

# Examination of Residues in Live Animals and Animals Products

– Results of the Control 2002

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**LIVSMEDELS  
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NATIONAL FOOD  
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# **Examination of residues in live animals and animal products - Results of the control 2002**

## **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 2002 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 programme included meat, poultry and shrimps from the main import countries, meat from South America, Polen, and New Zeeland, poultry from Thailand, Polen and Israel and shrimps from South East Asea. No detectable levels of any of the substances in the control programme were found except very low levels of an antiparasited drug (Ivermectin) well below MRL in one meat sample from Brazil.

Chloramphenicol and Nitrofurans, prohibited antibiotics within EU, have been detected in some animal products from certain third countries.

The Commission decided in 2002 that every consignment with certain aquaculture products from China, Indonesia, Thailand and Myanmar and poultry from Thailand and Brazil must be tested for certain prohibited substances by the border control before entering any EU country. 119 consignments were controlled by Swedish border controls. Three consignments from Thailand contained nitrofurans, one consignment from China and one consignment from Indonesia contained chloramphenicol during 2002. The consignments with detectable levels of prohibited antibiotics were destructed.

## **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 thyrostats.

### **LIMIT OF DETECTION (LOD)**

The smallest amount of a substance that show 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 2002, 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 reach the consumers.

## **Summary and comments to the results 2002**

The control programme 2002 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*

2 229 samples were tested. All samples from live animals and red meat were free from detectable residues of anabolic or prohibited substances.

#### *Veterinary medicines*

10 148 samples were tested. Ten samples (0.1%) contained residues above MRL: Seven bovine kidney samples contained residues of penicillins above MRL. Two bovine kidney samples contained residues of tetracyclines above MRL. One bovine kidney samples contained residues of sulphonamides above MRL.

Carcasses containing residues above MRL were condemned.

#### *Contaminants*

271 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*

26 reindeer and 3 ostrich samples were tested. All samples from reindeer and ostrich were free from detectable residues of anabolic or prohibited substances.

### *Veterinary medicines*

27 reindeer and 8 ostrich samples were tested. All samples were free from detectable residues of veterinary medicines.

### *Contaminants*

28 sample from reindeer and 70 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*

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

### *Veterinary medicines*

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

### *Contaminants*

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

## **Milk**

### *Prohibited and unauthorised substances*

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

### *Veterinary medicines*

1 584 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. The samples can be traced back to the farm.

### *Contaminants*

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

## **Eggs**

### ***Prohibited substances***

139 samples were tested. Same samples also tested for veterinary medicines. All samples were free of detectable residues.

### ***Veterinary medicines***

139 samples were tested. (same samples were tested for several substances. A total of 314 analyses were for veterinary medicines in eggs)  
All samples were tested for coccidiostats and very low quantitative levels of narasin were found in 63 samples.

### **Narasin**

In the end of 1999 the use of a newly developed LC-MS-MS method for the determination of narasin in eggs 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. By the new method, in 1999 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 2002 samples have been taken for analysis during spring. A summary of the results is shown in table on page 12.

Meetings between the Swedish Board of Agriculture, the National Food Administration and the feed industry have been held to follow up the results of the control. The results indicate that the feed industry still have problems with cross-contamination and to has to make improvements in the production of feed. 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.

## Narasin in eggs, a summary of the results of 1999 - 2002

	1999	Spring 2000	Autumn 2000	2001	2002
Narasin not detected or not confirmed	12 (50%)	32 (52%)	38 (57%)	74 (52%)	35 (25%)
Narasin confirmed, levels 0.03 –0.99 ug/kg	4 (17%)	21 (34%)	24 (36%)	50 (35%)	67 (49 %)*
Narasin confirmed, levels 1.00-10.83 ug/kg	8 (33%)	9 (14%)	5 (7%)	17 (12%)	37 (27 %)**
Total	24	62	67	141	139

\* The level of narasin in 41 samples were below the quantification limit for the method (0.50 ug/kg).

\*\* Year 2002: levels 1.00- 8.5 ug/kg.

### ***Contaminants***

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

## **Honey**

### ***Veterinary medicines***

90 samples were tested (50 of the samples were also tested for contaminants). All samples were free from detectable residues of veterinary medicines.

### ***Contaminants***

60 samples were tested. (50 of the samples were also tested for veterinary medicines). 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***

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

### ***Other substances***

5 samples were tested for malachit green. Malachitgreen is a chemical substance that is not allowed to use and is not registrated as veterinary drug. No maximum limit (MRL) is established. One sample was found positive in the end of year 2002. The farm was set under restrictions. No fish can be moved or sold from the farm. Investigation and follow-up sampling is done by The Swedish Board of Agriculture (SBA) and the National Food Administration (NFA).

### ***Contaminants***

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

## **Animal products from Third Countries**

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

35 meat, 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 one meat sample from Brazil that contained low levels of an antiparasitic drug. The levels were well below the maximum residue limit (MRL) for the substance.

### ***Contaminants***

11 meat samples were tested for organochlorine compounds. No detectable levels were found.

## **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 2002 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 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 suspect 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 122 cattle farms, 24 poultry farms and 40 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.

#### ***Eggs***

Staff appointed by NFA collected eggs. Eggs were taken in egg packing houses. NFA has a special inspector employed for collecting egg samples since year 2002.

#### ***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 held 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 2002 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 ECU/11.73 SEK per tonne

Pigs 1.35 ECU/11.73 SEK per tonne

Sheep 1.35 ECU/11.73 SEK per tonne

Poultry 1.35 ECU/11.73 SEK per tonne

Game 1.35 ECU/11.73 SEK per tonne

Milks 0.02 ECU/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 2003

The residue control programme will continue. The plan for year 2002 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.

Control programme	Year 2002 No of Samples	Year 2003 No of Samples
Red meat	12 000	12 000
Farmed game	100	114
Wild game	100	100
Poultry	500	561
Milk	1 800	1 545
Eggs	200	200
Fish	100	100
Honey	100	100
Total000	14 900	14 720

The programme is based on production data for the previous year. 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 confirmation 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.

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 2002**

During 2002, the method development programme has still been focused on the use of LC-MS/MS for analysis of veterinary drug residues.

The validation of the multi-residue method for confirmation of two tetracyclines (OTC and CTC), four sulphonamides (sulphadiazine, sulphathiazole, sulphamethazine and sulphadoxine) and penicillin-G in kidney has been finished. The method has temporarily been used during 2002.

An LC-MS/MS method for confirmation of chloramphenicol in muscle, urine and honey samples has been developed, as well as an LC-MS/MS method for the analysis of nitrofurantoin metabolites in fish, poultry and aquaculture products. Both methods are now in use in the Swedish control programme.

Validation of a new method for analysis of enrofloxacin, danofloxacin and ciprofloxacin has been finished during the year.

### **EU-Funded Research**

During 2002, National Food Administration was involved in three EU-funded research projects. All were shared cost projects.

The project "Food Safety Screening: Synthetic Glucocorticoids" supported by the framework of the specific research and technological development programme "Quality of Life and Management of Living Resources" has the objective to develop fast, sensitive, reliable and cost-effective analytical methods to establish monitoring programmes, assess human exposure to glucocorticoid residues.

The objective of the "Poultry-Check Project" is to provide the scientific community with a total solution for the control of selected coccidiostats used in poultry production.

The third project has the objective to prepare a candidate reference material for oxolinic acid and flumequine residues in fish muscle. This project has been finished during 2002.

### **Plans for 2003**

To continue the method development for analysis of thyreostats in urine and serum with LC-MS/MS. Other priority projects are to set up and validate analytical methods for several veterinary drugs e.g.  $\beta$ -agonists in liver with biosensor-technique, macrolides (tylosin) with LC-MS/MS, and non steroid antiinflammatory drugs (NSAIDS) with GC-MS, as well as a confirmation method for trenbolone with LC-MS/MS and a confirmation method for OTC in milk with LC-MS/MS.

Finally, we have to start to revalidate most of our older methods in order to follow the EU-directive (2002/657/EC)

**Appendix 1: NUMBER OF ANIMALS SLAUGHTERED  
AND PRODUCTION FIGURES OF CERTAIN ANIMAL PRODUCTS**

**Period 2001 – 2002**

**COUNTRY: SWEDEN**

CATEGORIES	Total number of slaughtered animals (approved carcasses) in the country	
	2001	2002
Sheep	194 000	197 000
Horses	5 100	5 400
Bovine animals	497 300	506 600
Porcine animals	3 199 800	3 282 200
Deer	2 334	2 797
Reindeer	56 233 (1575 tonnes)	58 172 (1629 tonnes)
<b>Production 2001-2002</b>		
Farmed fish	9 000 tonnes	9 000 tonnes
Milk	3 290 000 tonnes	3 226 000 tonnes
Broilers	97 372 tonnes	101 565 tonnes
Turkeys	2 162 tonnes	4 254 tonnes
Hens and Broiler parent	4 728 tonnes	4 764 tonnes
Geese	96 tonnes	95 tonnes
Ducks	160 tonnes	179 tonnes
Eggs	100 000 tonnes	94 000 tonnes
Honey	3 000 tonnes	3000 tonnes

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 2002**

<b>Group of substances</b>	<b>Compounds</b>	<b>Laboratory method</b>	<b>Matrix</b>	<b>Detection Limit</b>	<b>Maximum Residue Limit (MRL)</b>
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 GC-MS	Urine	1 µg/kg 2 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 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 Chlorampheni col	Chloramphenicol	ELISA LC MS-MS	Urine Muscle Eggs, Milk Honey	0.5 µg/kg in urine 0.3 µg/kg all others matrixes	Prohibited substance

<b>Group of substances</b>	<b>Compounds</b>	<b>Laboratory method</b>	<b>Matrix</b>	<b>Detection Limit</b>	<b>Maximum Residue Limit (MRL)</b>
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	Tetracycline Oxytetracycline Chlortetracycline Tetracycline Oxytetracycline Chlortetracycline	CHARM II HPLC  HPLC	Kidney Muscle  Honey	20 µg/kg TC 10 µg/kg OTC 100µg/kgCTC 15 µg/kgTC 15 µg/kgOTC 25 µg/kg CTC	100 µg/kg 100 µg/kg 100 µg/kg Not established Not established Not established
B 1	Microbiological test for antibacterial substances	Bacillus subtilis test	Kidney	Inhibition zone > 2 mm	Different See Council Regulation 2377/90
B 1	beta-Lactams in milk	Beta-Star HPLC	Milk	2-4 µg/kg milk 2 µg/kg milk	4 µg/kg milk
B 1	Penicillin-G	HPLC	Kidney	10 µg/kg	50 µg/kg
B 1	Antibacterial substances	Charm II, confirmed by HPLC	Kidney Muscle	Different	Different MRL See Council Regulation 2377/90
B 1	Sulfametazine Sulfadiazine Sulfadoxine	TLC HPLC	Kidney Muscle Liver, Eggs	50 µg/kg 25 µg/kg	100 µg/kg for tissues. No MRL for eggs is established
B1 Ouinolones	Enrofloxacin Ciprofloxacin	HPLC	Muscle	10 µg/kg 10 µg/kg	100 µg/kg
B 1	Oxolinic acid Flumequin	HPLC	Muscle	10 µg/kg 20 µg/kg	300 µg/kg 600 µg/kg
B 2a Anthelmintics	Ivermectin Doramectin Moxidectin	HPLC	Liver	4 µg/kg	Different See Council Regulation 2377/90

<b>Group of substances</b>	<b>Compounds</b>	<b>Laboratory method</b>	<b>Matrix</b>	<b>Detection Limit</b>	<b>Maximum Residue Limit (MRL)</b>
B 2a	Bensimidazoles	HPLC	Muscle Poultry Eggs	Different 20-50 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	Eggs Liver Muscle	Narasin:0.03 µg/kg egg, 5 µg/kg liver Monensin, Salinomycin: 0.1 ug/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>Group of substances</b>	<b>Compounds</b>	<b>Lab. method</b>	<b>Matrix</b>	<b>Detection limit</b>	<b>Maximum Residue Limit (MRL)</b>
B 2 f Others	Dexametazon Betametazon Flumetazon	LC-MS	Urine	2 µg/kg urine	Prohibited as a growth promoter MRL for medical purposes 2377/90 in tissues

Group of substances	Compounds	Lab. method	Matrix	Detection limit	Maximum Residue Limit (MRL)
B 3 a Contaminants: Chlorinated hydrocarbons				<b>LOQ</b>	<b>Bovine, porcine, ovine farmed game, poultry</b>
	HCB	GC-ECD	<b>Fat</b>	0.001 mg/kg fat	0.2 mg/kg
	HCH-alfa			0.001 mg/kg fat	0.2 mg/kg
	Lindane			0.001 mg/kg fat	0.02 mg/kg 0.7 mg/kg (lambs)
	Dieldrin			0.003 mg/kg fat	0.2 mg/kg
	DDTs			0.008 mg/kg fat	1.0 mg/kg
	PCB congeners			0.001 mg/kg fat	0.1 mg/kg (PCB-153)
				<b>Milk</b>	<b>Milk (whole milk)</b>
	HCB			0.03 µ g/kg whole milk	10 µ g/kg
	HCH-alfa			0.03 µ g/kg whole milk	4 µ g/kg
	Lindane			0.01 µ g/kg whole milk	1 µ g/kg
	DDTs			0.08 µ g/kg whole milk	40 µ g/kg
	PCB congeners			0.01 µ g/kg whole milk	PCB 153 1 µ g/kg *
				<b>Muscle</b>	<b>Farmed fish (fresh weight)</b>
	HCB			0.15 µ g/kg fresh weight	not established
	HCH-alfa			0.15 µ g/kg fresh weight	not established
	Lindane			0.06 µ g/kg fresh weight	not established
	DDTs			2.5 µ g/kg fresh weight	not established
	PCB congeners			0.14 µ g/kg fresh weight	PCB 153 0.1 mg/kg
				<b>Yolk</b>	<b>Eggs</b>
	HCB			0.4 µ g/kg fat	0.02 mg/kg
	HCH-alfa			0.16 µ g/kg fat	0.02 mg/kg
	Lindane			0.16 µ g/kg fat	0.1 mg/kg
DDTs			2.4 µ g/kg fat	0.05 mg/kg	
PCB congeners			0.3 µ g/kg fat**	PCB 153 0.1 mg/kg fat	

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

\*\* 0.3 µg/kg fat (CB 52, CB 101, CB153, CB 138), 0.16 µg/kg fat (CB 28, CB 118, CB180)

Group of substances	Compounds	Laboratory method	Matrix	Detection limit	Maximum Residue Limit (MRL)
B 3 b Organophosphorus compounds in bovine, pigs and lambs  In honey	Dichlorvos Acephate Chlorpyrifos-methyl Pirimiphos-methyl Chlorpyrifos Malathion Malathion-O-analog Phoxim Diazinon	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	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 10 µg/kg
	Azinphos-methyl Coumaphos			Honey Honey	0.05 mg/kg 0.05 mg/kg
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
B3 d Mycotoxines	Aflatoxin M1	HPLC	Milk	0.005 µg/kg	0.050 µg/kg milk
	Ochratoxin	HPLC	Kidney	1 µg/kg	Not established
B3 e Others	Malachitgreen Leuco-Malachitgreen	HPLC	Fish muscle	4 µg/kg 2 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 CHROMATOGRAPHY 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 2002

<b>Name and address of laboratory</b>	<b>Substances</b>
<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 egg and honey
Institutet for Fødevaredirektoratet Søborg, Denmark	Malachitgreen and leuco malachitgreen in fish
Hormonlaboratory Aker sykehus, Oslo, Norway	Hormones in fish
Avdelningen for restkoncentrationer Fødevaredirektoratet 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	

## Appendix 4: Residues in live animals and animal products 2002

### Summary of 2002 Sweden results

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	107	0
	Stilbenes	cattle<2 year	slaughterhouse	urine	54	0
	Zeranol	cattle<2 year	on farm	urine	65	0
	Zeranol	cattle<2 year	slaughterhouse	urine	63	0
	Trenbolone	cattle<2 year	on farm	urine	200	0
<b>Natural hormones</b>	17- Oestradiol	cattle<2 year	slaughterhouse	serum	98	0
	Testosterone	cattle<2 year	slaughterhouse	serum	100	0
<b>Thyrostats</b> Methylthiouracil Propylthiouracil Thiamazol	Thyrostats	cattle<2 year	on farm	serum	35	0
			slaughterhouse	serum	38	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol (slaughterhouse)	Beta-agonists	cattle<2 year	on farm	urine	164	0
			slaughterhouse	liver	190	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	cattle<2 year cows	on farm	urine	111	0
			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	1409	10 *
	Enrofloxacin	young bovine cows	slaughterhouse	muscle	58	0
			slaughterhouse	muscle	76	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	young bovine	slaughterhouse	liver	50	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	young bovine	slaughterhouse	liver	5	0

\* One sample contained sulfadoxin, two samples contained oxytetracycline and seven samples contained penicillin-G above MRL

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	30*	0
<b>Sedatives</b>	Acepromazin	bovine	slaughterhouse	urine	63	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	cows	slaughterhouse	serum	52	0
<b>Others</b> <b>Corticosteroids</b> Dexametazon Betametazon	Corticosteroids	cows	slaughterhouse	urine	64	0

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

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	1.0			
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	29			0
<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>				
HCB	29 samples	0 samples				
HCH-alfa						
Lindane						
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>				
Dieldrin	29 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	29 samples	0 samples				
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>				
PCBs	28 samples	1 samples				

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species: Bovines continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>	
<b>Residues examined in each sample:</b>	<b>det.limit ug/kg</b>	<b>MRL ug/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	30	30	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	37	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	5	14	17	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	0	37	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		ug/kg kidney	ug/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	0	0	0

## Residues in live animals and animal products 2002

### Summary of 2002 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	40	0
	Stilbenes	fattening pigs	slaughterhouse	urine	51	0
	Zeranol	fattening pigs	slaughterhouse	urine	70	0
	Trenbolone	fattening pigs	slaughterhouse	urine	100	0
<b>Thyrostats</b> Methylthiouracil Propylthiouracil Thiamazol	Thyrostats	fattening pigs	slaughterhouse	serum	41	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol	Beta-agonists	fattening pigs	slaughterhouse	liver	382	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	pigs>6 months	slaughterhouse	muscle	121	0
		fattening pigs	slaughterhouse	muscle	63	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Animicrobial screen	pigs	slaughterhouse	kidney	6684	0
	Sulphonamides	fattening pigs	slaughterhouse	muscle	22	0
	Enrofloxacin	fattening pigs	slaughterhouse	muscle	151	0
	Ciprofloxacin					
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	pigs>6months	slaughterhouse	liver	127	0
		fattening pigs	slaughterhouse	liver	78	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	fattening pigs	slaughterhouse	muscle	10	0
<b>Pyrethroids</b> Deltametrin Cyflumetrin Cypermetrin Permetrin	Pyrethroids	fattening pigs	slaughterhouse	muscle	12	0
<b>Sedatives</b>	Acepromazin	fattening pigs	slaughterhouse	urine	76	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	sows	slaughterhouse	serum	8	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

Species:Pigs continued

Contaminants:		Chlorinated hydrocarbons incl. PCBs			
<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	1.0			
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			
Species/Age	Sampling target	Matrix	Number of samples		Samples above MRL
fattening pigs	slaughterhouse	fat	25		0

<b>Residue</b>	<b>&lt;0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
HCB	25 samples	0 sample		
a-HCH				
g-HCH				
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>		
Dieldrin	25 samples	0 samples		
<b>Residue</b>	<b>&lt;0.10 mg/kg fat</b>	<b>0.10-0.20 mg/kg fat</b>	<b>0.21-0.50 mg/kg fat</b>	
sum DDT+DDE+DDD	24 samples	0 samples	1 samples	
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
PCBs	25 samples	0 samples		

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species:Pigs continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>	<b>det.limit ug/kg</b>	<b>MRL ug/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	21	21	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	49	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	25	21	2	1

  

<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	43	6	0	0	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species:Pigs continued**

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>Detection limit ug/kg kidney</b>	<b>Action level ug/kg kidney</b>	<b>MRL mg/kg</b>		
Ochratoxin		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	0	0	0

## Residues in live animals and animal products 2002

### Summary of 2002 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	8	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	sheep	slaughterhouse	muscle	7	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Animicrobial screen	sheep	slaughterhouse	kidney	403	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	sheep	slaughterhouse	liver	21	0
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	sheep	slaughterhouse	liver	5	0
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	sheep	slaughterhouse	muscle	5	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 2002**  
**Summary of 2002 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	2.0		
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> HCB a-HCH g-HCH	<b>&lt; 0.01 mg/kg fat</b> 5 samples	<b>0.01-0.05 mg/kg f fat</b> 0 sample	
<b>Residue</b> Dieldrin	<b>&lt;0.03 mg/kg fat</b> 5 samples	<b>0.03-0.05 mg/kg fat</b> 0 samples	
<b>Residue</b> sum DDT+DDE+DDD	<b>&lt;0.10 mg/kg fat</b> 4 samples	<b>0.10-0.20 mg/kg fat</b> 1 samples	
<b>Residue</b> PCBs	<b>&lt;0.01mg/kg fat</b> 5 samples	<b>0.01-0.05 mg/kg fat</b> 0 samples	

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species: Sheep continued**

<b>Contaminants:</b>		<b>Organophosphorus compounds</b>			
<b>Residues examined in each sample:</b>	<b>det.limit ug/kg</b>	<b>MRL ug/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	10	10	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species: Sheep 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 kidney		
Lead (Pb)		0.005	not established		
		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>
sheep	Kadmium Lead	slaughter-house	kidney	5	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	5	0	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	0	5	0	0	

<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		ug/kg kidney	ug/kg kidney	mg/kg kidney		
		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>
Sheep	slaughterhouse	kidney	5	5	0	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	643*	0
	Sulphonamides	horse	slaughterhouse	muscle	23	0
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	horse	slaughterhouse	liver	24	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	horse	slaughterhouse	serum	41	0

\* includes also emergency slaughtered horses on farm

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	6	0	
	Zeranol	reindeer	slaughterhouse	urine	2	0	
	Trenbolone	reindeer	slaughterhouse	urine	0	0	
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol	Beta-agonists	reindeer	slaughterhouse	liver	13	0	
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	reindeer	slaughterhouse	muscle	5	0	
		ostrich	slaughterhouse	muscle	3	0	
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>	
<b>Antibacterial substances</b>	Animicrobial screen	reindeer	slaughterhouse	muscle	6	0	
		ostrich	slaughterhouse	muscle	3	0	
<b>Anthelmintics</b> Ivermectin Doramectin Moxidectin	Avermectins	reindeer	slaughterhouse	liver	14	0	
		ostrich	slaughterhouse	liver	2	0	
<b>Coccidiostats</b> Salinomycin Monensin	Coccidiostats	reindeer	slaughterhouse	liver	3	0	
<b>Pyrethroids</b> Deltametrin Cyflumetrin Cypermethrin Permethrin	Pyrethroids	reindeer	slaughterhouse	muscle	5	0	
		ostrich	slaughterhouse	muscle	2	0	
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	reindeer	slaughterhouse	serum	0	0	
		ostrich	slaughterhouse	serum	1	0	

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	1.0			
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	16		0

<b>Residue</b>	<b>&lt; 0.01 mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
HCB	1 samples	15 samples		
a-HCH	16 samples	0 samples		
g-HCH	16 samples	0 samples		
<b>Residue</b>	<b>&lt;0.03 mg/kg fat</b>	<b>0.03-0.05 mg/kg fat</b>		
Dieldrin	16 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	16 samples	0 samples		
<b>Residue</b>	<b>&lt;0.01mg/kg fat</b>	<b>0.01-0.05 mg/kg fat</b>		
PCBs	16 samples	0 samples		

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	70		0
			liver	70		0
<b>Residue Reindeer</b>						
	<b>&lt;B7040.005-0.100 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	6	1	5
<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	2	1	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	3	0	9	13	19	26
liver	8	12	20	23	7	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	66	1	1	0	2	0
liver	65	3	1	0	0	1

## Residues in live animals and animal products 2002

### Summary of 2002 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	25	0
	Stilbenes	broiler chicken	slaughterhouse	liver	21	0
	Zeranol	broiler chicken	on farm	liver	18	0
	Zeranol	broiler chicken	slaughterhouse	liver	16	0
	Nortestosterone	broiler chicken	on farm	liver	10	0
	Nortestosterone	broiler chicken	slaughterhouse	liver	17	0
<b>Beta-agonists</b> Clenbuterol Salbutamol Mabuterol	Beta-agonists	broiler chicken	slaughterhouse	liver	90	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	broiler chicken	slaughterhouse	muscle	57	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	36	0
		turkey	slaughterhouse	muscle	18	0
		hens	slaughterhouse	muscle	8	0
	Sulphonamides incl. Suphaklozin	turkey	slaughterhouse	muscle	5	0
		hens	slaughterhouse	muscle	9	0
<b>Anthelmintics</b> Bensimidazoles	Fenbendazol Flubendazol Mebendazol Oxfendazol Oxfendazolsulfon Oxibendazol	hens	slaughterhouse	liver	10	0
<b>Coccidiostats</b>	Narasin	broiler chicken	slaughterhouse	liver	102	0
		hens	slaughterhouse	liver	13	0
<b>Pyrethroids</b> Deltamethrin Cyflumethrin Cypermethrin Permethrin	Pyrethroids	broiler chicken	slaughterhouse	muscle	30	0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	turkey	slaughterhouse	serum	4	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species:Poultry 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	1.0	
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	26	0
hens	slaughterhouse	fat	9	0
Total 35 samples				
<b>Residue</b> HCB a-HCH g-HCH	<b>&lt; 0.01 mg/kg fat</b> 35 samples	<b>0.01-0.05 mg/kg fat</b> 0 sample		
<b>Residue</b> Dieldrin	<b>&lt;0.03 mg/kg fat</b> 35 samples	<b>0.03-0.05 mg/kg fat</b> 0 samples		
<b>Residue</b> sum DDT+DDE+DDD	<b>&lt;0.10 mg/kg fat</b> 35 samples	<b>0.10-0.20 mg/kg fat</b> 0 samples		
<b>Residue</b> PCBs	<b>&lt;0.01mg/kg fat</b> 35 samples	<b>0.01-0.05 mg/kg fat</b> 0 samples		

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species:Poultry 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)	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		
<b>Species/Age</b>	<b>Substance</b>	<b>sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Samples above MRL</b>
Broiler chicken	Cadmium	slaughter-house	muscle	15	0
	Lead	slaughter-house	liver	15	0

<b>Residue broiler chicken</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 muscle	12	3	0	0		
liver	14	1	0	0		
<b>Residue broiler chicken</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 muscle	15	0	0	0	0	
liver	0	15	0	0	0	

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species:Poultry continued**

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>det.limit ug/kg muscle</b>	<b>Action level ug/kg muscle</b>	<b>MRL mg/kg muscle</b>		
Ochratoxin		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	5	5	0	0

**Residues in live animals and animal products 2002**  
**Summary of 2002 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	203	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	870 517	0 0
<b>Non-steroidal anti-inflammatory drugs</b>	Fenylbutazon	raw milk	on farm	milk	197	0

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>			
		<b>LOQ</b>	<b>MRL</b>		
<b>Residues examined in each sample:</b>		<b>ug/kg whole milk</b>	<b>ug/kg whole milk</b>		
HCB		0.03	10		
HCH-alfa		0.03	4		
Lindane		0.01	8		
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;2 ug/kg</b>	<b>2-5 ug/kg</b>			
HCB	25 samples	0 samples			
HCH-alfa	25 samples	0 samples			
Lindane	25 samples	0 samples			
<b>Residue</b>	<b>&lt;2 ug/kg</b>	<b>2-5 ug/kg</b>			
sum DDT+DDE+DDD	25 samples	0 samples			
<b>Residue</b>	<b>&lt;1 ug/kg</b>	<b>1-5 ug/kg</b>			
PCBs	25 samples	0 samples			

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

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

Species: Milk continued

<b>Contaminants:</b>		<b>Mycotoxines</b>				
<b>Residues examined in each sample:</b>		<b>detection limit ug/kg milk</b>	<b>Action level ug/kg milk</b>	<b>MRL mg/kg</b>		
Aflatoxin M1		0.005	0.050	not established		
	<b>Sampling random</b>	<b>Matrix</b>	<b>Number of samples</b>	<b>Below 0.005 ug/kg</b>	<b>0.005-0.010 ug/kg</b>	<b>Samples above MRL</b>
	on farm	raw milk	18	18	0	0

## Residues in live animals and animal products 2002

### Summary of 2002 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	139	0
<b>Veterinary drugs</b>						<b>Samples above MRL or action level</b>
<b>Antibacterial substances</b>	Oxytetracycline Tetracycline Chlortetracycline	hens	packing houses	eggs	95	0
	Sulphamethine Sulphaclozine	hens	packing houses	eggs	70	0
<b>Anthelmintics</b> Bensimidazoles	Albendazol Albendazol-sulfon Fenbendazol Oxfendazol Oxfendazolsulfon	hens	packing houses	eggs	10	0
<b>Cocciostats</b>	Narasin	hens	packing houses	eggs	139	0

\* Narasin above quantification level were found in 63 samples. The levels were very low and make no health risk to consumer. More information is given in the Summary of this report

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Product: Eggs continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>			
<b>Residues examined in each sample:</b>		<b>LOQ</b>	<b>MRL</b>		
		<b>ug/kg fat</b>	<b>mg/kg fat</b>		
HCB		0,4	0,2		
HCH-alfa		0,16	0,2		
Lindane		0,16	1,0		
sum DDT+DDE+DDD		2,4	0,5		
CB 28		0,16 ug/kg fat	not established		
CB 52		0,3 ug/kg fat	not established		
CB101		0,3 ug/kg fat	not established		
CB118		0,16 ug/kg fat	not established		
CB153		0,3 ug/kg fat	0,1		
CB138		0,3 ug/kg fat	not established		
CB180		0,16 ug/kg fat	not established		
* fat content > 10 %					
<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 ug/kg fat</b>	<b>2-5 ug/kg fat</b>			
HCB	25 samples	0 samples			
HCH-alfa	25 samples	0 samples			
Lindane	25 samples	0 samples			
<b>Residue</b>	<b>&lt;5 ug/kg fat</b>	<b>5-10 ug/kg fat</b>	<b>11-20 ug/kg fat</b>		
sum DDT+DDE+DDD	20 samples	1 samples	4 samples		
<b>Residue</b>	<b>&lt;5 ug/kg fat</b>	<b>5-10 ug/kg fat</b>	<b>11-20 ug/kg fat</b>		
PCBs	19 samples	5 samples	1 samples		

## Residues in live animals and animal products 2002

### Summary of 2002 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
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	on farm	honey	10	10	0
<b>Veterinary drugs</b>						
<b>Antibacterial substances</b>	Oxytetracycline Tetracycline Chlortetracycline	on farm	honey	30	30	0
<b>Pyrethroids</b>	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 2002**  
**Summary of 2002 Sweden results**

Product:Honey continued

Contaminants:		Heavy metals			
Residues examined in each sample:		det. limit	MRL		
		mg/kg honey	mg/kg honey		
Kadmium (Cd)		0.002	not established		
Lead (Pb)		0.004	not established		
Product	Substance	Sampling target	Matrix	Number of samples	Samples above MRL
honey	Cadmium Lead	on farm	honey	10	0
Residue	<0.002 mg/kg	0.002-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	
Cadmium	7	3	0	0	
Residue	<0.004 mg/kg	0.004-0.100 mg/kg	0.11-0.20 mg/kg	0.21-0.50 mg/kg	
Lead	1	9	0	0	

## Residues in live animals and animal products 2002

### Summary of 2002 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 Synthetic hormones</b>	Stilbenes	rainbow trout	on farm	muscle	8	0
	Stilbenes	char	on farm	muscle	2	0
	Beta-agonists	rainbow trout	on farm	muscle	10	0
<b>Prohibited substances According to Regulation (ECC) 2377/90 Annex IV</b>	Chloramphenicol	rainbow trout	on farm	muscle	5	
	Nitrofurans	rainbow trout	on farm	muscle	4	0
		char	on farm	muscle	1	0
<b>Veterinary drugs</b>						<b>Samples above MRL</b>
<b>Antibacterial substances</b>	Oxytetracycline	rainbow trout	on farm	muscle	9	0
	Tetracycline					
	Chlortetracycline					
	Oxytetracycline	char	on farm	muscle	1	0
	Tetracycline					
	Chlortetracycline					
Oxolinic acid	rainbow trout	on farm	muscle	13	0	
Flumequin						
Oxolinic acid						
Flumequin	char	on farm	muscle	1	0	
<b>Anthelmintics</b>	Avermectins	rainbow trout	on farm	liver	5	0
Ivermectin						
Doramectin						
Moxidectin						

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species: Farmed fish continued**

<b>Contaminants:</b>		<b>Chlorinated hydrocarbons incl. PCBs</b>			
<b>Residues examined in each sample:</b>		<b>LOQ ug/kg fresh weight</b>	<b>MRL mg/kg fresh weight</b>		
HCB		0.15	not established		
HCH-alfa		0.15	not established		
Lindane		0.06	not established		
sum DDT+DDE+DDD		2.5	not established		
CB 28		0.14	not established		
CB 52		0.14	not established		
CB101		0.14	not established		
CB118		0.14	not established		
CB153		0.14	0.1		
CB138		0.14	not established		
CB180		0.14	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 Char	on farm	muscle	10		0
<b>Residue</b>	<b>&lt; 2 ug/kg</b>	<b>2-5 ug/kg</b>	<b>5-10 ug/kg</b>		
HCB	10 samples	0 samples	0 samples		
HCH-alfa					
Lindane					
<b>Residue</b>	<b>&lt;5 ug/kg</b>	<b>5-10 ug/kg</b>	<b>11-20 ug/kg</b>		
sum DDT+DDE+DDD	6 samples	4 samples	0 samples		
<b>Residue</b>	<b>&lt;2 ug/kg</b>	<b>2-5 ug/kg</b>	<b>6-10 ug/kg</b>		
PCBs	7 samples	3 samples	0 samples		

**Residues in live animals and animal products 2002**  
**Summary of 2002 Sweden results**

**Species: Farmed fish continued**

**Contaminants:**

**Heavy metals**

Residues examined in each sample:	det. limit mg/kg	MRL mg/kg
Kadmium (Cd)	0.002	not established
Lead (Pb)	0.004	not established

Species/Age	Substance	Sampling target	Matrix	Number of samples	Samples above MRL
rainbow trout char	Cadmium Lead	on farm	muscle	10	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>	
Cadmium	0	10	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>	
Lead	10	0	0		

**Contaminants:**

**Mycotoxins and other substances**

Residues examined in each sample:	Detection limit ug/kg muscle	Action level ug/kg muscle	MRL mg/kg
Ochratoxin	1	5	not established
Malachitgreen	4	4	not established
Leucomalachitgreen	2	2	not established

Species/Age	Substances	Sampling target	Matrix	Number of samples	Below det. limit	Above action level
Rainbow trout	ochratoxin	on farm	muscle	5	5	0
Rainbow trout	malachitgreen	on farm	muscle	4	4	0
Char	leucomalachitgreen malachitgreen	on farm	muscle	1	0	1*

\* The sample contained 32 ug/kg of malachitgreen and 456 ug/kg of the metabolit leucomalachitgreen  
 The fish farm is under restrictions and no fish can be moved or sold from the farm.

An investigation and follow-up sampling is done by the Border of Agriculture and NFA. See also Summary report

## Residues in live animals and animal products 2002

### Import from third countries

#### Random Sampling

Residues examined	Detection limit ug/kg	Number of samples	Matrix
Chloramphenicol	0.1 ug/kg	14	Shrimps Tigershrimps Scampi
Nitrofurans incl met.	1.0 ug/kg		
Tetracyclines	10 -100 ug/kg		
Enrofloxacin	5 ug/kg		
Chloramphenicol	1 ug/kg	17	Bovine meat
Avermectins	4 ug/kg		
Beta-agonists	1 ug/kg		
Nitrofurans	1.0 ug/kg		
Tetracyclines	10-100 ug/kg		
Zeranol	2 ug/kg		
Trenbolon	2 ug/kg		
Nitrofurans	1 ug/kg	4	Poultry meat
Org.chlor compounds	different subst. se methods	5	lamb meat
		6	bovine meat

Total samles

46

Export country	Product	Number of Samples	Levels above detection limit
Argentina	bovine meat	2	0
Brazil	bovine meat	9	1*
Chile	lamb meat	2	0
Uruguay	bovine meat	5	0
Polen	bovine meat	5	0
New Zealand	lamb meat	3	0
Israel	poultry meat	2	0
Thailand	poultry meat	1	0
Polen	poultry meat	1	0
New Zealand	bovine meat	2	0
Indonesia	shrimps	10	0
Bangladesh	shrimps	1	0
Myanmar	shrimps	1	0
Sura Baya	shrimps	2	0
	<b>Total</b>	<b>46</b>	<b>1</b>

\* Detectable levels of Ivermectin well below MRL were found in one sample