline Chlortetracycline	rainbow trout	on farm	muscle	10	0
	Oxolinic acid Flumequin	rainbow trout	on farm	muscle	15	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	rainbow trout	on farm	liver	5	0
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	rainbow trout	on farm	muscle	10	0

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed fish continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>			
<b>Residues examined in each sample:</b>		<b>LOQ µg/kg fresh weight</b>	<b>MRL mg/kg fresh weight</b>		
HCB		0.1	not established		
HCH-alfa		0.25	not established		
Lindane		0.25	not established		
sum DDT+DDE+DDD		2.0	not established		
CB 28		0.25	not established		
CB 52		0.25	not established		
CB101		0.25	not established		
CB118		0.25	not established		
CB153		0.25	0.1		
CB138		0.25	not established		
CB180		0.25	not established		
<b>Species/Age</b>	<b>sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>		<b>Samples above MRL</b>
Rainbow trout	on farm	muscle	8		0
<b>Residue</b>	<b>&lt; 2 µg/kg</b>	<b>2-5 µg/kg</b>	<b>5-10 µg/kg</b>		
HCB	5 samples	3 samples	0 samples		
HCH-alfa	8 samples	0 samples	0 samples		
Lindane	8 samples	0 samples	0 samples		
<b>Residue</b>	<b>&lt;5 µg/kg</b>	<b>5-10 µg/kg</b>	<b>11-20 µg/kg</b>		
sum DDT+DDE+DDD	2 samples	4 samples	2 samples		
<b>Residue</b>	<b>&lt;2 µg/kg</b>	<b>2-5 µg/kg</b>	<b>6-10 µg/kg</b>		
PCB153	4 samples	4 samples	0 samples		

**Residues in live animals and animal products 2003**  
**Summary of 2003 Sweden results**

**Species: Farmed fish continued**

<b>Contaminants:</b>	<b>Heavy metals</b>	
<b>Residues examined in each sample:</b>	<b>det. limit mg/kg</b>	<b>MRL mg/kg</b>
Kadmium (Cd)	0.002	not established
Lead (Pb)	0.003	not established

<b>Species/Age</b>	<b>Substance</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Samples above MRL</b>
Rainbow trout	Cadmium Lead	on farm	muscle	5	0
<b>Residue</b>	<b>&lt;0.002 mg/kg</b>	<b>0.002-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	
Cadmium	5	0	0		
<b>Residue</b>	<b>&lt;0.003 mg/kg</b>	<b>0.003-0.100 mg/kg</b>	<b>0.11-0.20 mg/kg</b>	<b>0.21-0.50 mg/kg</b>	
Lead	5	0	0		

<b>Contaminants:</b>	<b>Mycotoxins and other substances</b>					
<b>Residues examined in each sample:</b>	<b>Detection limit µg/kg muscle</b>	<b>Action level µg/kg muscle</b>	<b>MRL mg/kg</b>			
Ochratoxin	1	5	not established			
Malachitgreen	1	1	not established			
Leucomalachitgreen	1	1	not established			
<b>Species/Age</b>	<b>Substances</b>	<b>Sampling target</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below det. limit</b>	<b>Above action level</b>
Rainbow trout	ochratoxin	on farm	muscle	5	5	0
Rainbow trout	malachitgreen leucomalachitgreen	on farm	muscle	12	12	0

## Residues in live animals and animal products 2003

### Import from third countries

#### Random Sampling at border inspection post

Residues examined	Detection limit µg/kg	Number of samples	Matrix
Chloramphenicol	0.1 µg/kg	93	Shrimps Tigershrimps Scampi Crabs Crayfish
Nitrofurans incl met.	1.0 µg/kg		
Tetracyclines	100 -200 µg/kg		
Mercury	1-2 µg/kg		
Chloramphenicol	0.3 µg/kg	15	Honey
Oxytetracycline	4 µg/kg		
Sulfonthiazol	8 µg/kg		
Nitrofurans	1 µg/kg	29	Poultry meat
Tetracyclines	10 -100 µg/kg	6*	
<b>Total samples</b>		<b>137</b>	

\* same samples as for nitrofurans in poultry

Export country	Product	Number of Samples	Levels above detection limit
Romania	honey	2	1**
Turkey	honey	3	0
Canada	honey	2	0
Hungary	honey	1	0
Tjeckien	honey	6	0
USA	honey	1	0
Brazil	poultry meat	17	0
Thailand	poultry meat	11	0
Argentina	poultry meat	1	0
Vietnam	shrimps*	1	0
Indonesia	shrimps*	26	0
China	crayfish	44	1***
Myanmar	shrimps*	4	0
Thailand	shrimps*	18	0
	<b>Total</b>	<b>137</b>	<b>2</b>

\* including tigershrimps or crabs

\*\* Detectable levels of sulphathiazol above detection level were found in one honey sample. Sulphathiazole is not allowed to use on bees within EU.

\*\*\*Levels of Chloramphenicol above detection level were found in crayfish. Chloramphenicol is a prohibited substance according to EU legislation. The consignment was destructed.

1. Utvärdering av Livsmedelsverkets Riksprojekt 2002–2003 av R Lindqvist och E Hay.
2. Interkalibrering av laboratorier. Mikrobiologi – Livsmedel, januari 2004 av C Normark.
3. Proficiency Testing – Food Chemistry, Nutritional Components, Round 33, March-April 2004 by L Merino.
4. Examination of Residues in Live Animals Products – Results of the Control 2003 by I Nordlander.



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