2001 FSIS NATIONAL RESIDUE PROGRAM DATA

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PREFACE

Welcome to the 2001 "Red Book". The Red Book presents the 2001 calendar year Food Safety and Inspection Service (FSIS) National Residue Program Data (NRPD). [For those reading this electronically, this document has been commonly known as the "Red Book" because the covers of the printed versions are red.]

The FSIS National Residue Program (NRP) is a multi-component analytical testing program for detecting residues (veterinary drugs, pesticides and environmental contaminants) in domestic and imported meat, poultry, and egg products. The text of the document explains the different sampling plans and interprets the data collected under the NRP. Results from the various plans are tabulated in the Red Book.

The Red Book includes the following tables for the convenience of the reader: Appendix I, *Summary of the 2001 FSIS Domestic Production Data;* Appendix II, *2001 FSIS National Residue Domestic Monitoring Plan and Special Projects Program Data in a Production Class-Specific Format;* Appendix III, *2001 FSIS National Residue Domestic Monitoring Plan and Special Projects Program Data in a Compound-Specific Format; Appendix* IV, *U.S. Residue Limits for Veterinary Drugs, and Unavoidable Contaminants in Meat, Poultry and Egg Products;* Appendix V, *U.S. Residue Limits for Pesticides in Meat, Poultry, and Egg Products;* Appendix VI, *Analytical Methods, 2001 FSIS National Residue Program* and Appendix VII, *Statistical Table* .

CONTACTS AND COMMENTS

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SECTION 1. INTRODUCTION TO THE FSIS NATIONAL RESIDUE PROGRAM

An essential aspect of food safety is in the control of residues that may result from the use of animal drugs and pesticides, or from incidents involving environmental contaminants. The United States has a complex residue control system, with rigorous processes for approval, sampling and testing, and enforcement. Three principal agencies are involved in the control of residues in meat, poultry, and egg products: the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA) and the Food Safety Inspection Service (FSIS) of the United States Department of Agriculture (USDA). FDA and EPA establish tolerances (maximum permissible levels) for chemical residues in foods, and FSIS enforces these tolerances through its various residue control programs.

FDA establishes tolerances for veterinary drugs and food additives, under the statutory authority of the Federal Food, Drug, and Cosmetic Act (FFDCA). These tolerances are published in Title 21 of the Code of Federal Regulations (21 CFR). EPA establishes tolerances for registered pesticides under the statutory authority of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and FFDCA, as modified by the Food Quality Protection Act (FQPA). These are published in 40 CFR. Maximum permissible levels have also been established for residues that are the result of environmental contamination, such as cancelled pesticides that are no longer approved for use but persist in the environment (e.g., DDT), industrial chemicals (e.g., PCBs), and heavy metals. Tolerances for industrial chemicals and heavy metals are established by FDA and published in 21 CFR. For cancelled pesticides, action levels (similar to tolerances, but less formal), are established by FDA or FSIS, based on recommendations that EPA has published in the Federal Register.

Under the Federal Meat Inspection Act (FMIA), the Poultry Products Inspection Act (PPIA), and the Egg Products Inspection Act (EPIA), FSIS acts to ensure that USDA-inspected meat, poultry and egg products do not contain illegal levels of chemical residues. The cornerstone of FSIS residue prevention activities is the FSIS National Residue Program (NRP), a multi-component analytical testing program for residues in domestic and imported meat, poultry, and egg products. The FSIS NRP, which has been in effect since 1967, provides a variety of sampling plans to prevent violative residues from entering the food supply, and develops national data on the occurrence of chemical residues to support risk assessment, enforcement and educational activities. The range of chemical compounds evaluated for inclusion in the various NRP testing programs is comprehensive in scope. It includes approved and unapproved pharmaceutical drugs and pesticides known or suspected to be present in food animals in the U.S. and in countries exporting products to the U.S. It also includes any other xenobiotic or naturally occurring compounds that may appear in meat, poultry, and egg products and that may pose a potential human health hazard.

The NRP is designed to provide: (1) a structured process for identifying and evaluating compounds of concern by production class; (2) the capability to analyze for compounds of concern; (3) appropriate regulatory follow-up of reports of violative tissue residues; and (4) collection, statistical analysis, and reporting of the results of these activities.

When violative residues are detected in food-producing animals submitted for slaughter, FSIS notifies the producer and other parties involved in offering these animals for sale. Product found to contain violative levels of residues is considered adulterated and is subject to condemnation. If the product has been distributed into commerce, it may be subject to market recall. In addition, FDA and cooperating state agencies may make on-site visits to these firms. Typically, an educational visit by the state is the first step in attempting to correct a residue problem. If the problem is not corrected, subsequent visits, made by FDA, could result in enforcement action, including prosecution. Until September 4, 2001, FSIS also subjected these parties to follow-up enforcement testing until compliance was demonstrated. Beginning on September 5, 2001, this policy was discontinued and a new policy was implemented, in which FSIS will post, on its website, the names and addresses of parties who the FDA has determined are responsible for the repeated sale of livestock or poultry containing violative levels of chemical residues. FSIS believes that this new policy will act as a more effective deterrent against residue violations, while also enabling the Agency to make better use of its residue testing resources.

An additional function of the FSIS NRP is to provide verification of residue control in Hazard Analysis and Critical Control Point (HACCP) systems. Under FMIA, and PPIA, the ultimate responsibility for ensuring that product is not adulterated when it enters commerce rests with the slaughter and processing establishments that produced the product. To define and formalize this responsibility, on July 25, 1996 USDA published the *Final Rule on Pathogen Reduction; Hazard Analysis and Critical Control Point Systems*. The principal focus of this rule is to reduce the incidence of foodborne illness associated with meat and poultry. Part 417 of the HACCP regulation requires meat and poultry establishments to develop and implement a system of preventive measures designed to ensure the safety of their products. In developing their HACCP plans, slaughter establishments must address all chemical, physical, and biological hazards that are reasonably likely to occur in the animals that enter their plants. Therefore, as part of the HACCP regulation, slaughter and processing establishments are required to identify all chemical residue hazards that are reasonably likely to occur, and develop systems to guard against them. A vigilant chemical residue prevention program is essential to foster the prudent use of drugs and pesticides in animals that enter the human food supply. The requirement that establishments implement HACCP systems is a significant step in this evolutionary process.

The goals of the NRP can be summarized as follows:

- Enforce Federal laws and regulations;
- Maintain consumer confidence by ensuring that meat, poultry, and egg products are not adulterated;
- Act as a deterrent against the slaughter of adulterated animals and the processing of adulterated eggs;
- Identify violative product and prevent its entry into the food supply;
- Assess and communicate human exposure to chemical residues; and
- Provide verification of residue control in HACCP systems.

SECTION 2. COMPONENTS OF THE FSIS NATIONAL RESIDUE PROGRAM

DOMESTIC RESIDUE SAMPLING PROGRAM

The Food Safety and Inspection service (FSIS) National Residue Program (NRP) provides a variety of sampling plans to verify and enforce that slaughter establishments are fulfilling their responsibilities under the Hazard Analysis and Critical Control Point (HACCP) regulation, and in accordance with Food and Drug Administration (FDA) and Environmental Protection Agency (EPA) regulations, to prevent the occurrence of violative residues. The NRP also collects and uses national data on chemical residues to support risk assessment, enforcement, and educational activities. All residue data is collected and stored in the Microbiological and Residue Computer Information System (MARCIS). Detailed information on violations is immediately transferred to the Residue Violation Information System (RVIS), which facilitates regulatory follow-up on violations and tracking of residue violators by both FSIS and FDA.

Components of the NRP for domestically produced products include:

- Monitoring Plan – the random sampling of specified animal populations at time of slaughter to provide information about the occurrence of residue violations on an annual, national basis. Monitoring information is obtained through a statistically based random selection of specimens from animals that that have passed inspection and therefore been permitted entry into the food supply. Generally, production classes are sampled at one of four levels (460 samples/year, 300 samples/year, 230 samples/year, or 90 samples/year). The probability of detecting a violation varies positively with the number of samples analyzed and the true violation rate of the production class being tested. The results are also used to identify producers or other entities marketing animals with violative concentrations of residues. When such producers subsequently offer animals for slaughter, the animals may be subjected to Enforcement Testing until compliance is demonstrated. The carcass is not retained after the sample is taken

- Special Projects – information-gathering studies that do not meet the criteria for inclusion in the Monitoring Plan, e.g., when sampling will not be conducted over a full 12-month period, or when there is a lack of precise slaughter volume data on the production classes to be sampled. This designation is also used when it is not possible to determine a "violation rate" for a compound because the violative level has not been defined. Many chemicals, such as heavy metals, industrial chemicals, and mycotoxins, may be inadvertently present in animals. Their presence in edible tissues, and the resulting need for limits to protect public health, has not been established. FSIS may conduct studies to develop information on the frequency and concentration at which such residues occur.

- Surveillance Plan – sampling is designed to investigate and control the occurrence of residue violations in animal populations. Surveillance consists of random sampling designed to distinguish components of livestock, poultry, and egg products in which residue problems exist, measure the extent of problems, and evaluate the impact of actions taken to reduce the

occurrence of residues. Depending upon the weight of evidence that led to the testing, product may be retained until test results indicate the appropriate regulatory disposition.

- Enforcement Testing – the analysis of specimens collected from individual animals or lots that appear suspicious to FSIS in-plant inspectors, based on herd history or antemortem or postmortem inspection. Enforcement Testing is performed to detect individual animals with violative concentrations of residues. This testing is emphasized in problem populations (those with a high prevalence of residue violations) and used as a tool to prevent carcasses with violative residues from entering the food supply. It is also used to follow up on producers and others who have marketed animals with violative concentrations of residues to determine if the non-compliance has been corrected, or to verify the performance of an establishment's Hazard Analysis and Critical Control Point (HACCP) system in controlling violative residues.

It is important to emphasize the differences between the types of samples collected under the Monitoring Plan and Special Projects, as compared with those collected under Enforcement Testing. Since the former plans are designed to collect information upon the prevalence of residue violations in the U.S. food supply, these plans collect samples only from animals that appear normal and healthy at time of slaughter and thus pass USDA inspection and are permitted entry into the food supply. By contrast, since Enforcement Testing is designed to prevent violative product from entering the food supply, it is targeted towards animals that do not appear to be normal or healthy, or which show abnormal postmortem signs, or which are suspicious based on herd history. Enforcement Testing occasionally also includes samples from animals that have already been condemned based on postmortem inspection.

Further, because carcasses sampled under Enforcement Testing are by definition "suspect," and because a principal goal of Enforcement Testing is to prevent adulterated meat, poultry, and egg products from entering the food supply, all carcasses sampled under Enforcement Testing are held pending the results of official laboratory testing (unless on-site screening tests, described below, show them to be negative, or unless they have already been condemned by the inspector for other reasons). Carcasses found to contain violative concentrations of residues are considered adulterated and are condemned. By contrast, carcasses sampled under the Monitoring Plan and Special Projects are not held pending the results of testing. This is because the primary purpose of these sampling plans is information gathering (and identification of emerging residue problems), rather than direct removal of violative product from the food supply. Additionally, carcasses tested under the Monitoring Plan and Special Projects are unlikely to be violative; violations for most combinations of compound classes and production classes are below 0.3%.

Finally, all samples collected under the Monitoring Plan and Special Projects are submitted directly to an FSIS laboratory for testing. By contrast, Enforcement Testing makes extensive use of rapid on-site screening tests. Because FSIS in-plant inspectors are required to subject all carcasses for which there is a suspicion of a residue violation to Enforcement Testing, many such tests are performed, typically between 100,000 and 200,000 annually. However, it is not practical for FSIS to carry out expensive and time-consuming laboratory tests on this number of Enforcement samples each year. Therefore, to perform such a large number of tests efficiently, carcasses are first pre-screened on-site by FSIS inspectors using rapid screening tests, where such tests are available. In this way, only those samples that test positive by a screening test

(again, where such tests are available) are sent to an official laboratory for follow-up testing. If an FSIS inspector suspects that a carcass may contain a violative level of a residue not detected by an official FSIS screening method (see below), a sample taken from that carcass is sent directly to an official laboratory for testing.

As explained above, the use of on-site rapid screening tests also facilitates rapid decisions on carcass disposition. A carcass that registers a positive result on the screening test is held pending the outcome of laboratory testing, while one that registers a negative result is permitted to enter the food supply (unless the FSIS inspector has condemned it for some other reason).

FSIS currently employs the following on-site rapid screening tests (as of this year, CAST, or Calf Antibiotic and Sulfonamide Test, which had been used for several years to test bob veal calves, has been replaced by FAST, because of the latter's superior speed and sensitivity):

- Sulfa-On-Site (SOS) was implemented in April 1988 to test swine urine for sulfonamide residues. SOS is used in many of the largest swine slaughtering facilities.
- Swab Test on Premises (STOP) was implemented in 1979 to detect the presence of antibiotic residues in kidney tissues. Originally developed for testing dairy cows, STOP is now approved for use in all species. While STOP is not designed to detect sulfonamides, it can register a positive at high concentrations. Additionally, producers will often use antibiotics in combination with sulfonamides. For these two reasons, the FSIS laboratory tests STOP positive samples for sulfonamides as well as antibiotics.
- Fast Antimicrobial Screen Test (FAST) quickly detects both antibiotic and sulfonamide drug residues in kidneys and livers. At this time, it has been approved for use in bovine animals only. It has proved to be a suitable replacement for CAST and STOP in this species, as it is both quicker and more sensitive. FAST was implemented in bovine pilot plants in 1995. Its use was extended to approximately 50 of the largest cow and bob veal slaughtering plants in 1996, and it is currently employed in all plants that slaughter cattle.

Contamination Response System

The Contamination Response System (CRS) is not a testing plan, but rather an emergency response management system for FSIS, FDA, and EPA. There are certain pesticides and environmental contaminants whose detection may suggest the occurrence of a potential risk to consumers. To ensure against this, detection of these residues immediately initiates a rapid follow-up investigation to characterize and address the residue problem. Actions taken may include investigation of any entity from the producer to the retailer and, if needed, withdrawal of the product from the market. This system is also triggered following the detection of banned veterinary drugs. On October 22, 2001, FSIS Directive 10,530.3, Contamination Response System was canceled.

IMPORT RESIDUE SAMPLING PROGRAM

The Federal Meat Inspection Act (FMIA), Poultry Products Inspection Act (PPIA), and Egg Products Inspection Act (EPIA) require foreign countries that export meat, poultry, or egg products to the U.S. to establish and maintain inspection systems that are equivalent to those of the U.S. Countries must undergo a rigorous review process before they can become eligible to export meat, poultry and egg products to the U.S.

Residue control is a major feature of an inspection system that must be judged equivalent to the U.S. system before a country becomes eligible to export to the U.S. Foreign countries exporting to the U.S. are required to have protection from foodborne hazards equivalent to that of the U.S. These may include the following: random sampling of animals at slaughter; use of approved testing methods; testing appropriate target tissues, even though such tissue may not be exported to the U.S.; testing for compounds identified as potential contaminants of meat exported to the U.S.; and random sampling of eggs presented for processing.

After a foreign country is determined to have an equivalent system of inspection and becomes eligible to export product to the U.S., FSIS relies on the country's national inspection authorities to certify that establishments meet all applicable standards and are authorized to export to the U.S. FSIS performs periodic audits of the foreign inspection systems. The frequency and extent of audits depend on the country's performance history, including the results from previous plant reviews and product reinspection at the port-of-entry. If a country does not maintain an inspection system equivalent to the U.S. system, it is not permitted to export product to the U.S.

As a further check on the effectiveness of the foreign inspection system, FSIS randomly samples meat, poultry, and egg products for residues at the U.S. port-of-entry. Sampling at the port-of-entry is based on the Import Residue Plan, which is designed annually by FSIS. Components of FSIS import residue sampling include Monitoring, Increased Monitoring, Surveillance, and Exploratory Testing. These are described below.

- Monitoring involves the sampling of specified raw or processed products to provide information about the occurrence of residue violations on an annual, international basis. Monitoring information is obtained through a statistically based random selection of products that have passed inspection from the foreign country. The probability of detecting a violation varies positively with the number of samples analyzed and the true violation rate of the product being tested. The results are used to identify countries whose product contains violative concentrations of residues. When a violation is found in a product, the foreign country is subjected to increased testing until compliance is demonstrated. The product is not retained after the sample is taken.

- Increased Monitoring occurs when FSIS finds a violation in a sample from a foreign country.

- Surveillance Testing occurs when FSIS suspects that product from a specific country might have violative concentrations of a residue. Surveillance is designed to measure the extent of problems, and to evaluate the impact of actions taken to reduce the occurrence of residues in imported products.

- Exploratory Testing occurs when FSIS determines a need to study a specific product or compound that is being imported from one or more countries.

Residue sampling of meat and poultry is directed by the Automated Import Information System (AIIS), which stores results from all port-of-entry samples for each country and for each plant. All shipments are inspected for transportation damage, labeling, proper certification, general condition, and accurate count. AIIS assigns a variety of types of inspections, which may include analysis for chemical residues. Residue analyses are not limited to those compounds included in the domestic residue program. FSIS can initiate a special sampling plan when there is a need to monitor a country for residues of a specific compound, based on detection of violative residues at port of entry, or other information concerning risk to human health. Decisions about product acceptability are based on U.S. tolerances or action levels.

The first ten shipments of egg products from individual foreign establishments are subjected to 100 percent reinspection, to establish a history of compliance for each product category. This level is reduced a random selection of one reinspection out of eight shipments, which continues as long as the product is in compliance. If a positive result is found in an egg product, import requests would be denied until foreign officials and FSIS determined that egg products originating from that country are safe for human consumption.

Shipments that are sampled during routine monitoring are eligible to be stamped with the U.S. mark of inspection and allowed to enter commerce prior to receipt of the results of the analysis. If violative results are subsequently reported, imported product bearing the U.S. mark of inspection cannot be used as human food; the importer does not have the option of recalling the product and exporting it from the U.S. It must either be destroyed or, if approved by FDA, converted to animal food. By contrast, if the importer chooses to voluntarily hold the shipment until the results are received, and the results are found to be violative, the shipment is refused entry as human food, and is either exported from the United States, destroyed or, if approved by FDA, allowed entry to the U.S. as animal food.

SECTION 3. 2001 FSIS DOMESTIC MONITORING PLAN AND SPECIAL PROJECTS RESULTS

This section reports the results from the Domestic Monitoring Plan and Special Projects from the 2001 FSIS National Residue Program. Descriptions of the Domestic Monitoring Plan and Special Projects are found in section 2 on page 3.

The Domestic Monitoring Plan and Special Projects are designed to detect, with a predetermined level of confidence, specific compounds in each designated production class. These sampling plans are not designed to provide an estimate of an overall national percentage of violations for all chemical residues or all production classes tested. The percentage occurrence of violations or positive findings can be considered representative only within a production class/compound pair. **The data on violations reported here should not be summed across either production class or analysis with the intent of arriving at a single value to represent the percentage occurrence of violations over all the species that were tested using a given analysis. This mathematical operation will not produce a statistically valid estimate, given the sample design in use. Care must be taken when making statistical inferences from these data.**

The sample selection procedure is designed to approximate the selection of a simple random sample of a production class of animals. Within a production class/compound pair, the results of the sampling may be considered as representative of that entire production class population. Hence, the percentage of violations in each pair is a statistically valid estimate of the corresponding production class population percentage. Therefore, the information presented includes these estimates of percent violations, along with appropriate confidence intervals. The two-sided 95% confidence intervals for the population percentage of violations are given (i.e., the probability is approximately 95% that the interval ranging from the lower bound through the upper bound will contain the true population value). The confidence intervals were computed using a binomial distribution.

The violations and non-violative positives reported in the “2001 FSIS National Residue Program Data” represent the number of samples analyzed. Samples analyzed, generally, are from a single animal, except in the case of poultry. A poultry sample is a composite of six birds taken from the same flock. FSIS employs several multi-residue methods (MRM’s), which are capable of simultaneous identification and quantitation of multiple residues. Consequently, animals analyzed with an MRM could have more than one violation. Regardless of how many violations are found in a given animal, the results are reported as one violative animal and the number “1” is entered in the table under the column “Number of Violations”. The actual number and identity of individual violative residues are reported in the “Specific Violative Residues” section.

The FSIS Domestic Monitoring Plan and Special Projects often require several different analyses to be carried out on each production class. This reduces sample collection time in the field, shipping costs, and sample preparation time in the laboratory, without compromising the statistical basis of the sampling plan. In such cases, the results of each analysis are reported independently.

In 2001**,** the FSIS Domestic Monitoring Plan and Special Projects sampled and tested 12 compound classes of veterinary drugs and pesticides, comprising approximately 59 residues. Of the 32,090 Domestic Monitoring Plan and Special Project samples analyzed, 64 residue violations were found in 64 animals and egg products. The violations consisted of 30 antibiotics, six arsenicals, 10 avermectins/milbemycins, 15 sulfonamides, one chlorinated hydrocarbon/chlorinated organophosphate and two zeranol. No residue violations were found in the testing of fluoroquinolones, carbadox, chloramphenicol, diethylstilbestrol, melengesterol acetate and ractopamine. The majority of the violations were from illegal levels of approved animal drugs, particularly sulfonamides and antibiotics used to prevent or treat bacterial infections. Most antibiotic and sulfonamide residue violations are confined to a relatively small percentage of livestock, poultry and egg products. The most common cause of violations of approved drugs in livestock, poultry, and egg products is a failure to allow an adequate withdrawal time for the drugs to clear the animal's system. The illegal residues are usually concentrated in kidney, liver, or fat rather than muscle meat. The FSIS sampling focuses on kidney and liver tissues, since most FDA limits are established for these tissues.

Tables 3.1 through 3.6, *2001 FSIS Domestic Residue Plan Results,* present the following information for analysis conducted under the Domestic Monitoring Plan and Special Projects: the total number of animals (or the number of composite samples in the case of poultry) or egg products sampled; the number of violations and non-violative positives (i.e., compounds detected at a level equal to or below the established tolerance) detected; the percent violations; and the confidence interval for the percent violations.

ANTIBIOTIC RESULTS

An antibiotic is a chemical substance, which has the capacity, in dilute solutions, to inhibit the growth of microorganisms or destroy them. In 2001, FSIS analyzed 7,866 Domestic Monitoring Plan and Special Projects samples for antibiotic residues. Samples were screened by FAST and positives were further analyzed using the FSIS 7-plate Bioassay. Thirty antibiotic violations were detected in 30 animals from several production classes. The following antibiotics are quantitated by the FSIS 7-plate Bioassay multi-residue method and associated follow-up analytical methodologies.

Bacitracin
Chlortetracycline
Erythromycin
Flavomycin
Gentamicin sulfate
Hygromycin
Neomycin
Novobiocin
Oxytetracycline
Penicillins
Streptomycin
Tetracycline
Tilmicosin
Tylosin

The results of the antibiotic FSIS 7-plate Bioassay testing are in Table 3.1 below.

Table 3.1
Antibiotics
2001 FSIS Domestic Residue Plan Results

Production Class	**Monitoring and Special Projects**				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Horses	392	35	5	1.3	(0.42,2.95)
Bulls	231	1	0	0.0	(0.00,1.58)
Beef cows	294	2	1	0.3	(0.01,1.88)
Dairy cows	699	0	5	0.7	(0.23,1.66)
Heifers	508	2	1	0.2	(0.00,1.09)
Steers	470	0	0	0.0	(0.00,0.78
Bison	40	0	0	0.0	(0.00,8.81)
Bob veal	400	15	11	2.8	(1.38,4.87)

Table 3.1 - *continued*
Antibiotics
2001 FSIS Domestic Residue Plan Results

Production Class	**Monitoring and Special Projects**				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Formula-fed veal	724	43	1	0.1	(0.00,0.77)
Non-formula-fed veal	106	1	1	0.9	(0.02,5.14)
Heavy calves	139	1	0	0.0	(0.00,2.62)
Sheep	118	0	0	0.0	(0.00,3.08)
Lambs	344	3	0	0.0	(0.00,1.07)
Goats	216	2	0	0.0	(0.00,1.69)
Market hogs	672	35	0	0.0	(0.00,0.55)
Boars/Stags	153	5	0	0.0	(0.00,2.38)
Roaster pigs	112	23	0	0.0	(0.00,3.24)
Sows	296	11	4	1.4	(0.37,3.42)
Young chickens	506	2	0	0.0	(0.00,0.73)
Mature chickens	227	0	0	0.0	(0.00,1.61)
Young turkeys	477	2	0	0.0	(0.00,0.77)
Mature turkeys	197	3	0	0.0	(0.00,1.86)
Ducks	238	0	0	0.0	(0.00,1.54)
Squabs	27	0	0	0.0	(0.00,12.77)
Ratites	91	0	0	0.0	(0.00,3.97)
Rabbits	189	75	1	0.5	(0.01,2.91)
Total	**7,866**	**219**	**30**		

SPECIFIC ANTIBIOTIC VIOLATIVE RESIDUES

Monitoring and Special Projects:

Horses: 4 penicillin, 1 gentamicin sulfate
Beef cows: 1 neomycin
Dairy cows: 1 penicillin, 1 oxtetracycline, 3 gentamicin sulfate
Heifers: 1 penicillin
Bob veal: 11 neomycin
Formula-fed veal: 1 gentamicin sulfate
Non-formula-fed veal: 1 neomycin
Sows: 4 penicillin
Rabbits: 1 penicillin

SULFONAMIDE RESULTS

Sulfonamides are a group of sulfa drugs, some with bacteriostatic activity, used to treat infections. In 2001, FSIS analyzed 6,308 Domestic Monitoring Plan and Special Projects samples and 15 violations were detected in 15 animals from several production classes. The following sulfonamides are analyzed for residue violations.

Sulfabromomethazine	Sulfaguanidine	Sulfaphenazole
Sulfacetamide	Sulfamerazine	Sulfapyridine
Sulfachlorpyridazine	Sulfamethazine	Sulfaquinoxaline
Sulfadiazine	Sulfamethizole	Sulfasalazine
Sulfadimethoxine	Sulfamethoxazole	Sulfathiazole
Sulfadoxine	Sulfamethoxypyridazine	Sulfatroxazole
Sulfaethoxypyridazine	Sulfanilamide	Sulfisoxazole

The results from the sulfonamide testing are reported in Table 3.2 below.

Table 3.2
Sulfonamides
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Horses	191	0	0	0.0	(0.00,1.91)
Bulls	314	1	0	0.0	(0.00,1.17)
Beef cows	300	0	0	0.0	(0.00,1.22)
Dairy cows	308	0	1	0.3	(0.01,1.80)
Heifers	322	0	0	0.0	(0.00,1.14)
Steers	318	0	0	0.0	(0.00,1.15)
Bison	34	0	0	0.0	(0.00,10.28)
Bob veal	281	0	3	1.1	(0.22,3.09)
Formula-fed veal	316	0	3	0.9	(0.20,2.75)
Non-formula-fed veal	114	1	0	0.0	(0.00,3.18)
Heavy calves	137	0	1	0.7	(0.02,4.00)
Lambs	352	0	1	0.3	(0.01,1.57)
Goats	206	0	0	0.0	(0.00,1.77)
Market hogs	467	2	2	0.4	(0.05,1.54)
Boars/Stags	161	0	1	0.6	(0.02,3.41)
Roaster pigs	121	0	2	1.7	(0.20,5.84)
Sows	457	1	0	0.0	(0.00,0.80)
Young chickens	296	0	0	0.0	(0.00,1.24)

Table 3.2 - *continued*
Sulfonamides
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Mature chickens	292	0	0	0.0	(0.00,1.26)
Young turkeys	318	0	0	0.0	(0.00,1.15)
Mature turkeys	257	0	1	0.4	(0.01,2.15)
Egg products	393	0	0	0.0	(0.00,0.93)
Squabs	31	0	0	0.0	(0.00,11.22)
Ratites	79	0	0	0.0	(0.00,4.56)
Ducks	243	0	0	0.0	(0.00,1.51)
Total	**6,308**	**5**	**15**		

SPECIFIC SULFONAMIDE VIOLATIVE RESIDUES

Monitoring and Special Projects:

Dairy cows: 1 sulfadimethoxine
Bob veal: 2 sulfadimethoxine, 1 sulfathiazole
Formula-fed veal: 2 sulfadimethoxine, 1 sulfamethazine
Heavy calves: 1 sulfamethazine
Lambs: 1 sulfadimethoxine
Market hogs: 2 sulfamethazine
Roaster pigs: 2 sulfamethazine
Boars/Stags: 1 sulfamethazine
Mature turkeys: 1 sulfadimethoxine

ARSENICAL RESULTS

Arsenical compounds are used in food-producing animals (swine and poultry) primarily as growth promoters and to prevent bacterial enteritis. In 2001, FSIS analyzed 3,924 Domestic Monitoring Plan and Special Projects samples for arsenic and six violations were detected in six animals. The results of the arsenical testing are reported in Table 3.3 below.

Table 3.3
Arsenical
2001 FSIS Domestic Residue Plan Results

Production Class	**Monitoring and Special Projects**				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Beef cows	308	0	0	0.0	(0.00,1.19)
Goats	265	0	1	0.4	(0.01,2.08)
Market hogs	321	0	0	0.0	(0.00,1.14)
Boars/Stags	53	0	0	0.0	(0.00,6.72)
Roaster pigs	95	1	0	0.0	(0.00,3.81)
Sows	232	2	0	0.0	(0.00,1.58)
Young chickens	1207	650	3	0.2	(0.05,0.72)
Mature chickens	224	15	0	0.0	(0.00,1.63)
Young turkeys	483	22	0	0.0	(0.00,0.76)
Mature turkeys	77	1	0	0.0	(0.00,4.68)
Ducks	259	0	2	0.8	(0.09,2.76)
Egg products	400	0	0	0.0	(0.00,0.92)
Total	**3,924**	**691**	**6**		

CHLORINATED HYDROCARBONS, CHLORINATED ORGANOPHOSPHATES and PHENYLBUTAZONE RESULTS

Chlorinated hydrocarbons and chlorinated organophosphates are used as insecticides. In 2001, FSIS analyzed 7,342 Domestic Monitoring Plan samples for chlorinated hydrocarbons and chlorinated organophosphates, and one violation was found. Listed below are the chlorinated hydrocarbons and chlorinated organophosphates analyzed.

Aldrin
Benzene hexachloride (BHC)
Carbophenothion (trithion)
Chlordane (technical)
2-Chloro-1 (2,4,-dichlorophenyl)vinyl diethyl phosphate [chlorfenvinphos, supona]
2-Chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl phosphate [stirofos, gardona]
Chlorpyrifos
Coumaphos and oxygen analog
DDT and metabolites
Dieldrin
Dodecachlorooctahydro-1,3,4-metheno-2H-cyclobuta(cd)pentalene [mirex]
Endosulfan and metabolites
Endrin
Heptachlor and heptachlor epoxide
Hexachlorobenzene (HCB)
Lindane
Linuron
Methoxychlor
Phosalone
Polybrominated biphenyls
Polychlorinated biphenyls

Phenylbutazone is a nonsteroidal anti-inflammatory drug that is not registered for use in food animals. It can cause aplastic anemia and agranulocytosis. The method used to analyze for chlorinated hydrocarbons and chlorinated organophosphates is used to screen for residues of phenylbutazone. In 2001, FSIS analyzed 7,342 Domestic Monitoring Plan samples for phenylbutazone and no violations were found. The results of the chlorinated hydrocarbons, chlorinated organophosphates and phenylbutazone analysis are reported in Table 3.4 below.

Table 3.4
Chlorinated Hydrocarbons, Chlorinated Organophosphates (CHC's/COP's) and Phenylbutazone
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Horses	236	24	0	0.0	(0.00,1.55)
Bulls	297	47	0	0.0	(0.00,1.23)
Beef cows	455	41	0	0.0	(0.00,0.81)
Dairy cows	452	63	0	0.0	(0.00,0.81)
Heifers	487	13	1	0.2	(0.01,1.14)
Steers	479	22	0	0.0	(0.00,0.77)
Bison	45	1	0	0.0	(0.00,7.87)
Bob veal	263	37	0	0.0	(0.00,1.39)
Formula-fed veal	324	2	0	0.0	(0.00,1.13)
Non-formula-fed veal	114	17	0	0.0	(0.00,3.18)
Heavy calves	187	45	0	0.0	(0.00,1.95)
Sheep	241	36	0	0.0	(0.00,1.52)
Lambs	340	40	0	0.0	(0.00,1.08)
Goats	292	31	0	0.0	(0.00,1.26)
Market hogs	436	5	0	0.0	(0.00,0.84)
Boars/Stags	218	24	0	0.0	(0.00,1.68)
Sows	282	11	0	0.0	(0.00,1.30)
Young chickens	423	2	0	0.0	(0.00,0.87)

Table 3.4 - *continued*
Chlorinated Hydrocarbons, Chlorinated Organophosphates, and Phenylbutazone
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Mature chickens	297	4	0	0.0	(0.00,1.23)
Young turkeys	471	3	0	0.0	(0.00,0.78)
Mature turkeys	197	2	0	0.0	(0.00,1.86)
Ducks	251	3	0	0.0	(0.00,1.46)
Ratites	90	28	0	0.0	(0.00,4.02)
Squabs	33	1	0	0.0	(0.00,10.58)
Rabbits	70	5	0	0.0	(0.00,5.13)
Egg products	362	0	0	0.0	**(**0.00,1.01)
Total	**7,342**	**461**	**1**		

SPECIFIC CHC's/COP's and PHENYLBUTAZONE VIOLATIVE RESULTS

Monitoring and Special Projects:

Heifers: 1 Polybrominated biphenyl

AVERMECTINS (IVERMECTIN and DORAMECTIN) and MILBEMYCINS (MOXIDECTIN) RESULTS

Avermectins and milbemycins are macrocyclic lactones used in animal husbandry against nematode and arthropod parasites. Ivermectin is active against a wide variety of parasites. Doramectin is a potent endectocide that combines broad-spectrum activity with a prolonged duration of activity offering broad-spectrum activity against the major internal and external parasites of cattle. Moxidectin is an antiparasitic drug that is used to control a range of internal and external parasites in sheep, cattle and deer. In 2001, FSIS analyzed 4,527 Domestic Monitoring Plan and Special Projects samples for avermectin and milbemycin and ten violations were found in ten animals. The results of the avermectin and milbemycin testing are reported in Table 3.5 below.

Table 3.5
Avermectins and Milbemycins
2001 FSIS Domestic Residue Plan Results

Production Class	**Monitoring and Special Projects**				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Horses	406	0	5	1.2	(0.40,2.85)
Bulls	323	11	2	0.6	(0.08,2.22)
Beef cows	307	4	0	0.0	(0.00,1.19)
Diary cows	305	2	0	0.0	(0.00,1.20)
Heifers	322	0	0	0.0	(0.00,1.14)
Steers	482	0	0	0.0	(0.00,0.76)
Bison	34	0	0	0.0	(0.00,10.28)
Bob veal	214	0	0	0.0	(0.00,1.71)
Formula-fed veal	238	6	0	0.0	(0.00,1.54)
Non-formula-fed veal	120	1	0	0.0	(0.00,3.03)
Heavy calves	157	0	0	0.0	(0.00,2.32)
Sheep	66	0	0	0.0	(0.00,5.44)
Lambs	357	0	0	0.0	(0.00,1.03)

Table 3.5 - *continued*
Avermectins and Milbemycins
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Goats	272	0	3	1.1	(0.23,3.19)
Market hogs	321	0	0	0.0	(0.00,1.14)
Boars/Stags	53	0	0	0.0	(0.00,6.72)
Roaster pigs	94	0	0	0.0	(0.00,3.85)
Sows	232	0	0	0.0	(0.00,1.58)
Ratites	82	0	0	0.0	(0.00,4.40)
Rabbits	142	0	0	0.0	(0.00,2.56)
Total	**4,527**	**24**	**10**		

SPECIFIC AVERMECTIN and MILBEMLYCIN VIOLATIVE RESIDUES

Monitoring and Special Projects:

Horses: 3 ivermectin, 2 moxidectin
Bulls: 2 ivermectin
Goats: 1 ivermectin, 2 moxidectin

FLUOROQUINOLONES RESULTS

Fluoroquinolones are a modern group of therapeutic antibiotics, which are active against a range of bacteria. In 2001, FSIS analyzed 677 samples for fluoroquinolones and no violations were found. The results from the testing are reported in Table 3.6 below.

Table 3.6
Fluoroquinolones
2001 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects				
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval
Dairy cows	461	0	0	0.0	(0.00,0.80)
Young chickens	216	0	0	0.0	(0.00,1.69)
Total	**677**	**0**	**0**		

CARBADOX RESULTS

Carbadox is a coccidiostat registered for use in swine. Carbadox is used to control swine dysentery, bacterial swine enteritis, and to increase weight gain. Thirty-three roaster pigs were tested in 2001, for carbadox. No violations were found in any of the animals tested.

CHLORAMPHENICOL RESULTS

Chloramphenicol is used in the treatment of infections caused by bacteria. It works by killing bacteria or preventing their growth. Three hundred and seven dairy cows, 323 formula-fed veal and 108 non-formula-fed veal were tested in 2001, for chloramphenicol. No violations were found in any of the animals tested.

DIETHYLSTILBESTROL/ZERANOL RESULTS

Diethylstilbestrol (DES) is a non-steroid, synthetic estrogen. The use of DES is prohibited in food producing animals. Zeranol is a mycotoxin produced by *Fusarium* spp. Zeranol produces hyperestrogenic syndrome in swine. Eight formula-fed veal were tested in 2001 for DES/zeranol. No DES violations were found, while two zeranol violations were found in the animals tested.

MELENGESTROL ACETATE RESULTS

Melengestrol acetate is a progestational and antineoplastic agent used as a growth stimulating feed additive for beef cattle. No violations were found in the 2001 Special Projects sampling of 240 heifers.

RACTOPAMINE RESULTS

Ractopamine is used for increased rate of weight gain, improved feed efficiency, increased carcass leanness, and prevention and/or control of porcine proliferative enteropathies (ileitis). No violations were found in the 2001 Special Projects sampling of 125 steers and 294 market hogs.

SECTION 4. 2001 FSIS DOMESTIC ENFORCEMENT RESULTS

This section reports the results of the FSIS enforcement sampling from the 2001 FSIS National Residue Program. As previously stated, the principle goal of FSIS enforcement testing is to prevent adulterated meat, poultry, and egg products from entering the food supply.

The FSIS Enforcement results include the follow-up testing. In follow-up testing, the inspector takes samples from producers or other parties who had previously marketed animals with violative concentrations of residues. Testing is conducted to determine if the non-compliance has been corrected, or to verify that an establishment's Hazard Analysis and Critical Control Point system has corrected the problem.

On September 5, 2001, FSIS changed the action to be taken when livestock or poultry are presented for slaughter at official establishments that come from producers and others who have previously marketed such animals with violative levels of drug, pesticide, or other chemical residues. FSIS began posting on its website the names and addresses of the sellers of livestock and poultry who the Food and Drug Administration has determined are responsible for the repeated sale of livestock or poultry containing violative levels of chemical residues.

If in-plant screening tests are not available, enforcement samples from suspect animals are collected by veterinarians and sent to an FSIS official laboratory for analysis. However, if in-plant screening tests are available, enforcement samples from suspect animals are tested on-site by FSIS veterinarians using either the Swab Test on Premises (STOP) or the Fast Antimicrobial Screen Test (FAST). Samples that test positive by a screening test are then sent to an official laboratory for confirmation. A description of these sampling programs is found in section 2 on pages 4 through 6.

RESULTS FROM 2001 FSIS FOLLOW-UP ENFORCEMENT TESTING

When violative residues are detected in food-producing animals submitted for slaughter, FSIS notifies the producer and any parties involved in offering these animals for sale. These parties are subject to follow-up enforcement testing until compliance is demonstrated. Tables 4.1 to 4.3 presents the results from the follow-up enforcement samples tested in 2001.

Table 4.1
Antibiotics
2001 FSIS Domestic Enforcement Results

Production Class	Follow-up Enforcement Results		
	Analyses	Number of violations	Percent violations
Beef cows	3	0	0.0
Bulls	1	0	0.0
Dairy cows	1	0	0.0
Lambs	5	0	0.0
Total	**10**	**0**	

Table 4.2
Sulfonamides
2001 FSIS Domestic Enforcement Results

Production Class	Follow-up Enforcement Results		
	Analyses	Number of violations	Percent violations
Beef cows	1	1	100
Dairy cows	1	1	100
Total	**2**	**2**	

SPECIFIC SULFONAMIDE VIOLATIVE RESULTS

Beef cows: 1 sulfamethazine
Dairy cows: 1 sulfamethazine

Table 4.3
Chlorinated Hydrocarbons, Chlorinated Organophosphates and Phenylbutazone
2001 FSIS Domestic Enforcement Results

Production Class	Follow-up Enforcement Results		
	Analyses	Number of violations	Percent violations
Beef cows	5	0	0.0
Market hogs	5	0	0.0
Total	**10**	**0**	

ARSENIC 2001 DOMESTIC ENFORCEMENT RESULTS FROM FOLLOW-UP TESTING

No violations were found in the follow-up sampling of 6 young chickens.

FLUNIXIN 2001 DOMESTIC ENFORCEMENT RESULTS FROM FOLLOW-UP TESTING

No violations were found in the follow-up sampling of 10 dairy cows.

RESULTS FROM FSIS DOMESTIC ENFORCEMENT TESTING FROM SUSPECT ANIMALS

Veterinarian generated enforcement sampling consists of the analysis of specimens obtained from individual animals or lots that appear suspicious based on herd history or ante-mortem and/or post-mortem inspection. The samples are tested to detect individual animals with violative concentrations of residues and are used as a tool to prevent carcasses with violative residues from entering the food supply. Tables 4.4 to 4.9 present the results from enforcement samples tested in 2001, in which the samples were **sent directly to an official laboratory for analysis.** Tables 4.10 and 4.11 present the results from enforcement samples **tested positive by a screening in plants** and confirmed in an official laboratory.

Table 4.4
Antibiotics and Sulfonamides
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Horses	1	0	0.0
Bulls	12	2	0.16
Steers	8	0	0.0
Beef cows*	33	7	21.2
Heifers	4	0	0.0
Dairy cows	64	20	31.2
Formula-fed veal	2	0	0.0
Lambs	4	0	0.0
Market hogs	37	0	0.0
Sow	2	0	0.0
Roaster pigs	1	0	0.0
Young chickens	12	0	0.0
Young turkeys	2	0	0.0
Total	**182**	**29**	

* Multiple violations were found

SPECIFIC ANTIBIOTIC and SULFONAMIDE VIOLATIVE RESULTS

Bulls: 1 penicillin, 1 gentamicin sulfate
Beef cows: 4 penicillin, 2 oxytetracycline, 2 gentamicin sulfate
Dairy cows: 12 penicillin**,** 1 neomycin, 4 gentamicin sulfate, 1 sulfamethazine, 2 sulfadimethoxine

Table 4.5
Arsenicals
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Formula-fed Veal	2	0	0.0
Ducks	10	0	0.0
Total	**12**	**0**	

Table 4.6
Chlorinated Hydrocarbon, Chlorinated Organophosphates, and Phenylbutazone
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Steers	4	0	0.0
Heifers	1	0	0.0
Dairy cows	7	0	0.0
Young chickens	1	0	0.0
Ducks	1	0	0.0
Total	**14**	**0**	

Table 4.7
Avermectins and Milbemycins
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Steers	2	0	0.0
Beef cows	1	0	0.0
Sow	1	0	0.0
Total	**4**	**0**	

Table 4.8
Flunixin
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Beef cows	1	0	0.0
Dairy cows	1	0	0.0
Total	**2**	**0**	

Table 4.9
Ractopamine
2001 FSIS Domestic Enforcement Results

Production Class	Analyses	Number of violations	Percent violations
Steers	3	0	0.0
Market hogs	9	0	0.0
Total	**12**	**0**	

TRACE METALS DOMESTIC ENFORCEMENT RESULTS FROM VETERINARY MEDICAL OFFICER GENERATED SAMPLES

No violations were found in the sampling of two formula-fed veal.

DOMESTIC ENFORCEMENT RESULTS FROM THE SWAB-TEST ON PREMISES

Swab-Test on Premises was used on 25,210 animals to test for antibiotic and sulfonamide residues. One hundred and fifty eight violations were found in 158 animals. The following Table 4.10, *Swab Test on Premises,* presents the results from the on-site screened samples collected in 2001 by veterinarians using STOP.

Table 4.10
Swab-Test on Premises
2001 FSIS Domestic Enforcement Results

Production Class	Enforcement Testing		
	Analysis	Number of Violations	Percent Violations
Horses	3	1	33.3
Bulls	270	0	0.0
Steers	1,588	3	0.2
Beef cows	4,856	39	0.8
Heifers	845	2	0.2
Dairy cows	9,919	76	0.8
Formula-fed veal	96	1	1.0
Non-formula-fed veal	2	0	0.0
Bob veal	8	0	0.0
Heavy calves	32	0	0.0
Sheep	14	0	0.0
Lambs	720	0	0.0
Goats	95	0	0.0
Market hogs	5,481	18	0.3
Boar/Stags	47	0	0.0
Sows	1,234	18	1.5
TOTAL	**25,210**	**158**	

SPECIFIC STOP VIOLATIVE RESIDUES

Horses: 1 penicillin
Steers: 2 penicillin, 1 tilmicosin
Beef cows: 29 penicillin, 1 tetracycline, 1 gentamicin sulfate, 2 tilmicosin, 6 sulfadimethoxine,
Heifers: 1 penicillin, 1 gentamicin sulfate
Dairy cows: 59 penicillin, 1 oxytetracycline, 5 gentamicin sulfate, 3 tilmicosin, 7 sulfadimethoxine, 1 sulfamethazine
Formula-fed veal: 1 gentamicin sulfate
Market hogs: 18 penicillin
Sows: 18 penicillin

DOMESTIC ENFORCEMENT RESULTS FROM THE FAST ANTIMICROBIAL SCREEN TEST

Fast Antimicrobial Screen Test was used on 257,210 animals to test for antibiotics and sulfonamides residues and 2,148 violations were found in the 2,059 animals. The following Table 4.11, *Fast Antimicrobial Screen Test*, presents the results from the on-site samples collected in 2001 by veterinarians using FAST.

Table 4.11
Fast Antimicrobial Screen Test
2001 FSIS Domestic Enforcement Program

Production Class	Enforcement Testing		
	Analyses	Number of Violations	Percent Violations
Horses	2	0	0.0
Bovine	124	4	3.2
Bulls*	1,481	7	0.5
Steers	3,766	24	0.6
Beef cows*	13,505	63	0.3
Heifers*	2,313	19	0.8
Dairy cows*	184,094	1,605	0.9
Bob veal*,**	49,846	323	0.6
Formula-fed veal	1,019	1	0.1
Non-formula-fed veal*	423	9	2.1
Heavy calves*	237	3	1.2
Mature sheep	18	0	0.0
Lamb	54	0	0.0
Goats	42	0	0.0
Market hogs	156	0	0.0
Sows	121	1	0.8
Boar/stags	1	0	0.0
Roaster pigs	6	0	0.0
Ostrich	1	0	0.0
Emu	1	0	0.0
TOTAL	**257,210**	**2,059**	

* Multiple violations were found in some animals

** The total analyzed includes both enforcement testing (testing of suspect animals) and surveillance testing (testing of a suspect population)

SPECIFIC FAST VIOLATIVE RESIDUES

Bovine: 2 penicillin, 1 neomycin, 1 gentamicin sulfate
Bulls: 5 penicillin, 1 neomycin, 1 gentamicin sulfate, 1 tilmicosin
Steers: 7 penicillin, 1 tylosin, 3 neomycin, 3 tilmicosin, 2 gentamicin sulfate, 3 sulfadimethoxine, 5 sulfamethazine
Beef cows: 40 penicillin, 5 oxytetracycline, 10 gentamicin sulfate, 2 tilmicosin, 4 sulfadimethoxine, 7 sulfamethazine
Heifers: 9 penicillin, 1 neomycin, 1 oxytetracycline, 3 gentamicin sulfate, 3 tilmicosin, 4 sulfadimethoxine, 9 sulfamethazine
Dairy cows: 944 penicillin, 1 streptomycin, 18 tetracycline, 3 tylosin, 72 neomycin, 28 oxytetracycline, 246 gentamicin sulfate, 42 tilmicosin, 220 sulfadimethoxine, 1 sulfachlorpyridazine, 50 sulfamethazine, 2 sulfathoazole, 1 sulfadoxine, 17 flunixin
Bob veal: 47 penicillin, 8 tetracycline, 3 tylosin, 202 neomycin, 10 oxytetracycline, 1 chlortetracycyline, 29 gentamicin sulfate, 2 tilmicosin, 17 sulfamethazine, 6 sulfamethoxazole, 27 sulfadimethoxine
Formula-fed veal: 1 penicillin
Non-formula-fed veal: 2 penicillin, 1 neomycin, 4 gentamicin sulfate, 2 tilmicosin, 1 sulfadimethoxine
Heavy calves: 1penicillin, 2 neomycin, 2 sulfamethazine
Sows: 1 penicillin

CUMULATIVE TOTALS FOR ENFORCEMENT TESTING IN WHICH THE PRE-SCREENING TESTING IS DONE ON-SITE BY FSIS VETERINARIANS

The total number of analyses performed by using the in-plant screening enforcement tests is listed in Table 4.12, *Cumulative Totals for On-site Rapid Screening Tests*, below.

Table 4.12
Cumulative Totals for On-Site Rapid Screening Enforcement Tests
2001 FSIS Domestic Enforcement Program

On-site Rapid Screening Tests	Number of Analyses	Violations
Swab-Test on Premises	25,210	158
Fast Antimicrobial Screen Test	257,210	2,059
TOTALS	**282,420**	**2,217**

SECTION 5. 2001 FSIS DOMESTIC SURVEILLANCE RESULTS

This section reports the results of the FSIS surveillance sampling from the 2001 FSIS National Residue Program. As previously stated, surveillance testing is designed to distinguish components of the livestock, poultry and egg products in which residue problems exist, measure the extent of the problem, and evaluate the impact of actions initiated to reduce the problem. The veterinarian in charge may perform in-plant sample testing procedures, or samples may be submitted to an FSIS laboratory for analysis. Depending upon the weight of evidence that led to the testing, products may be retained until test results indicate the appropriate regulatory disposition.

FSIS currently conducts surveillance sampling for sulfonamides in market hogs, for antibiotics and sulfonamides in bob veal, and for clenbuterol and antibiotics in show animals. The following are the results from surveillance sampling.

RESULTS FROM SULFA-ON-SITE

The SOS test was used on 7,221 swine to test for sulfonamide residues. Thirteen market hog samples (0.13%) and one sow sample had violative levels of sulfamethazine.

RESULTS FROM THR CALF ANTIBIOTIC & SULFONAMIDE TEST

CAST was used on 424 bob veal to test for antibiotic and sulfonamide residues. One penicillin residue violation was found in bob veal.

RESULTS FROM THE TESTING OF CLENBUTEROL IN SHOW ANIMALS

Testing was done on the following animals: thirty three steers, two heifers, two formula-fed veal, 12 lambs, and nine market hogs. No violations were found.

RESULTS FROM THE TESTING OF ANTIBIOTICS IN SHOW ANIMALS

Testing was done on two steers and four lambs. No violations were found.

SECTION 6. 2001 FSIS DOMESTIC MONITORING PLAN, SPECIAL PROJECTS, ENFORCEMENT AND SURVEILLANCE CUMULATIVE RESULTS

This section reports the cumulative results from the FSIS Domestic Monitoring Plan, Special Projects, Enforcement and Surveillance sampling. The cumulative results are presented by production class and by compound class.

CUMULATIVE TOTALS – BY PRODUCTION CLASS

The cumulative results from the Domestic Monitoring Plan, Special Projects, Enforcement and Surveillance sampling by production class are reported in Table 6.1 below.

Table 6.1
Cumulative Totals by Production Class
2001 FSIS Domestic Residue Program

Production Class	Monitoring and Special Projects	Enforcement Testing	Surveillance Testing
Horses	1,225	6	0
Bovine	0	124	0
Bulls	1,165	1,764	0
Beef cows	1,664	18,405	0
Dairy cows	2,532	194,097	0
Heifers	1,879	3,163	3
Steers	1,874	5,373	51
Bison	153	0	0
Bob veal	1,158	49,854*	424
Formula-fed veal	1,941	1,119	2
Non-formula-fed veal	562	425	0
Heavy calves	620	269	1

* The total analyzed includes both enforcement testing (testing of suspect animals) and surveillance testing (testing of suspect population)

Table 6.1 –*continued*
Cumulative Totals – by Production Class
2001 FSIS Domestic Residue Program

Production Class	Monitoring and Special Product	Enforcement Testing	Surveillance Testing
Sheep	425	32	0
Lambs	1,393	783	16
Goats	1,251	137	0
Market hogs	2,511	5,688	7,229
Boars/Stags	638	48	0
Roaster pigs	455	7	0
Sows	1,499	1,358	1
Young chickens	2,648	18	0
Mature chickens	1,040	0	0
Young turkeys	1,749	2	0
Mature turkeys	728	0	0
Ducks	991	11	0
Rabbits	401	0	0
Squab	91	0	0
Ratites	342	0	0
Ostrich	0	1	0
Emus	0	1	0
Egg products	1,155	1	0
TOTAL	**32,090**	**282,686**	**7,727**

CUMULATIVE TOTALS – BY COMPOUND CLASS

The cumulative results from the Domestic Monitoring Plan, Special Projects, Enforcement and Surveillance sampling by compound class are reported in Table 6.2 below.

Table 6.2
Cumulative Totals by Compound Class
2001 FSIS Domestic Residue Plan

Compound Class	Monitoring and Special Projects	Enforcement Testing	Surveillance Testing
Antibiotics	7,866		6
Sulfonamides	6,308		7,221
Antibiotics & Sulfonamides		282,614	424
Arsenicals	3,924	18	0
CHC's/COP's/ phenylbutazone	7,342	24	0
Avermectins	4,527	4	0
Melengesterol acetate	240	0	0
Fluoroquinolones	677	0	0
Flunixin	0	12	0
Carbadox	33	0	0
Chloramphenicol	738	0	0
Clenbuterol	0	0	76
Diethylstilbestrol	8	0	0
Zeranol	8	0	0
Ractopamine	419	12	0
Trace metals	0	2	0
TOTAL	**32,090**	**282,686**	**7,727**

SECTION 7. RESULTS FROM THE PHENYLBUTAZONE CULL COW SPECIAL PROJECT

FSIS collaborated with FDA to determine if phenylbutazone was being used illegally in cull cows. This study was initiated in September 2000, and completed in February 2001. The study utilized an Enzyme-linked Immunosorbent Assay (ELISA) screen on kidney swabs. The objectives of this project were:

1. Determine whether ELISA tests on kidney swabs can be used to reliably detect the presence of phenylbutazone in cattle.

2. Confirm the usefulness of "at risk" factors for identifying cattle bearing illegal residues of phenylbutazone. The "at risk" factors are the same as those that would trigger enforcement testing with FAST.

3. Obtain information on whether illegal residues of phenylbutazone are present in cull cows.

4. Protect the public health by retaining carcasses while testing is conducted. Carcasses will be released only if the FAST test and the phenylbutazone tests are negative.

FSIS collected beef and dairy cow samples from 20 establishments that accounted for 70% of the cows slaughtered in 1999. FDA analyzed these samples. The samples that tested positive with ELISA were re-analyzed by Liquid Chromatography/Mass Spectrometry to confirm the presence of phenylbutazone. The presence of phenylbutazone was confirmed in 13 of the 2238 samples. The results indicate that ELISA testing of kidney swabs can be used to screen for phenylbutazone.

Since this project was conducted in two calendar years, the data is not included in Section 6, Cumulative Results.