Table A-IIa – Analytical Methods
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
Antibiotics	Carbadox		GC-ECD	GC/EI IT/MS		15 ppb	30 ppb
	Chloramphenicol	ELISA	GC-ECD	GC-MS	0.25 ppb	0.25 ppb (M)(B)(T)(catfish)	0.30 ppb (M)(B)(T) (catfish)
	Florfenicol		HPLC	GC/SIM-MS LC/MS/MS		0.3 ppm (L)(B) (catfish) 0.2 ppm (M)(B) 1.5 ppm (P)(L) 0.6 ppm (P)(M)	0.5 ppm (L)(B), 0.3 ppm (M)(B) 0.3 ppm (B)(L,M), 1.5 ppm (P)(L), 0.6 ppm (P)(M) and catfish
Antibiotics: β-Lactams	Amoxicillin	HPLC/MS-MS		HPLC/MS-MS	Same as confirmatory	TBD	TBD
	Ampicillin					0.05 ppm	10 ppb
	Cefazolin					TBD	50 ppb
	Cloxacillin					TBD	TBD
	Desacetyl Cephapirin					TBD	100 ppb
	Ceftiofur (Parent) Desfuroyl Ceftiofur (Marker residue for Quantiation) Desfuroylceftiofur cysteine disulfide (DCCD) (Metabolite For Confirmation)		HPLC-UV			0.10 ppm	50 ppb
	Dicloxacillin					TBD	50 ppb
	Nafcillin					TBD	20 ppb
	Penicillin-G		Bioassay			0.05 ppm	50 ppb
	Oxacillin					TBD	TBD
Antibiotics: Tetracyclines	Chlortetracycline	7-Plate Bioassay	Bioassay	HPLC		0.05 ppm	0.5 ppm
	Oxytetracycline					0.40 ppm	
	Tetracycline						

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
Antibiotics: Macrolides	Clindamycin	7-Plate Bioassay		HPLC/MS-MS			0.1 ppm
	Erythromycin		Bioassay			0.25 ppm	0.1 ppm
	Lincomycin						0.1 ppm
	Pirlimycin						0.1 ppm
	Tilmicosin		HPLC-Ion Pairing			300 ppb (M) 600 ppb (L,K)	0.1 ppm
	Tulathromycin						1 ppm
	Tylosin		Bioassay			1.0 ppm	0.1 ppm
Antibiotics: Aminoglycosides	Amikacin	7-Plate Bioassay		UHPLC-MS/MS (B) HPLC-MS/MS (P,S)			1.0 ppm (P,S,-L,K), 0.4 ppm (P,S-M) 0.05 ppm (B-L,K,M)
	Apramycin						0.4 ppm (P,S-L,), 0.1 ppm (P,S-K,M), 0.05 ppm (B-K), 0.20 ppm (B-L), 0.10 ppm (B-M)
	Dihydrostreptomycin		Bioassay			1.0 ppm	0.40 ppm (P,S,-L,K,M), 1.0 (B-L,K), 0.25 (B-M)
	Gentamicin		Bioassay			0.5 ppm	0.4 ppm (P,S,B-L,), 0.1 ppm (P,S,B-K,M),
	Hygromycin						1.0 ppm (P,S-L,K), 0.4 ppm (P,S-M) 0.1 ppm (B-K,), 0.2 ppm (B-M)
	Kanamycin						4.0 ppm (P,S-L,M), 2.0 ppm (P,S-K) 4.0 ppm (B-L) 0.05 ppm (B-M), 0.20 ppm (B-K)
	Neomycin		Bioassay			2.5 ppm	1.80 ppm (P,S-K), 0.4 ppm (P,S,B-L), 0.1 ppm (P,S-M), 3.6 ppm (B-K), 1.2 ppm (B-M)
	Spectinomycin						1.0 ppm (P,S-L), 0.4 ppm (P,S-K), 0.25 ppm (P,S-M) 2.0 ppm (B-K), 0.25 ppm (B-L), 0.125 ppm (B-M)
	Streptomycin		Bioassay			0.5 ppm	0.4 ppm (P,S-L,K,M), 1.0 ppm (B-K,L), 0.25 ppm (B-M)
	Paromomycin						0.1 ppm (B-K), 0.2 ppm (B-M,L)
	Tobramycin						1.0 ppm (P,S,B-L), 0.1 ppm (P,S,B-K,M)

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
Antibiotics: Fluroquinolones	Ciprofloxacin	7-Plate Bioassay		HPLC IT -MS^2/ MS^3			25 ppb
	Danofloxacin						
	Desethylene diprofloxacin						
	Desmethyl danofloxacin						
	Difloxacin						
	Enrofloxacin						
	Norfloxacin						
	Sarafloxacin						
Arsenicals	Arsenicals		AAS	AAS		0.2 ppm	0.2 ppm
Avermectins	Ivermectin		HPLC	HPLC/APCI-MS		7.5 ppb	25 ppb
	Doramectin						
	Moxidectin						
β-Agonists	Cimaterol	LC/MS/MS		LC/MS/MS	3 ppb		3 ppb
	Clenbuterol				3 ppb		3 ppb
	Ractopamine		HPLC		21 ppb	1 ppb (M),(S-L) 25 ppb (L)(B)	21 ppb
	Salbutamol				3 ppb		3 ppb
	Zilpaterol				6 ppb		6 ppb
Heavy metals	Cadmium			ICP/MS			10 ppb
	Lead						25 ppb
Hormones, synthetic	Diethylstilbesterol (DES)		GC-MS	GC-MS		0.5 ppb	1.0 ppb (L,M)
	Zeranol	ELISA	GC-MS	GC-MS	1.0 ppb	1.0 ppb	1.0 ppb (L,M)
	alpha-Trenbolone	ELISA		GC/MS-MS	5.0 ppb		5.0 ppb (L)
	beta-Trenbolone	ELISA		GC/MS-MS	5.0 ppb		5.0 ppb (M)
Nitrofurans	Furazolidone	LC/MS-MS		LC/MS-MS	5.0 ppb (L) 1.0 ppb (catfish)		5.0 ppb (L) 1.0 ppb (catfish)
	Furaltadone				5.0 ppb (L) 1.0 ppb (catfish)		5.0 ppb (L) 1.0 ppb (catfish)

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
Hormones, synthetic	Diethylstilbesterol (DES)		GC-MS	GC-MS		0.5 ppb	1.0 ppb (L,M)
	Zeranol	ELISA	GC-MS	GC-MS	1.0 ppb	1.0 ppb	1.0 ppb (L,M)
	alpha-Trenbolone	ELISA		GC/MS-MS	5.0 ppb		5.0 ppb (L)
	beta-Trenbolone	ELISA		GC/MS-MS	5.0 ppb		5.0 ppb (M)
Nitrofurans	Furazolidone	LC/MS-MS		LC/MS-MS	5.0 ppb (L) 1.0 ppb (catfish)		5.0 ppb (L) 1.0 ppb (catfish)
	Furaltadone				5.0 ppb (L) 1.0 ppb (catfish)		5.0 ppb (L) 1.0 ppb (catfish)
Nitroimidazoles	Hydoxydimetridazole		HPLC	HPLC/MS/MS	1 ppb (S) (M)		1 ppb (S) (M)
	Hydroxyipronidazole				1 ppb		1 ppb
Non-Steroidal Anti-Inflam-matory Drugs (NSAIDs)	Flunixin	ELISA	HPLC/ESI-MS-MS	HPLC/ESI-MS-MS	50 ppb	62.5 ppb (L) 12.5 ppb (M)	62.5 ppb (L) 12.5 ppb (M)

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
Sulfonamides	Sulfapyridine	TLC	LC/MS-MS	LC/MS-MS	0.05 ppm	0.05 ppm for all but 0.10 ppm SQX	0.05 ppm for all but 0.10 ppm SQX
	Sulfadiazine						
	Sulfathiazole						
	Sulfamerazine						
	Sulfamethazine						
	Sulfachloropyridazine						
	Sulfamethoxypryridazine						
	Sulfaquinoxaline (SQX)						
	Sulfadimethoxine						
	Sulfaethoxypyridazine						
	Sulfaphenazole						
	Sulfatroxazole						
	Sulfisoxazole						
	Sulfadoxine						
Thyreostats	2-Mercaptobenzimidazole			HPLC/MS-MS			25 ppb
	6-Methyl-2-thiouracil						
	2-Mercapto-1-methylimidazole						
	6-Phenyl-2-thiouracil						
	6-Propyl-2-thiouracil						
	2-Thiouracil						
CHCs/COPs/ OCs/Environmental Contaminants	Aldrin	GC-ECD	GC-ECD		0.10 ppm	0.10 ppm	
	alpha-BHC				0.10 ppm	0.10 ppm	
	beta-BHC				0.10 ppm		
	delta-BHC				0.10 ppm		
	Captan				0.04 ppm	0.04 ppm	
	Carbophenothion				0.06 ppm	0.06 ppm	
	Chlordene				0.10 ppm		
	Chlorfenvinphos				0.05 ppm	0.05 ppm	

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
CHCs/COPs/ OCs/Environmental Contaminants *(cont'd)*	Chlorpyrifos	GC-ECD	GC-ECD		0.10 ppm	0.10 ppm	
	Chlorpyrifos methyl				0.10 ppm		
	cis-chlordane				0.02 ppm	0.30 ppm	
	Coumaphos-O				0.40 ppm	0.20 ppm	
	Coumaphos-S				0.20 ppm	0.20 ppm	
	Dichlofenthion				0.1 ppm		
	Dieldrin				0.10 ppm	0.10 ppm	
	Endosulfan I				0.02 ppm	0.02 ppm	
	Endosulfan II				0.04 ppm	0.04 ppm	
	Endosulfan sulfate				0.10 ppm		
	Endrin				0.10 ppm	0.10 ppm	
	Endrin Ketone				0.10 ppm		
	2,2',4,4',5,5'-hexabromobiphenyl (HBB)				0.10 ppm		
	Hexachlorobenzene (HCB)				0.10 ppm	0.10 ppm	
	Heptachlor epoxides				0.10 ppm	0.10 ppm	
	Heptachlor				0.03 ppm	0.10 ppm	
	Kepone				0.06 ppm	0.06 ppm	
	Lindane				0.10 ppm	0.10 ppm	
	Linuron				0.50 ppm	0.50 ppm	
	Methoxychlor				0.50 ppm	0.50 ppm	
	Mirex				0.10 ppm	0.10 ppm	
	Trans-Nonachlor				0.15 ppm	0.15 ppm	
	o,p'-TDE				0.15 ppm		
	o,p'-DDT				0.15 ppm	0.15 ppm	
	o,p'-DDE				0.10 ppm		
	Oxychlordane				0.04 ppm	0.04 ppm	

Table A-IIa – Analytical Methods *(continued)*
2011 U.S. NRP

Compound Class	*Compound*	*Analytical Method*			*Minimum Level of Applicability*		
		Screen	*Determinative (quantitative)*	*Confirmatory (identification)*	*Screen*	*Determinative (quantitative)*	*Confirmatory (identification)*
CHCs/COPs/ OCs/Environmental Contaminants *(cont'd)*	p,p'-DDE	GC-ECD	GC-ECD		0.10 ppm	0.10 ppm	
	p,p'-DDT				0.10 ppm	0.15 ppm	
	p,p'-TDE				0.10ppm	0.15 ppm	
	PCB 1260				0.50 ppm	0.50 ppm	
	PCB 1254				0.50 ppm	0.50 ppm	
	Phosalone				0.02 ppm	0.02 ppm	
	Polybrominated biphenyls				0.10 ppm		
	Ronnel				0.03 ppm	0.03 ppm	
	Stirofos				0.04 ppm	0.06 ppm	
	Toxaphene				1.00 ppm	1.00 ppm	
	trans-chlordane				0.04 ppm	0.30 ppm	
Adulterant / Contaminant	Melamine		HPLC-MS-MS	HPLC-MS-MS		50 ppb ground beef 1 ppp RTE	50 ppb ground beef 1 ppp RTE

Key:
AAS = Atomic Absorption Spectroscopy
APCI = Atmospheric Pressure Chemical Ionization
B = Bovine
CHCs = Chlorinated Hydrocarbons
COPs = Chlorinated Organophosphates
ECD = Electron Capture Detection
ELISA = Enzyme Linked Immunosorbent Assay
GC = Gas Chromatoraphy
GPC = Gel Permeation Chromatography
HPLC = High Performance Liquid Chromatography
K = Kidney
L = Liver
M = Muscle
Minimum Level of Applicability = The lowest quantity of residue (or sample component) that can be reliably observed or found in the sample matrix by the analytical methodology used.
MS = Mass Spectroscopy
P = Poultry
PCBs = Polychlorinated Biphenyls
ppb = parts per billion
ppm = parts per million
RTE= Ready–to-eat
SIM = Selected Ion Mode
S = Swine
TBD = To Be Determined
TLC = Thin Layer Chromatography
T = Turkey
UHPLC = Ultra High Performance Liquid Chromatography