

STATUTORY INSTRUMENT

No. 9 of 1985

REGULATIONS made by the Minister of Health, Labour and Sports in exercise of the powers conferred upon him by Section 11 of the Food and Drugs Ordinance Chapter 219 of the Laws of Belize as amended and all other powers thereunto him enabling.

(Gazetted 9th February, 1985)

These Regulations may be cited as

Short Title

BIOLOGICAL RESIDUES (CONTROL) REGULATIONS 1985

2. In these Regulations, the following expressions shall have the meanings hereby assigned to them:—

Definitions

"active principle" means any chemical substance which gives any product the nature of the pesticide specific to it.

"Animal" means the male, female or young of any of the following species, cattle, sheep, goat, swine, horse or poultry (chicken, duck, goose, turkey, guineafowl, pheasant)

"Authorized Officer" means a Medical Officer of Health, Veterinarian, or any person authorized by the Minister for the purpose of these Regulations.

"Biological residue" means the residue of any substance including metabolic products; metabolites remaining in the tissues and organs of animals after slaughter as a result of treatment or exposure of the animals to a pesticide, herbicide, fungicide, organic or inorganic compound, hormone or hormone-like substance, growth promoter, antibiotic, anthelmintic, tranquiliser or other therapeutic or prophylactic agents.

"Lot" means a maximum of 30 bovines or one day's throughput if such animals come from the same owner or grower or a single ranch, farm or fattening lot, which is separate from other farms and shall include the carcasses and meat from such animals. If the number of animals from one source is less than 30 then that number constitute the lot size.

"Official Laboratory" means any laboratory authorized by the Minister for the purposes of these Regulations

"Pesticide" means any substance or mixture of substances used to fight or control any form of animal or plant life other than man and other than bacteria, virus and other micro-organisms on or in living man or other living animals that affects the health or the environment and shall include insecticides, nematocides, acaricides, herbicides, fungicides, metals, hormones and hormone-like substances, sulphonamides, anti-biotics and coeli-diostats.

"Tolerance level" means that level of biological residue which does not render the meat, poultry or meat product unacceptable directly or indirectly for human consumption.

"Withdrawal Time" means the minimum period of time necessary for any substance used in the treatment of an animal, to be eliminated or reduced to the tolerance level, so that on the day the animal is presented for slaughter, in the animal so treated or exposed to such substances, any residue will not render the meat harmful or unacceptable for human food.

3. The Authorized Officer shall have the authority to take such samples as he deems necessary for the determination of Biological residues.

Authorized
Officer to
take samples

4. (a) The Authorized Officer shall conduct a regular surveillance of the biological residues in animals being slaughtered.

(b) He shall institute a sampling programme, taking into consideration the antemortem and postmortem signs, the history of the farm and area from which the animals come and the chemicals and/or drugs used on the farm.

(c) Such samples shall be taken according to the phase of the investigation, which shall in the first instance be an investigatory phase, followed by the second or routine surveillance phase. However, in any known or suspected situation of biological residue abuse or accident more intensive sampling may be instituted as deemed necessary by the Minister.

Investigatory
Phase

(i) In the investigatory phase, the animals of a lot shall be randomly selected and one set of samples shall be taken from the carcass or meat of each animal, maximum one to ten as follows:—

<i>No. of Animals in the Lot</i>	<i>No. of Animals to be sampled</i>
1 — 5	1
6 — 10	2
11 — 15	3
16 — 20	4
21 — 30	5

(ii) Where the animals are of unknown or undisclosed origin the carcasses or meat of all such animals shall be sampled.

(iii) All carcasses or meat of such animals shall be retained by the Authorized Officer pending the receipt of the laboratory results.

(iv) In the investigatory phase the rate of testing shall be one per lot for Chlorinated Hydrocarbons' organophosphates, environmental contaminants; antibiotics and one per week for hormones and for heavy metals.

Surveillance
Phase

(v) In the routine surveillance phase samples shall be taken from randomly selected carcasses or meat of animals at

about half the rate of sampling used in the investigatory phase.

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| <p>(d) Each tissue shall be packed in a separate plastic bag, frozen and forwarded whilst maintained in a frozen state to the official laboratory for the determination of biological residues.</p> | <p>Handling of Samples</p> |
| <p>(e) Samples for histological examination shall include all abnormal tissues and the normal tissues, which shall include heart, liver, spleen, kidney, brain and muscle and these shall be from 1/4" to 1/2" thick and preserved in 10% buffered formalin.</p> | |
| <p>(f) All samples shall be accompanied by a laboratory request form (A) as prescribed in the First Schedule, stating the analysis requested, species of animal, type of tissue submitted name and address of Establishment, name and address of the owner of the animal and of the farm, feedlot, or other source of the animals. The type of tissue and amount to be submitted are specified in the Second Schedule.</p> | <p>First Schedule

Second Schedule</p> |
| <p>(g) Samples shall be taken in duplicate and the duplicate sample shall be retained by the Authorized officer pending the receipt of the laboratory results.</p> | |
| <p>(h) The methods of analysis shall be those specified by the Minister in the Regulations.</p> | |
| <p>(i) The laboratory results shall be reported on the form B as prescribed by the First Schedule.</p> | <p>First Schedule</p> |
| <p>5. The Authorized Officer shall keep a record of all samples submitted for analysis and the record shall show the species of animals, origin of the animal (Farm and Owner) and the laboratory findings. The Authorized Officer shall submit a monthly report of these to the Minister.</p> | <p>Records to be kept</p> |
| <p>6. Tolerance levels for biological residues shall be as specified in the third Schedule, and these may be amended by the Minister from time to time.</p> | <p>Third Schedule</p> |
| <p>7. Carcasses suspected of containing biological residues as evidence by the antemortem and postmortem examinations shall be retained by the Authorized Officer and shall have a "Retained" tag affixed, pending the receipt of the laboratory results.</p> | <p>Suspect Carcasses</p> |
| <p>8. (a) Where carcasses are found to have biological residues in excess of the permitted tolerance levels as specified in the third Schedule to these Regulations, they shall be condemned and disposed of as required by the Regulations under the supervision of the Authorized Officer.</p> | <p>Action on Laboratory Results</p> |
| <p>(b) Investigatory Phase</p> | |
| <p>(i) Where the biological residue in the carcasses is present in an amount less than the tolerance level as specified, the carcass may be passed for human consumption.</p> | |
| <p>(ii) Where the biological residue in the composite sample is present in an amount of up to 10% of the tolerance level</p> | |

as specified, the carcasses or meat therefrom may be passed for export without restriction.

(iii) Where the biological residue in the composite sample is present in an amount of from 11 to 19% of the tolerance level, all carcasses in the group of five shall be re-sampled and tested individually and those carcasses showing levels of up to 10% may be passed for export as in (i) above.

(iv) Where the Biological residue in the composite sample is present at 20% or greater than the tolerance level, all carcasses shall be re-sampled as in (iii) above.

(c) Surveillance Phase

When the investigatory phase as described in paragraph 4 (c) (i) of these Regulations, has shown a farm, ranch or feedlot or an area to be free from pesticide problems, or to give consistent results of below 10% of the tolerance levels in the composite sample, in three consecutive tests, the animals from the area, farm, ranch or feedlot shall be treated under the second or surveillance phase.

(i) In this surveillance phase, samples shall be taken as in the investigatory phase but at a rate of maximum one to twenty.

(ii) Where the laboratory results of these tests in (i) show levels of biological residues in excess of 15% of the tolerance levels the farm feedlot, ranch or area shall return to the first or investigatory phase until it is cleared by three consecutive tests as specified in paragraph (b) above.

Fourth
Schedule

9. The Authorized Officer shall control the use of pesticides in authorized establishments and shall take steps to prevent the introduction of prohibited chemicals and the like for use in approved establishments. Permitted pesticides are shown in the fourth schedule to these Regulations.

10. Where prohibited or non-approved substances are found in an approved establishment the Authorized Officer shall make provision for their removal and/or destruction.

Withdrawal
Time

11. Where animals have been treated with or exposed to various drugs or pesticides, a sufficient period of time—the so called withdrawal time—shall be allowed before such animals are presented for slaughter, so that any biological residue may be eliminated or reduced to acceptable levels as prescribed by the Regulations and as listed in the third and fifth schedules to these Regulations.

Third
Schedule

Fifth
Schedule

Experimental
Animals

12. No animal that has been experimentally exposed to any pharmaceutical, chemical or biological product shall be accepted for slaughter at approved establishments unless:—

(a) the Manager, research worker and sponsor of the experiment submit in advance to the Minister an evaluation of the protocols which demonstrate that the use of the experimental product will not result in adulteration of the meat or other-

wise they shall submit the methods for detection of the residues of the product and its withdrawal period.

- (b) on a basis of the above information in (a) the Minister shall inform the Authorized Officer of the guidelines for control in each case.
- (c) the standards prescribed in the Regulations are complied with.

13. The Minister may at his discretion ban or restrict the use of pesticides on farms, feedlots, ranches and the like and in stables, pens, poultry houses or other such places where animals are kept, where such pesticides constitute or may constitute a danger to health and well being of useful animals and man.

14. The Minister shall from time to time issue notes or memoranda for the guidance of Authorized Officers showing the effects of pesticide on animals, as in Appendix I to these Regulations, and which by order may be amended, from time to time.

MADE by the Minister of Health, Labour and Sports this 22nd day of January, 1983.

ELODIO ARAGON
Minister of Health, Labour and Sports

FIRST SCHEDULE

FORM A (Rev. 4/7)

LABORATORY REQUEST FORM

MINISTRY OF NATURAL RESOURCES BELIZE C. A.

VETERINARY MEAT INSPECTION SERVICES FORM FOR REMITTANCE OF MEAT SAMPLES FOR ANALYSIS OF PESTICIDE AND BIOLOGICAL RESIDUES

Place: _____ Date: _____

Establishment No: _____ Type of Tissue: _____

Quantity: _____ Type of Packing: _____

ANALYSIS REQUESTED: .

Organochlorines	
Organophosphates	
Herbicides	
Carbamates	
Heavy Metals	
Diethylstilbestrol	
Fungicides	
Antibiotics and	
Drugs	
Species	
Other	

* Indicate specific drug or chemicals when necessary e.g. Chloramphenicol.

Inspector taking sample: _____

No. of animals slaughtered: _____

No. of animals sampled: _____

Lot No: _____

Farm of Origin: _____

Owner: _____

Date of slaughter: _____ Date submitted: _____ Time: _____

Laboratory to which samples sent: _____

Decision made: _____

Sender

Received By

Signature

Date & Time Received

Signature

SECOND SCHEDULE

(Reg. 4 (f))

SAMPLES FOR ANALYSIS, TISSUES, AMOUNT & HANDLING

<i>Class of Substance</i>	<i>Tissues</i>	<i>Amount</i>	<i>Handling</i>	<i>Species</i>
Chlorinated Hydrocarbons and P.C.B.s.	Fresh Fat	1 lb/animal from 5 animals/lot	Frozen	Livestock & Poultry
Organo phosphates	Muscle	1 lb	"	"
	Liver	1 lb	"	"
Carbamates	Fat	1 lb	"	"
	Liver, Lung heart, muscle	1 lb ea.	"	"
Fungicides	Fat	1 lb	"	"
	Muscle, liver	1 lb ea.	"	"
	Kidney	1 lb ea.	"	"
Herbicides	Fat, Muscle	1 lb ea.	"	"
	Liver, Kidney	1 lb ea.	"	"
Heavy metals (Arsenic, lead, mercury, selenium, Cadmium)	Muscle	1 lb ea.	"	"
	Liver, kidney	1 lb ea.	"	"
	Rumen or crop contents			
Antibiotics	Kidney	1	"	"
Chloramphenicol	Muscle	1.0 lb	"	"
Hormones	Kidney	2	"	"
	Muscle	1.0 lb	"	"

For histological examination—Submit all abnormal tissues and the normal tissues to include heart, liver, kidney, spleen and brain (cerebrum, cerebellum, brain stem) tissues to be from 1/4" to 1/2" thick and preserved in 10% buffered formalin.

THIRD SCHEDULE (Reg. 6 & 11)
 BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance of Guideline in p. p. m.</i>	<i>Animal Species</i>
A PESTICIDES			
Aldrin and Dieldrin	Milk	0.15	Milk on fat basis
do	Fat	0.3	All species
do	Eggs	0.1	Eggs-shell-free basis
Benzene Hexachloride (BHC)	Fat	0.3	All species
Hexachlorobenzene (HCB)	Fat	0.5	do
Chlordane	do	0.3	do
D.D.T. and Metabolites	do	5.0	do
	Milk	1.25	Milk on fat basis
	Milk Products	1.25	do on fat basis
	Eggs	0.5	Eggs-shell-free basis
Endrin	Fat	0.3	All species
Heptachlor and Metabolites	Fat	0.0	All species
Methoxychlor	Fat	3.0	Cattle, sheep, goat, swine
Toxaphene	do	7.0	All species
Nirx	do	0.1	do
Strobane	do	—	
Diuron	Meat or fat	1.0	do
Perthane (1,1, Dichloro 2,2-bis- <i>p</i> - ethylphenyl ethane)	Meat	0.0	Cattle, goats
Dalapon	Meat or fat	0.2	Cattle, sheep, swine
Carbophenothion	Fat	0.1	Cattle, sheep, goat, swine
Sevin (Carbaryl)	Meat or fat	0.1	Cattle, goats, swine, sheep
	Kidney or liver	1.0	Cattle, goat, sheep, swine
Tetradifon (Tedian)	Fat, meat,	0.0	All species
Linuron	Fat meat meat produce	1.0	Cattle, goat, sheep, swine

THIRD SCHEDULE (Reg. 6 & 11)
BIOLOGICAL RESIDUES OF PESTICIDES DRUGS ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance or Guideline in p.p.m.</i>	<i>Animal Species</i>
Coumaphos	edible tissues or fat	1.0	All species
Lindane	Fat	7.0	Cattle, calves, sheep, goat
	Fat	4.0	Swine, poultry
	Tissue	0.1	Cooked meats
Dichlorvos (Vapona)	Tissue fat	0.02	Cattle, sheep, goat, swine
	do	0.1	swine
	Tissue or fat	0.05	Poultry and Eggs (Shell free basis)
	Milk	0.02	Whole Milk
Diazinon	Fat, Meat, Meat Products	0.7	Cattle, calves, sheep, goats, pigs
Ethion	Fat	2.5	Cattle calves
	Tissue (Muscle, meat-by-products)	0.75	Cattle, calves
	Tissue or fat	0.2	Sheep, goat, swine poultry
Malathion	Tissue, fat	4.0	All species
Parathion	Tissue, fat	0.0	All species
Ronnel (Fenchlorphos)	Tissue	4.0	Cattle, calves, sheep, goats
	Tissue	2.0	Swine
	Fat	10.0	Cattle, calves, sheep, goats
Chlorobenzilate (Ethyl 4,4 dichlorobenzilate)	Fat	3.0	Swine
	Fat, meat, meat products	0.5	Cattle, sheep
Guthion	do	0.1	Cattle, sheep, goat
Dodine	Meat	0.5	All species
Endosulfan	Fat, meat	0.2	Cattle, sheep, goats, swine, horses

THIRD SCHEDULE (Reg. 6 & 11)
BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance or Guidelines in p.p.m.</i>	<i>Animal Species</i>
Ruelene (Cruformate)	Fat, Tissue	1.0	Cattle, sheep, goats, calves
	Whole milk	0.03	Whole Milk
Trichlorfon	edible tissue or fats	0.1	Cattle, sheep, goats, calves
Methyl parathion	do	—	"
Dioxathion (Deinav)	Fat	1.0	Cattle, calves, sheep, goats, swine, horses
Disulfoton	Fat	—	—
Fenthion	Tissue, fat	0.1	Cattle, calves, poultry
Polychlorinated Biphenyls (PCB's)	Fat	3.0	All species
Piperonyl butoxide	Meat, Fat	0.1	Cattle, goats, swine, sheep
	do	3.0	Chickens, Turkeys
Pyrethrine	Meat, Fat	0.1	Cattle, goats, swine, sheep
	do	0.2	Chickens, Turkeys
2,4-D and 2,4 Dichlorophenol	do	0.2	Cattle, goats, swine, sheep
	Kidney	2.0	do
Paraquat	Meat, Fat	0.01	All species
Atrazine	do	0.02	do
Alachlor	do	0.02	do
Propanil 3,4 dichlorophenyl propionamide	do	0.1	do
Majoran	Meat, Fat	0.1	All species
	do	0.2	Cattle, goats, swine, sheep
Ficloram	Liver	0.5	do
	Kidney	5.0	do

THIRD SCHEDULE
BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance or Guideline in p.p.m.</i>	<i>Animal Species</i>
	Meat, fat	0.05	Poultry
Metarystox	Meat, Fat	0.01	Cattle, sheep, goats, swine
Glyphosate	Kidney, liver	0.5	All species
(b) DRUGS GENERAL			
Clopidol	Liver	1.5	Cattle, calves, sheep, goats
	Muscle	0.2	Swine
	Kidneys	3.0	Cattle, goats, sheep
	Kidney	15.0	Poultry
	Liver	15.0	Poultry
	Muscle	5.0	Poultry
Eurazolidone	Muscle	0.0	Cattle, sheep, goats, swine
Nitrofurazone	do	0.0	do
Decoquinat	edible tissues	2.0	Chicken, cattle
	skeletal muscle	1.0	do
Monermin	Muscle	0.05	Cattle, chicken
Carbadox	edible tissues	0.03	Swine
Roebenidine HCL	Fat	0.2	Chicken
	Muscle	0.1	do
Thiabendazole	edible tissue	0.1	Cattle, swine, sheep, goats
Levamisole Hydrochloride	do	0.1	Cattle, swine, sheep
(c) DRUGS-SULPHONAMIDES			
Sulphaethoxy pyridazine	Edible tissues	0.1	Cattle
	do	0.0	Swine
Sulphaclioypyridazine	do	0.1	Calves, swine
Sulphadimethoxine	do	0.1	Cattle, calves, turkey, chicken
Sulphanitren	do	0.0	Chicken

THIRD SCHEDULE (Reg. 6 & 11)
BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance or Guideline in p.p.m.</i>	<i>Animal Species</i>
Sulphamethazine	do	0.1	Cattle, swine
Sulphaethiopyrazine	do	—	—
Sulphamerazine	do	—	—
Sulphathiazole	do	0.1	Swine
Sulphaquinoxaline	do	—	—
Sulphabromomethazine	do	—	—
Sulphamethiazole	Edible tissues	—	—
Sulphanilamide	do	—	—
Sulphamycin	do	—	—

N.B. Terminal residues greater than 0.1 ppm are not permitted in any sulphonamide drugs

(d) DRUGS ANTIBIOTICS

Ampicillin	Muscle, liver, kidney	0.01	Cattle, swine
Penicillin	Muscle, liver, kidney	0.05	Cattle, calves
	do	0.0	Turkeys
	do	0.0	Swine, chickens, sheep
Streptomycin	do	0.0	Swine, chickens, turkeys
	do	—	Cattle
Chloramphenicol	do	—	—
Tetracycline	do	0.25	Calves, sheep, poultry, swine
	do	0.25	Cattle, goats
Tylosin	Muscle, liver, Kidney Fat	0.2	Cattle, swine, chicken, turkeys

THIRD SCHEDULE (Reg. 6 & 11)
 BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance or Guideline in p.p.m.</i>	<i>Animal Species</i>
Gentamycin Sulphate	Muscle, liver, kidney	0.1	Turkeys
	do	0.4	Cattle, swine
	Liver	0.3	Sheep, chickens
	Muscle	0.1	
Lincomycin	Kidney	0.1	Swine, chickens
	do	—	Cattle, sheep, goats, turkeys
Oxytetracycline	Muscle, liver	0.1	Cattle, calves, swine
	Fat, liver, muscle, skin	1.0	Chickens, turkeys
	Kidney	0.1	Cattle, calves, swine
	do	3.0	Chickens, turkeys
Chlortetracycline	Muscle, liver, kidney	0.1	Cattle
	Fat	0.0	
	Muscle	1.0	Calves, swine, poultry
	Liver	4.0	Calves
	Liver	2.0	Swine
	Fat	0.2	Swine
	Liver	1.0	Poultry
	Kidney	4.0	Calves, swine, poultry
Dihydrostreptomycin	edible tissue	0.0	Calves
		—	Cattle, sheep, goats, swine
Erythromycin	Muscle, liver, kidney	0.1	Swine
	do	0.125	Poultry
	do	0.0	Cattle, calves
Neomycin	do	0.25	Calves

THIRD SCHEDULE (Reg. 6 & 11)
 BIOLOGICAL RESIDUES OF PESTICIDES, DRUGS, ETC.

<i>Substance</i>	<i>Tissues</i>	<i>Tolerance of Guideline in p.p.m.</i>	<i>Animal Species</i>
Cloxacillin	edible tissue	0.01	Cattle
Hygromycin B	do	0.0	Swine, poultry
Haloxon	do	0.1	Cattle
(e) DRUGS HORMONES*			
Diethylstilboestrol	Muscle, liver	0.0	Cattle, sheep, goats
Zearalanol	Muscle, liver, kidney	20.0	do
Zearalenone**	---	---	---
Dienoestrol diacetate	---	---	---
Estradiol monopalmitate	Edible tissue	0.0	Poultry
Hexoestrol and others	---	---	---
Estradiol Benzoate	edible tissue	0.0	Heifers, steers, lambs
Melengestrol Acetate	do	0.0	Cattle
Progesterone	do	0.0	Steers, lambs
Zeranol	do	0.0	Cattle, sheep
Testosterone propionate	do	0.0	Cattle (heifers)
*Tolerance levels for hormones used in livestock and poultry is zero			
**A naturally occurring substance-no tolerance level established			
(f) TRACE METALS			
Arsenic	Liver	2.0	Swine, chickens, turkeys
	do	2.7	Cattle
	Muscle	0.7	Cattle
	do	0.5	Swine, chickens, turkeys
Lead	Liver, kidney	---	All species
Mercury	Liver, kidney	---	All species
Selenium	"	---	" "
Cadmium	"	---	" "
Iron	All tissues	---	" "
Copper	Kidney, liver	---	All species

FOURTH SCHEDULE

(Reg. 9)

PESTICIDES PERMITTED FOR THE USE ON ANIMALS AND ON FARMS

Substance	Animals	Premises	Tolerance or Guideline in p.p.m	Tissues
D.D.T.	No	only for Mosquito control	5.0	Fat
Chlordane	No	only for termites control	0.3	All tissues
Dieldrin	No	Yes	0.3	" "
Lindane	No	Yes	7.0	Fat
			4.0	Swine-fat or meat
Methoxychlor	No	Yes	3.0	Fat
Toxaphene	No	Yes	7.0	Fat
Godrin	Yes	Yes	—	All tissues
Coumaphos	Yes	Yes	1.0	Meat & meat food products
Diazinon	Sheep only	Yes	0.70	Fat (sheep only)
Dichlorvos	Yes	Yes	0.02	Cattle, calves, sheep goats
Disoxathion	Yes	No	1.0	Swine, fat
Malathion	Yes	Yes	4.0	Meat & Meat products
Naled (Dibrom)	No	Yes	0.05	All tissues
Parathion	No	Swine only	0.0	All tissues
Round	Yes	Yes	4.0	All tissues
Trichlorfon	No	Yes	0.1	All tissues
Diphenylamine	Yes (screw- worm repellent)	No	—	All tissues
Phenothiazine	Yes	Yes	2.0	Cattle fat

**FIFTH SCHEDULE
WITHDRAWAL TIMES**

(Reg. 11)

<i>Substance</i>	<i>Species</i>	<i>Form Used</i>	<i>withdrawal (before slaughter)</i>	
Ruelene Ronol	Cattle		28 days	
	Beef Cattle	0.275% mineral feed mixture per 100 lbs body weight for 14 days		
		0.6% feedmix per 100 lbs for 7 days	60 days	
			15.0 mg/300 lbs live weight orally	50 days
		5.5% mineral supplement block granules		
		1.5% oil back rubber	60 days	
		0.75 Dip or spray	56 days	
		4.0% screw worm treatment	21 days	
		5.0% Dust	21 days	
		Sheep & Goat	0.3% Dip or spray	84 days
		5.0% screw worm treatment	21 days	
	Swine	0.5% Dip or spray	72 days	
		5.0% screw worm treatment	21 days	
Diazinon	Sheep & Goat	0.03—0.06% in water 2.0% Dust	14 days	
Coumaphos	Cattle Sheep & Goat	No restrictions	15 days	
	Swine	0.25% Water	5 days	
		No restrictions		
Hygromycin alone or in combinations	Swine	—	2 days	
Chlortetracycline	Swine	400 gram for 14 day treatment	10 days	
Chlortetracycline with Penicillin and Sulpha mezathine	Swine			
	Cattle	150 mg and over	2 days	
Tylosin and Hygromycine	Swine		2 days	
Sulphabrom	Cattle		10 days	

APPENDIX
EFFECTS OF PESTICIDES ON ANIMALS

Pesticides may be grouped as chlorinated hydrocarbons, carbamates, organophosphates, fungicides, herbicides, heavy metals, etc.

1. Chlorinated Hydrocarbons

These compounds are stored in the fat of livestock and poultry and act as stimulants or depressants of the central nervous system, with neuromuscular symptoms which usually appear as restlessness, muscular spasms, lack of coordination while walking and convulsions. The symptoms vary according to the exposure dose and the nature of the active principle of the product used.

(A) Antemortem Symptoms

(i) Restlessness, anorexia, polyuria, abnormal postures, salivation, muscular spasms, trembling, shivering, stiff and exaggerated gait, convulsions, depressions and coma. The majority of animals show symptoms within the first 24 hours following exposure, but in acute cases the animals may appear highly depressed or in a comatose state several hours before death.

(ii) Poultry

Nervous chirp, hyperexcitability, dyspnoea, tremors, convulsions and prostration. Mucous, nasal discharge. Atrophic, cyanotic comb and wattles.

(B) Post mortem changes

(i) Livestock

Congestion of organs (lungs, liver, kidneys) lung oedema, haemorrhages on epicardium, blood-tinged froth in the trachea and bronchi, congestion and oedema of the brain and spinal cord, gastro enteritis (after oral ingestion) Degeneration of organs (in chronic cases). In animals which show signs of acute poisoning the symptoms are non specific, generally showing petechial haemorrhages in the heart and in areas adjacent to the large blood vessels.

(ii) Poultry

Amber fluid in pericardial sac, enlarged heart with distorted coronary vessels, congestion of the liver and kidneys. Degeneration of the gizzard lining and muscular oedematoses, ascites.

(C) Laboratory Examination

(i) Chemical — Submit 1 pound of fat, frozen

(ii) Histopathological — submit all abnormal tissues and the normal tissues which shall include heart, liver, spleen, kidney, brain (cerebrum, cerebellum, medulla and brainstem). Samples should be from 1/4" to 1/2" thick and preserved in 10% buffered formalin.

2. Organophosphates and Carbamates

Organophosphates contain the phosphorous radical in a combination which enables the compound to inhibit the acetylcholinesterase and other cholinesterases, carbamates (many of which have a pesticide action) act in a similar manner to that of the organophosphates as parasympathicometic drugs that inhibit cholinesterases. In this case the inhibition takes place due to carbamylation instead of phosphorylation (of organophosphates) but the effects are similar.

The biological action results from an excess of acetylcholine at the nerve endings where they function as transmitters of the nerves impulses. The accumulation of acetylcholine leads first to a stimulation and later a paralysis of all nerves synapses and motor endings except the endings of the sympathetic nerve fibres.

An analytical method exists for the detection of all organophosphates but the inspector should, if possible specify the particular organophosphate to aid the laboratory in making the chemical determination on the tissue submitted. A commonly used carbamate is sevin (carbaryl).

(A) Antemortem Symptoms

(i) Livestock

Salivation, dyspnoea, restlessness, stiffness, abdominal pain, diarrhoea, convulsions.

(B) Post Mortem Changes

In acute poisoning the lesions are never pathognomic or particularly noticeable. Haemorrhages are observed in the heart, lungs, and gastro-intestinal tract. Pulmonary congestion with signs of oedema and pneumonia. Accumulation of mucus in the bronchi. Poultry show a dark congested heart and injected subcutaneous vessels.

(C) Laboratory Examination

(i) Chemical

Organophosphates 1 pound each of muscle and liver
Carbamates 1 pound each of fat, liver and muscle to be submitted frozen.

(ii) Histopathological

as for chlorinated hydrocarbons see (1)(C)(ii)

3 Fungicides

Fungicides are frequently used for treating seed grains which later may sometimes be used for animal feeds. Such a practice is considered to be unsafe since tolerances have not been established for biological residues for most of these compounds. There is no established method for screening hence the inspector should specify the fungicide to be analysed for.

Commonly used fungicide are captain, thiram, cercsan and zineb.

(A) Antemortem Symptoms

(i) Livestock

Nasal discharge, colic, diarrhoea, stilted gait, rapid respiration, depression and coma.

(ii) Poultry

Stilted gait, slipped tendon, sprain foot, enlarged hocks, curled or crooked toes, ventral recumbency, abnormal curvature of femur and tibio-tarsus.

(B) Post Mortem Changes

(i) Livestock

Symptoms are non-specific. Blood tinged fluid in abdominal and thoracic cavities. Liver and kidneys degenerated. Haemorrhages in heart lungs and gastro-intestinal tract.

(ii) Poultry

Specific for the compound used.

(C) Laboratory Examination

(i) Chemical

One pound each of fresh liver, muscle, kidney, and fat submitted frozen.

(ii) *Histopathological*

as for organophosphates See 1(C) (ii)

4. **Herbicides**

Herbicides and other chemicals are used to control undesirable plants. Hormone-type herbicides have added to the list of organic and inorganic products used. The herbicides include dinitrocompounds, chlorobenzoic acids, arsenicals, phenols and hormone types.

(A) **Antemortem Symptoms**

(i) *Livestock*

General depression, anorexia, rumen stony, muscular weakness and diarrhoea

(ii) *Poultry*

Depression, anorexia and muscular weakness.

(B) **Post Mortem Changes**

(i) *Livestock*

Non specific, undigested food, gastro-intestinal tract with ulcers and necrotic foci, inflammation of liver, kidney and lungs.

(ii) *Poultry*

Specific for compounds used

(C) **Laboratory Examination**

(i) *Chemical*

One pound each of fat and muscle submitted frozen

(ii) *Histopathological*

As for organophosphates See 1(C) (ii)

5. **Heavy Metals**

The most commonly occurring of the heavy metals are arsenic, lead, selenium and mercury. Arsenic may be obtained from pesticides, herbicides or compounds with sodium copper and lead; it persists in the soil for long periods. Lead, its alloys and salts frequently produce poisoning in cattle. The main sources are paints, pesticides, wet cells batteries (automobile). Selenium may come from insecticides and in certain areas from the soil, water and plants containing selenium. Mercury is a cumulative poison and may be found in fungicides, antiseptics and corrosive sublimate (mercury chloride). There is no single method of identification of heavy metals therefore the inspector should specify which metals are to be detected.

(1) **Arsenic**

(A) **Antemortem Symptoms**

(i) *Livestock*

Salivation, thirst, vomiting, muscle twitching, tremors, staggering gait, colic, diarrhoea (haemorrhagic) paralysis, coma.

(ii) *Poultry*

Arsenicals can be safely used in feed for poultry raised for food production when used in accordance with established dosages and withdrawal periods. Restless, spasmodic jerking of the neck and loss of equilibrium, depraved appetite.

(B) Post Mortem Changes

(i) Livestock

Haemorrhagic gastro-enteritis, intestinal oedema, inflammation and ulceration of liver,

(ii) Poultry

Submucosal crop and gizzard inflammation, catarrhal enteritis, severe kidney degeneration.

(C) Laboratory Examination

(i) Chemical

One pound each of fresh fat, liver, muscle, kidney, rumen or crop contents, submitted frozen.

(ii) Histopathological

As for organophosphates see 1(C) (ii)

(2) Lead

(A) Antemortem Symptoms

(i) Livestock

(a) Acute

Depression, muscular weakness, walking in circles, head against objects, paralysis of masseters, muscular twitching, grinding of teeth, bellowing, vomiting, diarrhoea, blindness, convulsions.

(b) Chronic—Anorexia, depression, constipation, muscular weakness, prostration, brisket and leg oedema.

(ii) Poultry

Anorexia, emaciation, polydipsia, muscular weakness, drooping wings, greenish feces.

(B) Post Mortem Changes

(i) Livestock

(a) Acute

Haemorrhagic gastro-enteritis, pale and degenerated liver with necrotic areas, sub epicardial haemorrhages.

(b) Chronic: yellow liver with lobule degeneration, scattered haemorrhages in kidneys, heart, atrophy of laryngeal muscles (horses), kidney degeneration.

(ii) Poultry

Hepatic and renal degeneration, enteritis, hepatic and cardiac atrophy, hydropericardium, gall bladder hypertrophy. Urates in kidneys; greenish-brown coloured gizzard Mucosa.

(C) Laboratory Examination

(i) Chemical

One pound each of fresh fat, liver, kidney, muscle, rumen or crop contents submitted frozen.

(ii) Histopathological

As for organo-phosphates see 1(c) (ii)

3. Mercury

(A) Antemortem Symptoms

(i) Livestock

(a) Acute: Vomiting, bloody diarrhoea, polyuria, anuria, increased respiration, shock.

(b) Chronic: Weakness, depression, incoordination, muscle spasms, posterior paralysis, anaemia, anorexia, diarrhoea, polyuria, anuria, blindness.

(ii) Poultry

Incoordination and progressive muscular weakness, depression, diarrhoea.

(B) Postmortem Changes

(i) Livestock

(a) Acute: Ashgrey mucosa of mouth, tongue, pharynx, oesophagus, (caustic action) ulcers of gastro-intestinal tract: haemorrhages in nose, lungs, kidneys, liver, subperitoneal tissues, dark red blood with slow coagulation.

(b) Chronic: Pale organs, ulcers in gastro-intestinal tract, necrotic and haemorrhagic areas in liver, nephritis, splenitis.

(ii) Poultry

Gray areas in mouth and oesophagus, catarrhal inflammation and necrosis and sloughing of mucosa of proventriculus and intestine, pale kidney with white foci. Fatty degeneration of liver, greenish fluid in the gastro-intestinal tract and abdominal cavity.

(C) Laboratory Examination

(i) Chemical

One pound each of fresh fat, muscle, liver, kidney, rumen or crop contents submitted frozen.

(ii) Histopathological

As for organophosphates see 1 (C) (ii)

4. Selenium

Intoxication results from insecticides or from seleniferous soil (Alkali Disease) in certain areas or plants or water from such soils

(A) Antemortem Symptoms

(i) Livestock

(a) Acute: (Blind Staggers) Laboured breathing, staggering, dilated pupils, paralysis of throat and tongue, prostration.

(b) Chronic (Alkali Disease) Lameness, cracked hooves, joint stiffness, hair loss, emaciation.

(B) Postmortem Changes

(i) Livestock

(a) Acute: Congestion of lungs, epicardial petechiae, congestion and ulceration of omasum.

(b) Chronic: Articular surfaces of long bones with erosions, heart atrophy, liver cirrhosis.

(C) Laboratory Examination

(i) Chemical

One pound each of fresh fat muscle, liver, kidney, rumen or crop contents submitted frozen.

(ii) Histopathological

As for organo phosphates see 1(C) (ii)

6. Potential Drug Residues

Antibiotics and other drugs are usually used for the prevention and treatment of diseases. Some drugs used as feed additives: hormones, tranquilisers, anthelmintics, antibiotics etc. serve a useful purpose only when properly used. Indiscriminate use of antibiotics and/or drugs in feed of livestock poultry, or direct injection, to promote growth of animals is a frequent cause of cancer. Drugs may mask the signs of disease and such animals may be unsuitable for food purposes. The Inspector must be on the look-out for these cases.

(A) Antemortem Symptoms

Swelling in the gluteal or other heavy muscle regions, discolourations in the region of body orifices, pronounced medicinal or chemical odour and other abnormal should be looked for in the antemortem inspection.

B Post Mortem Changes

Lesions in the muscles, discolouration of the subcutaneous tissues and characteristic medicinal, chemical or other foreign odours are possible postmortem findings, associated with drug residues. The inspector should be on the look-out for possible lesions due to injection of antibiotics etc. These may be in the heavy muscle masses and in the form of an oily viscous opaque yellow material which on laboratory assay have shown therapeutic levels of drugs. Trimming of such areas does not assure that the rest of the carcass will be free of such residues. Each carcass showing lesions of injection should be retained and disposed of in accordance with the laboratory findings.

(C) Laboratory Examination

(i) Chemical

One pound each of injection site, normal muscle, liver and kidney submitted frozen.

(ii) Histopathological

As for organophosphates see 1 (C) (ii)

(iii) In order to reduce the possibility of error, in the assay and to aid the tracing of any antibiotic or other drug injections, all available informations regarding the case should accompany the laboratory sample i.e. antemortem symptoms, origin of animal, number in lot, number of animals affected, antibiotic suspected, dose, manufacturer's product name etc.

General: Effects of pesticides in man

The products of degradation of antibiotics and their metabolites as well as the antibiotics themselves can constitute a danger as they are capable of sensitising people. e.g. penicillin is degraded into protein combinations with penicillic acid. Only small amounts are needed to sensitise people. Apart from this, these sensitising substances when taken in with food can cause drug resistance in bacteria in the intestinal tract.

Some antibiotics such as the tetracycline are destroyed on cooking but others such as streptomycin are not destroyed to any significant extent. Freezing has no effect on antibiotic residues. Chloramphenicol concentrates in the bone marrow causing a reticulocytopenia, a decrease in haemoglobin and an increase in iron in the blood serum and other abnormalities,

Tetracyclines favour liver toxicity, interfere with tooth development in the foetus and kidney failure. Some antibiotics of the aminoglycoside group may cause neuromuscular paralysis and impairment of hearing.

Chlorinated hydrocarbons pesticides may cause damage to the peripheral and central nervous systems, raise the level of liver enzymes and disorganize the biosynthesis of steroids producing collapse.