

CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of
the United Nations



World Health
Organization

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MAXIMUM RESIDUE LIMITS (MRLs) AND RISK MANAGEMENT RECOMMENDATIONS (RMRs) FOR RESIDUES OF VETERINARY DRUGS IN FOODS

CXM 2-2023

LIST OF ABBREVIATIONS

ADI	acceptable daily intake
ARfD	acute reference dose
BMD	benchmark dose
BMDL	confidence limit for BMD
bw	body weight
CAC	Codex Alimentarius Commission
CCPR	Codex Committee on Pesticide Residues
CCRVDF	Codex Committee on Residues of Veterinary Drugs in Foods
EDI	estimated daily intake
DNC	dinitrocarbanilide
HDP	2-hydroxy-4,6-dimethylpyrimidine
GEADE	global estimated acute dietary exposure
GECDE	global estimated chronic dietary exposure
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JMPR	Joint FAO/WHO Expert Meeting on Pesticide Residues
LOAEL	lowest-observed-adverse-effect level
NOAEL	no-observed-adverse-effect level
LOQ	limit of quantification
mADI	microbiological acceptable daily intake
MIC	minimum inhibitory concentration
MRL	maximum residue limit
RMR	risk management recommendation
TMDI	theoretical maximum daily intake

Maximum residue limits (MRLs)

Abamectin	Gentamicin
Albendazole	Halquinol
Amoxicillin	Imidocarb
Ampicillin	Isometamidium
Avylamycin	Ivermectin
Azaperone	Lasalocid sodium
Benzylpenicillin/Procaine benzylpenicillin	Levamisole
Carazolol	Lincomycin
Ceftiofur	Lufenuron
Chlortetracycline/Oxytetracycline/Tetracycline	Melengestrol acetate
Clenbuterol	Monensin
Closantel	Monepantel
Colistin	Moxidectin
Cyfluthrin	Narasin
Cyhalothrin	Neomycin
Cypermethrin and alpha-cypermethrin	Nicarbazin
Danofloxacin	Phoxim
Deltamethrin	Pirlimycin
Derquantel	Porcine somatotropin
Dexamethasone	Progesterone
Diclazuril	Ractopamine
Dicyclanil	Sarafloxacin
Diflubenzuron	Spectinomycin
Dihydrostreptomycin/Streptomycin	Spiramycin
Diminazene	Sulfadimidine
Doramectin	Teflubenzuron
Emamectin benzoate	Testosterone
Eprinomectin	Thiabendazole
Erythromycin	Tilmicosin
Estradiol-17beta	Trenbolone acetate
Febantel/Fenbendazole/Oxfendazole	Trichlorfon (Metrifonate)
Fluazuron	Triclabendazole
Flubendazole	Tylosin
Flumequine	Zeranol
Flumethrin	Zilpaterol Hydrochloride

Risk management recommendations (RMRs) for residues of veterinary drugs

Carbadox	Malachite Green
Chloramphenicol	Metronidazole
Chlorpromazine	Nitrofur
Dimetridazole	Olaquinox
Furazolidone	Ronidazole
Gentian Violet	Stilbens
Ipronidazole	

PART I**MAXIMUM RESIDUE LIMITS FOR RESIDUES OF VETERINARY DRUGS IN FOODS**

ABAMECTIN (anthelmintic agent)				
JECFA evaluation		45 (1995); 47 (1996)		
Acceptable daily intake		0–2 µg/kg bw (1997) established for the sum of abamectin and (Z)-8,9 isomer by JMPR (1997)		
Residue definition		Avermectin B1a		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Liver	100	26 (2003)	
Cattle	Kidney	50	26 (2003)	
Cattle	Fat	100	26 (2003)	

ALBENDAZOLE (anthelmintic agent)				
JECFA evaluation		34 (1989)		
Acceptable daily intake		0–50 µg/kg bw (JECFA34)		
Residue definition		Except milk, 2-aminosulfone metabolite; Milk, not yet identified		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Not specified	Muscle	100	20 (1993)	
Not specified	Liver	5 000	20 (1993)	
Not specified	Kidney	5 000	20 (1993)	
Not specified	Fat	100	20 (1993)	
Not specified	Milk (µg/l)	100	20 (1993)	

AMOXICILLIN (antimicrobial agent)				
JECFA evaluation		75 (2011); 85 (2017)		
Microbiological acceptable daily intake		0–0.002 mg/kg body weight (bw) based on the effects of amoxicillin on the intestinal microbiota		
Acute reference dose		0.005 mg/kg bw based on microbiological effects on the intestinal microbiota		
Estimated chronic dietary exposure		0.14 µg/kg bw per day (for the general population), which represents 7% of the upper bound of the mADI		
Estimated acute dietary exposure		1.4 µg/kg bw (for the general population), which represents 28% of the microbiological ARfD 1.6 µg/kg bw (for children), which represents 31% of the microbiological ARfD		
Residue definition		Amoxicillin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	50	35 (2012)	
Cattle	Liver	50	35 (2012)	
Cattle	Kidney	50	35 (2012)	
Cattle	Fat	50	35 (2012)	
Cattle	Milk	4	35 (2012)	
Sheep	Muscle	50	35 (2012)	
Sheep	Liver	50	35 (2012)	
Sheep	Kidney	50	35 (2012)	
Sheep	Fat	50	35 (2012)	
Sheep	Milk	4	35 (2012)	
Pigs	Muscle	50	35 (2012)	
Pigs	Liver	50	35 (2012)	
Pigs	Kidney	50	35 (2012)	
Pigs	Fat/Skin	50	35 (2012)	
Finfish	Fillet	50	41 (2018)	The term “finfish” includes all fish species Muscle plus skin in natural proportion
	Muscle	50	41 (2018)	The term “finfish” includes all fish species

AMPICILLIN (antimicrobial agent)				
JECFA evaluation		85 (2017)		
Microbiological acceptable daily intake		0–0.003 mg/kg bw based on a NOAEL equivalent to 0.025 mg/kg bw per day for increase in population(s) of ampicillin-resistant bacteria in the gastrointestinal tract in humans, and using a safety factor of 10 (for the variability in the composition of the intestinal microbiota within and between individuals)		
Acute reference dose		0.012 mg/kg bw based on the microbiological end-point		
Estimated chronic dietary exposure		0.29 µg/kg bw per day (for the general population), which represents 10% of the upper bound of the ADI		
Estimated acute dietary exposure		1.9 µg/kg bw per day (for the general population), which represents 16% of the ARfD 1.7 µg/kg bw per day (for children), which represents 14% of the ARfD		
Residue definition		Ampicillin		
Note		JECFA85 recommended an MRL of 50 µg/kg for ampicillin in finfish muscle and in finfish muscle plus skin in natural proportion, the same as that recommended for amoxicillin, because the modes of action, the physicochemical properties and the toxicological and pharmacokinetic profiles of amoxicillin and ampicillin are very similar.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Finfish	Fillet	50	41 (2018)	The term “finfish” includes all fish species Muscle plus skin in natural proportion
	Muscle	50	41 (2018)	The term “finfish” includes all fish species

AVILAMYCIN (antimicrobial agent)				
JECFA evaluation		70 (2008)		
Acceptable daily intake		0–2 mg/kg bw on the basis of a NOAEL of 150 mg avilamycin activity/kg bw per day and a safety factor of 100 and rounding to one significant figure (JECFA70)		
Residue definition		Dichloroisoeverninic acid (DIA)		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Pigs	Muscle	200	32 (2009)	
Pigs	Liver	300	32 (2009)	
Pigs	Kidney	200	32 (2009)	
Pigs	Fat/Skin	200	32 (2009)	
Chicken	Muscle	200	32 (2009)	
Chicken	Liver	300	32 (2009)	
Chicken	Kidney	200	32 (2009)	
Chicken	Fat/Skin	200	32 (2009)	
Turkey	Muscle	200	32 (2009)	
Turkey	Liver	300	32 (2009)	
Turkey	Kidney	200	32 (2009)	
Turkey	Fat/Skin	200	32 (2009)	
Rabbits	Muscle	200	32 (2009)	
Rabbits	Liver	300	32 (2009)	
Rabbits	Kidney	200	32 (2009)	
Rabbits	Fat/Skin	200	32 (2009)	

AZAPERONE (tranquillizing agent)				
JECFA evaluation		38 (1991); 43 (1994); 50 (1998); 52 (1999)		
Acceptable daily intake		0–6 µg/kg bw (JECFA50)		
Residue definition		Sum of azaperone and azaperol		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Pig	Muscle	60	23 (1999)	
Pig	Liver	100	23 (1999)	
Pig	Kidney	100	23 (1999)	
Pig	Fat	60	23 (1999)	

BENZYL PENICILLIN/PROCAINE BENZYL PENICILLIN (antimicrobial agent)				
JECFA evaluation		36 (1990); 50 (1998)		
Acceptable daily intake		30 µg-penicillin/person/day (JECFA50). Residues of benzylpenicillin and procaine benzylpenicillin should be kept below this level.		
Residue definition		Benzylpenicillin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	50	23 (1999)	
Cattle	Liver	50	23 (1999)	
Cattle	Kidney	50	23 (1999)	
Cattle	Milk (µg/l)	4	23 (1999)	
Chicken	Muscle	50	23 (1999)	Applies to procaine benzylpenicillin only
Chicken	Liver	50	23 (1999)	Applies to procaine benzylpenicillin only
Chicken	Kidney	50	23 (1999)	Applies to procaine benzylpenicillin only
Pig	Muscle	50	23 (1999)	
Pig	Liver	50	23 (1999)	
Pig	Kidney	50	23 (1999)	

CARAZOLOL (beta-adreniceptor-blocking agent)				
JECFA evaluation		38 (1991); 43 (1994); 52 (1999)		
Acceptable daily intake		0–0.1 µg/kg bw (JECFA43). ADI based on the acute pharmacological effects of carazolol		
Residue definition		Carazolol		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Pig	Muscle	5	26 (2003)	The concentration at the injection site two hours after treatment may result in an intake that exceeds the ARfD and therefore, an appropriate withdrawal period should be applied.
Pig	Liver	25	26 (2003)	
Pig	Kidney	25	26 (2003)	
Pig	Fat/Skin	5	26 (2003)	The concentration at the injection site two hours after treatment may result in an intake that exceeds the ARfD and therefore, an appropriate withdrawal period should be applied.

CEFTIOFUR (antimicrobial agent)				
JECFA evaluation		45 (1995); 48 (1997)		
Acceptable daily intake		0–50 µg/kg bw (JECFA45)		
Residue definition		Desfuroylceftiofur		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	1 000	23 (1999)	
Cattle	Liver	2 000	23 (1999)	
Cattle	Kidney	6 000	23 (1999)	
Cattle	Fat	2 000	23 (1999)	
Cattle	Milk (µg/l)	100	23 (1999)	
Pig	Muscle	1 000	23 (1999)	
Pig	Liver	2 000	23 (1999)	
Pig	Kidney	6 000	23 (1999)	
Pig	Fat	2 000	23 (1999)	

CHLORTETRACYCLINE/OXYTETRACYCLINE/TETRACYCLINE (antimicrobial agent)				
JECFA evaluation		45 (1995); 47 (1996); 50 (1998); 58 (2002)		
Acceptable daily intake		Group ADI for chlortetracycline, oxytetracycline and tetracycline: 0–30 µg/kg bw (JECFA50). Group ADI for chlortetracycline, oxytetracycline and tetracycline.		
Residue definition		Parent drugs, singly or in combination		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	200	26 (2003)	
Cattle	Liver	600	26 (2003)	
Cattle	Kidney	1200	26 (2003)	
Cattle	Milk (µg/l)	100	26 (2003)	
Fish	Muscle	200	26 (2003)	Applies only to oxytetracycline
Giant prawn (<i>Paeneus monodon</i>)	Muscle	200	26 (2003)	Applies only to oxytetracycline
Pig	Muscle	200	26 (2003)	
Pig	Liver	600	26 (2003)	
Pig	Kidney	1 200	26 (2003)	
Poultry	Muscle	200	26 (2003)	
Poultry	Liver	600	26 (2003)	
Poultry	Kidney	1 200	26 (2003)	
Poultry	Eggs	400	26 (2003)	
Sheep	Muscle	200	26 (2003)	
Sheep	Liver	600	26 (2003)	
Sheep	Kidney	1 200	26 (2003)	
Sheep	Milk (µg/l)	100	26 (2003)	

CLENBUTEROL (adrenoceptor agonist)				
JECFA evaluation		47 (1996)		
Acceptable daily intake		0–0.004 µg/kg bw (JECFA47)		
Residue definition		Clenbuterol		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	0.2	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Cattle	Liver	0.6	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Cattle	Kidney	0.6	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Cattle	Fat	0.2	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Cattle	Milk (µg/l)	0.05	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Horse	Muscle	0.2	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Horse	Liver	0.6	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
Horse	Kidney	0.6	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.

Horse	Fat	0.2	26 (2003)	Due to the potential abuse of this drug, the MRLs are recommended only when associated with a nationally approved therapeutic use, such as tocolysis or as an adjunct therapy in respiratory diseases.
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CLOSANTEL (anthelmintic agent)				
JECFA evaluation		36 (1990); 40 (1992)		
Acceptable daily intake		0–30 µg/kg bw (JECFA40)		
Residue definition		Closantel		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	1 000	20 (1993)	
Cattle	Liver	1 000	20 (1993)	
Cattle	Kidney	3 000	20 (1993)	
Cattle	Fat	3 000	20 (1993)	
Sheep	Muscle	1 500	20 (1993)	
Sheep	Liver	1 500	20 (1993)	
Sheep	Kidney	5 000	20 (1993)	
Sheep	Fat	2 000	20 (1993)	

COLISTIN (antimicrobial agent)				
JECFA evaluation		66 (2006)		
Acceptable daily intake		0–7 µg/kg bw (JECFA66)		
Residue definition		Sum of colistin A and colistin B		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	150	31 (2008)	
Cattle	Liver	150	31 (2008)	
Cattle	Kidney	200	31 (2008)	
Cattle	Fat	150	31 (2008)	
Cattle	Milk	50	31 (2008)	
Sheep	Muscle	150	31 (2008)	
Sheep	Liver	150	31 (2008)	
Sheep	Kidney	200	31 (2008)	
Sheep	Fat	150	31 (2008)	
Sheep	Milk	50	31 (2008)	
Goat	Muscle	150	31 (2008)	
Goat	Liver	150	31 (2008)	
Goat	Kidney	200	31 (2008)	
Goat	Fat	150	31 (2008)	
Pig	Muscle	150	31 (2008)	
Pig	Liver	150	31 (2008)	
Pig	Kidney	200	31 (2008)	
Pig	Fat	150	31 (2008)	The MRL includes skin + fat
Chicken	Muscle	150	31 (2008)	
Chicken	Liver	150	31 (2008)	
Chicken	Kidney	200	31 (2008)	
Chicken	Fat	150	31 (2008)	The MRL includes skin + fat
Chicken	Eggs	300	31 (2008)	
Turkey	Muscle	150	31 (2008)	
Turkey	Liver	150	31 (2008)	
Turkey	Kidney	200	31 (2008)	
Turkey	Fat	150	31 (2008)	The MRL includes skin + fat
Rabbit	Muscle	150	31 (2008)	
Rabbit	Liver	150	31 (2008)	
Rabbit	Kidney	200	31 (2008)	
Rabbit	Fat	150	31 (2008)	

CYFLUTHRIN (insecticide)				
JECFA evaluation		48 (1997)		
Acceptable daily intake		0–20 µg/kg bw (JECFA48)		
Residue definition		Cyfluthrin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	20	26 (2003)	
Cattle	Liver	20	26 (2003)	
Cattle	Kidney	20	26 (2003)	
Cattle	Fat	200	26 (2003)	
Cattle	Milk (µg/l)	40	26 (2003)	

CYHALOTHRIN (insecticide)				
JECFA evaluation		54 (2000); 58 (2002); 62 (2004)		
Acceptable daily intake		0–5 µg/kg bw (JECFA62)		
Residue definition		Cyhalothrin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	20	28 (2005)	
Cattle	Liver	20	28 (2005)	
Cattle	Kidney	20	28 (2005)	
Cattle	Fat	400	28 (2005)	
Cattle	Milk	30	28 (2005)	
Pig	Muscle	20	28 (2005)	
Pig	Liver	20	28 (2005)	
Pig	Kidney	20	28 (2005)	
Pig	Fat	400	28 (2005)	
Sheep	Muscle	20	28 (2005)	
Sheep	Liver	50	28 (2005)	
Sheep	Kidney	20	28 (2005)	
Sheep	Fat	400	28 (2005)	

CYPERMETHRIN AND ALPHA-CYPERMETHRIN (insecticide)				
JECFA evaluation		62 (2004)		
Acceptable daily intake		JECFA62 established a common ADI of 0–20 µg/kg bw for both cypermethrin and alpha-cypermethrin		
Residue definition		Total of cypermethrin residues (resulting from the use of cypermethrin or alpha-cypermethrin as veterinary drugs)		
Species	Tissue	MRL (µg/kg)	CAC	Note
Cattle	Muscle	50	29 (2006)	
Cattle	Liver	50	29 (2006)	
Cattle	Kidney	50	29 (2006)	
Cattle	Fat	1 000	29 (2006)	
Cattle	Milk	100	29 (2006)	
Sheep	Muscle	50	29 (2006)	
Sheep	Liver	50	29 (2006)	
Sheep	Kidney	50	29 (2006)	
Sheep	Fat	1 000	29 (2006)	

DANOFLOXACIN (antimicrobial agent)				
JECFA evaluation		48 (1997)		
Acceptable daily intake		0–20 µg/kg bw (JECFA48)		
Residue definition		Danofloxacin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	200	24 (2001)	
Cattle	Liver	400	24 (2001)	
Cattle	Kidney	400	24 (2001)	
Cattle	Fat	100	24 (2001)	
Chicken	Muscle	200	24 (2001)	
Chicken	Liver	400	24 (2001)	
Chicken	Kidney	400	24 (2001)	
Chicken	Fat	100	24 (2001)	Fat/skin in normal proportion
Pig	Muscle	100	24 (2001)	
Pig	Liver	50	24 (2001)	
Pig	Kidney	200	24 (2001)	
Pig	Fat	100	24 (2001)	

DELTA METHRIN (insecticide)				
JECFA evaluation		52 (1999); 60 (2003)		
Acceptable daily intake		0–10 µg/kg bw (1982). Established by JMPR (1982).		
Residue definition		Deltamethrin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	30	26 (2003)	
Cattle	Liver	50	26 (2003)	
Cattle	Kidney	50	26 (2003)	
Cattle	Fat	500	26 (2003)	
Cattle	Milk	30	26 (2003)	
Chicken	Muscle	30	26 (2003)	
Chicken	Liver	50	26 (2003)	
Chicken	Kidney	50	26 (2003)	
Chicken	Fat	500	26 (2003)	
Chicken	Eggs	30	26 (2003)	
Salmon	Muscle	30	26 (2003)	
Sheep	Muscle	30	26 (2003)	
Sheep	Liver	50	26 (2003)	
Sheep	Kidney	50	26 (2003)	
Sheep	Fat	500	26 (2003)	

DERQUANTEL (anthelmintic agent)				
JECFA evaluation		75 (2011); 78 (2013)		
Acceptable daily intake		0–0.3 µg/kg bw on the basis of a LOAEL of 0.1 mg/kg bw per day for acute clinical observations in dogs, consistent with antagonistic activity on the nicotinic acetylcholine receptors. A safety factor of 300 was applied to the LOAEL. (JECFA75)		
Estimated dietary exposure		There were insufficient data to calculate an EDI, and the TMDI approach was used. Using the model diet and the MT:TR approach, these MRLs result in an estimated dietary exposure of 6.8 µg/person, which represents approximately 38% of the upper bound of the ADI. (JECFA78)		
Residue definition		Derquantel		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Sheep	Muscle	0.3	38 (2015)	
Sheep	Liver	0.8	38 (2015)	
Sheep	Kidney	0.4	38 (2015)	
Sheep	Fat	7.0	38 (2015)	

DEXAMETHASONE (glucocorticosteroid)				
JECFA evaluation		70 (2008)		
Acceptable daily intake		0–0.015 µg/kg bw (JECFA42)		
Residue definition		Dexamethasone		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	1.0	32 (2009)	
Cattle	Liver	2.0	32 (2009)	
Cattle	Kidney	1.0	32 (2009)	
Cattle	Milk (µg/l)	0.3	32 (2009)	
Pig	Muscle	1.0	32 (2009)	
Pig	Liver	2.0	32 (2009)	
Pig	Kidney	1.0	32 (2009)	
Horses	Muscle	1.0	32 (2009)	
Horses	Liver	2.0	32 (2009)	
Horses	Kidney	1.0	32 (2009)	

DICLAZURIL (antiprotozoal agent)				
JECFA evaluation		45 (1995); 50 (1998)		
Acceptable daily intake		0–30 µg/kg bw (JECFA50)		
Residue definition		Diclazuril		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Poultry	Muscle	500	23 (1999)	
Poultry	Liver	3 000	23 (1999)	
Poultry	Kidney	2 000	23 (1999)	
Poultry	Fat/Skin	1 000	23 (1999)	
Rabbit	Muscle	500	23 (1999)	
Rabbit	Liver	3 000	23 (1999)	
Rabbit	Kidney	2 000	23 (1999)	
Rabbit	Fat	1 000	23 (1999)	
Sheep	Muscle	500	23 (1999)	
Sheep	Liver	3 000	23 (1999)	
Sheep	Kidney	2 000	23 (1999)	
Sheep	Fat	1 000	23 (1999)	

DICYCLANIL (insecticide)				
JECFA evaluation		54 (2000); 60 (2003)		
Acceptable daily intake		0–7 µg/kg bw (JECFA54)		
Residue definition		Dicyclanil		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Sheep	Muscle	150	28 (2005)	
Sheep	Liver	125	28 (2005)	
Sheep	Kidney	125	28 (2005)	
Sheep	Fat	200	28 (2005)	

DIFLUBENZURON (insecticide)

JECFA evaluation		88 (2019)		
Acceptable daily intake		JECFA established an ADI of 0–0.02 mg/kg bw – based on a NOAEL of 2 mg/kg bw per day for increased methaemoglobin and sulfhaemoglobin levels in a 2-year study of toxicity and carcinogenicity in rats; and increased methaemoglobin and sulfhaemoglobin levels, platelet counts and hepatic pigmentation in a 1-year study of toxicity in dogs – applying a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Acute reference dose		JECFA reiterated the conclusion of the 81st meeting (1) that it was not necessary to establish an ARfD, in view of the low acute oral toxicity and the absence of developmental toxicity, and any other toxicological effects likely to be elicited by a single dose.		
Estimated chronic dietary exposure		The GECDE for the general population is 0.84 µg/kg bw per day, which represents 4% of the upper bound of the ADI. The GECDE for children is 2.85 µg/kg bw per day, which represents 14% of the upper bound of the ADI.		
Estimated acute dietary exposure		The acute dietary exposure was not estimated because JECFA concluded that it was not necessary to establish an ARfD.		
Residue definition		JECFA reconfirmed Diflubenzuron as the marker residue (MR) and the ratio of the MR to the total radioactive residue of 0.9 established at its 81st meeting.		
Maximum residue limits		JECFA recommended an MRL in salmon of 10 µg/kg in muscle plus skin in natural proportions.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Salmon	Muscle plus skin in natural proportions	10	44 (2021)	

DIHYDROSTREPTOMYCIN / STREPTOMYCIN (antimicrobial agent)				
JECFA evaluation		43 (1994); 48 (1997); 52 (1999); 58 (2002)		
Acceptable daily intake		0–50 µg/kg bw (JECFA48). Group ADI for combined residues of dihydrostreptomycin and streptomycin.		
Residue definition		Sum of dihydrostreptomycin and streptomycin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	600	24 (2001)	
Cattle	Liver	600	24 (2001)	
Cattle	Kidney	1 000	24 (2001)	
Cattle	Fat	600	24 (2001)	
Cattle	Milk	200	26 (2003)	
Chicken	Muscle	600	24 (2001)	
Chicken	Liver	600	24 (2001)	
Chicken	Kidney	1 000	24 (2001)	
Chicken	Fat	600	24 (2001)	
Pig	Muscle	600	24 (2001)	
Pig	Liver	600	24 (2001)	
Pig	Kidney	1 000	24 (2001)	
Pig	Fat	600	24 (2001)	
Sheep	Muscle	600	24 (2001)	
Sheep	Liver	600	24 (2001)	
Sheep	Kidney	1 000	24 (2001)	
Sheep	Fat	600	24 (2001)	
Sheep	Milk	200	26 (2003)	

DIMINAZENE (trypanocide)				
JECFA evaluation		34 (1989); 42 (1994)		
Acceptable daily intake		0-100 µg/kg bw (JECFA42)		
Residue definition		Diminazene		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	500	22 (1997)	
Cattle	Liver	12 000	22 (1997)	
Cattle	Kidney	6 000	22 (1997)	
Cattle	Milk (µg/l)	150	22 (1997)	LOQ of the analytical method

DORAMECTIN (anthelmintic agent)				
JECFA evaluation		45 (1995); 52 (1999); 58 (2002); 62 (2004)		
Acceptable daily intake		0–1 µg/kg bw (JECFA58)		
Residue definition		Doramectin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	10	22 (1997)	High concentration of residues at the injection site over a 35-day period after subcutaneous or intramuscular administration of the drug at the recommended dose.
Cattle	Liver	100	22 (1997)	
Cattle	Kidney	30	22 (1997)	
Cattle	Fat	150	22 (1997)	High concentration of residues at the injection site over a 35-day period after subcutaneous or intramuscular administration of the drug at the recommended dose.
Cattle	Milk	15	29 (2006)	Depending on the route and/or time of administration, the use of doramectin in dairy cows may result in extended withdrawal periods in milk. This may be addressed in national/regional regulatory programmes.
Pig	Muscle	5	24 (2001)	
Pig	Liver	100	24 (2001)	
Pig	Kidney	30	24 (2001)	
Pig	Fat	150	24 (2001)	

EMAMECTIN BENZOATE (antiparasitic agent)				
JECFA evaluation		78 (2013)		
Acceptable daily intake		ADI of 0–0.5 µg/kg bw established by JMPR (2011), based on an overall NOAEL of 0.25 mg/kg bw per day for neurotoxicity from 14- and 53-week studies in dogs, supported by an overall NOAEL of 0.25 mg/kg bw per day from 1- and 2-year studies in rats. An uncertainty factor of 500 was applied to the NOAEL, which includes an additional uncertainty factor of 5 to account for the steep dose–response curve and irreversible histopathological effects in neural tissues at the lowest-observed-adverse-effect level (LOAEL) in dogs, as used by JMPR and confirmed by JECFA78.		
Estimated dietary exposure		11 µg/person per day, which represents approximately 37% of the upper bound of the ADI (JECFA78)		
Residue definition		Emamectin B1a		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Salmon	Muscle	100	38 (2015)	
Salmon	Fillet	100	38 (2015)	Muscle plus skin in natural proportion
Trout	Muscle	100	38 (2015)	
Trout	Fillet	100	38 (2015)	Muscle plus skin in natural proportion

EPRINOMECTIN (anthelmintic agent)				
JECFA evaluation		50 (1998)		
Acceptable daily intake		0–10 µg/kg bw (JECFA50)		
Residue definition		Eprinomectin B1a		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	26 (2003)	
Cattle	Liver	2 000	26 (2003)	
Cattle	Kidney	300	26 (2003)	
Cattle	Fat	250	26 (2003)	
Cattle	Milk (µg/l)	20	26 (2003)	

ERYTHROMYCIN (antimicrobial agent)				
JECFA evaluation		66 (2006)		
Acceptable daily intake		0–0.7 µg/kg bw (JECFA66)		
Residue definition		Erythromycin A		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Chicken	Muscle	100	31 (2008)	
Chicken	Liver	100	31 (2008)	
Chicken	Kidney	100	31 (2008)	
Chicken	Fat	100	31 (2008)	The MRL includes skin + fat
Chicken	Eggs	50	31 (2008)	
Turkey	Muscle	100	31 (2008)	
Turkey	Liver	100	31 (2008)	
Turkey	Kidney	100	31 (2008)	
Turkey	Fat	100	31 (2008)	The MRL includes skin + fat

ESTRADIOL-17BETA (production aid)				
JECFA evaluation		25 (1981); 32 (1987); 52 (1999)		
Acceptable daily intake		unnecessary (JECFA32); 0–0.05 µg/kg bw (JECFA52)		
Residue definition		Estradiol-17beta.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	unnecessary	21 (1995)	Residues resulting from the use of this substance as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Liver	unnecessary	21 (1995)	Residues resulting from the use of this substance as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Kidney	unnecessary	21 (1995)	Residues resulting from the use of this substance as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Fat	unnecessary	21 (1995)	Residues resulting from the use of this substance as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.

FEBANTEL/FENBENDAZOLE/OXFENDAZOLE (anthelmintic agent)				
JECFA evaluation		38 (1991); 45 (1995); 50 (1998)		
Acceptable daily intake		Group ADI of 0–7 µg/kg bw (JECFA50)		
Residue definition		Sum of fenbendazole, oxfendazole and oxfendazole sulphone, expressed as oxfendazole sulphone equivalents		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	23 (1999)	
Cattle	Liver	500	23 (1999)	
Cattle	Kidney	100	23 (1999)	
Cattle	Fat	100	23 (1999)	
Cattle	Milk (µg/l)	100	23 (1999)	
Goat	Muscle	100	23 (1999)	
Goat	Liver	500	23 (1999)	
Goat	Kidney	100	23 (1999)	
Goat	Fat	100	23 (1999)	
Horse	Muscle	100	23 (1999)	
Horse	Liver	500	23 (1999)	
Horse	Kidney	100	23 (1999)	
Horse	Fat	100	23 (1999)	
Pig	Muscle	100	23 (1999)	
Pig	Liver	500	23 (1999)	
Pig	Kidney	100	23 (1999)	
Pig	Fat	100	23 (1999)	
Sheep	Muscle	100	23 (1999)	
Sheep	Liver	500	23 (1999)	
Sheep	Kidney	100	23 (1999)	
Sheep	Fat	100	23 (1999)	
Sheep	Milk (µg/l)	100	23 (1999)	

FLUAZURON (insecticide)				
JECFA evaluation		48 (1997)		
Acceptable daily intake		0–40 µg/kg bw (JECFA48)		
Residue definition		Fluazuron		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	200	23 (1999)	
Cattle	Liver	500	23 (1999)	
Cattle	Kidney	500	23 (1999)	
Cattle	Fat	7 000	23 (1999)	

FLUBENDAZOLE (anthelmintic agent)				
JECFA evaluation		40 (1992)		
Acceptable daily intake		0–12 µg/kg bw (JECFA40)		
Residue definition		Flubendazole		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Pig	Muscle	10	21 (1995)	
Pig	Liver	10	21 (1995)	
Poultry	Muscle	200	21 (1995)	
Poultry	Liver	500	21 (1995)	
Poultry	Eggs	400	21 (1995)	

FLUMEQUINE (antimicrobial agent)				
JECFA evaluation		42 (1994); 48 (1997); 54 (2000); 60 (2002); 62 (2004); 66 (2006)		
Acceptable daily intake		0–30 µg/kg bw (JECFA62)		
Residue definition		Flumequine		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	500	28 (2005)	
Cattle	Liver	500	28 (2005)	
Cattle	Kidney	3 000	28 (2005)	
Cattle	Fat	1 000	28 (2005)	
Chicken	Muscle	500	28 (2005)	
Chicken	Liver	500	28 (2005)	
Chicken	Kidney	3 000	28 (2005)	
Chicken	Fat	1 000	28 (2005)	
Pig	Muscle	500	28 (2005)	
Pig	Liver	500	28 (2005)	
Pig	Kidney	3 000	28 (2005)	
Pig	Fat	1 000	28 (2005)	
Sheep	Muscle	500	28 (2005)	
Sheep	Liver	500	28 (2005)	
Sheep	Kidney	3 000	28 (2005)	
Sheep	Fat	1 000	28 (2005)	
Trout	Muscle	500	28 (2005)	Muscle including normal proportion of skin

FLUMETHRIN (insecticide)

JECFA evaluation		85 (2017)		
Acceptable daily intake		0–0.004 mg/kg bw based on the NOAEL of 0.37 mg/kg bw per day for skin lesions in parental animals and reduced survival and body weight gain in pups in a two-generation toxicity study in rats and using a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Acute reference dose		0.005 mg/kg bw based on the NOAEL of 0.5 mg/kg bw for salivation in dams in a developmental toxicity study in rats and using a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Estimated chronic dietary exposure		0.008 µg/kg bw per day (for the general population), which represents 0.2% of the upper bound of the ADI. 0.006 µg/kg bw per day (for children), which represents 0.2% of the upper bound of the ADI. <u>Note:</u> As Flumethrin is also used as pesticide the overall dietary exposure was estimated. The assumptions and detailed results will be displayed in the JECFA85 report. Results below are only for use as veterinary drug.		
Estimated acute dietary exposure		0.1 µg/kg bw per day (for the general population), which represents 2.2% of the ARfD. 0.1 µg/kg bw per day (for children), which represents 2.2% of the ARfD.		
Residue definition		Flumethrin (trans-Z1 and trans-Z2 diastereomers at a ratio of approximately 60:40).		
Species	Tissue	MRL (µg/kg)	CAC	Note
	Honey	Unnecessary	CAC44 (2021)	Residues resulting from the use of this substances as an insecticide in accordance with good practice for veterinary drug are unlikely to pose a hazard to human health.

GENTAMICIN (antimicrobial agent)				
JECFA evaluation		43 (1994); 48 (1997); 50 (1998)		
Acceptable daily intake		0–20 µg/kg bw (JECFA50)		
Residue definition		Gentamicin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	24 (2001)	
Cattle	Liver	2 000	24 (2001)	
Cattle	Kidney	5 000	24 (2001)	
Cattle	Fat	100	24 (2001)	
Cattle	Milk (µg/l)	200	24 (2001)	
Pig	Muscle	100	24 (2001)	
Pig	Liver	2 000	24 (2001)	
Pig	Kidney	5 000	24 (2001)	
Pig	Fat	100	24 (2001)	

HALQUINOL (broad-spectrum antimicrobial)

JECFA evaluation		88 (2019)		
Acceptable daily intake		JECFA established an ADI of 0–0.2 mg/kg bw, based on histopathological changes in the kidney, accompanied by increases in absolute and relative renal weight in a 1-year chronic toxicity study in rats, applying a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Acute reference dose		JECFA established an ARfD of 0.3 mg/kg bw, based on a NOAEL of 30 mg/kg bw for clinical signs in dams observed in a developmental toxicity study in mice, with application of a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Estimated chronic dietary exposure		The GECDE for the general population is 5.9 µg/kg bw per day, which represents 3% of the upper bound of the ADI. The GECDE for children is 6.9 µg/kg bw per day, which represents 3.4% of the upper bound of the ADI.		
Estimated acute dietary exposure		The GEADE was comparable for children and adults, being 2–224 µg/kg bw per day, which represents 0.5–75% of the ARfD.		
Residue definition		The marker residue (MR) is the sum of 5-chloroquinolin-8-ol (5-CL), 5,7-dichloroquinolin-8-ol 5,7-DCL (5,7-DCL) and their glucuronide metabolites: 5-CLG (expressed as 5-CL equivalents) and 5,7-DCLG (expressed as 5,7-DCL equivalents).		
Maximum residue limits		JECFA recommended MRLs in swine of 40 µg/kg for muscle, 350 µg/kg for skin plus fat, 500 µg/kg for liver and 9000 µg/kg for kidney.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Swine	Muscle	40	44 (2021)	
Swine	Skin plus fat	350	44 (2021)	
Swine	Liver	500	44 (2021)	
Swine	Kidney	9 000	44 (2021)	

IMIDOCARB (antiprotozoal agent)				
JECFA evaluation		50 (1998); 60 (2003)		
Acceptable daily intake		0–10 µg/kg bw (JECFA50)		
Residue definition		Imidocarb		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	300	28 (2005)	
Cattle	Liver	1 500	28 (2005)	
Cattle	Kidney	2 000	28 (2005)	
Cattle	Fat	50	28 (2005)	
Cattle	Milk	50	28 (2005)	

ISOMETAMIDIUM (trypanocide)				
JECFA evaluation		34 (1989); 40 (1992)		
Acceptable daily intake		0–100 µg/kg bw (JECFA40)		
Residue definition		Isometamidium		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	21 (1995)	
Cattle	Liver	500	21 (1995)	
Cattle	Kidney	1 000	21 (1995)	
Cattle	Fat	100	21 (1995)	
Cattle	Milk (µg/l)	100	21 (1995)	

IVERMECTIN (broad-spectrum antiparasitic agent)				
JECFA evaluation		36 (1990); 40 (1992); 54 (2000); 58 (2002); 81 (2015); 94 (2021)		
Acceptable daily intake		0–10 µg/kg body weight (JECFA81)		
Acute reference dose		200 µg/kg body weight (JECFA81)		
Estimated acute dietary exposure		The GEADE for cattle muscle, applicable to children and the general population, is 69 µg/kg bw, which represents 35% of the ARfD of 200 µg/kg bw. The GEADE for sheep muscle, applicable to children and the general population, is 73 µg/kg bw, which represents 37% of the ARfD of 200 µg/kg bw. The GEADE for pig muscle, applicable to children and the general population, is 30 µg/kg bw, which represents 15% of the ARfD of 200 µg/kg bw. (JECFA94)		
Estimated chronic dietary exposure		The GECDE for adults and the elderly is 0.72 µg/kg bw per day, which represents 7.2% of the upper bound of the ADI of 10 µg/kg bw. The GECDE for children and adolescents is 0.93 µg/kg bw per day, which represents 9.3% of the upper bound of the ADI of 10 µg/kg bw. The GECDE for infants and toddlers is 0.48 µg/kg bw per day, which represents 4.8% of the upper bound of the ADI of 10 µg/kg bw. (JECFA94)		
Residue definition		Ivermectin B _{1a} The marker residue in sheep, pigs and goats is ivermectin B _{1a} (H ₂ B _{1a} , or 22,23-dihydroavermectin B _{1a}). (JECFA94)		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	30	40 (2017)	
Cattle	Liver	800	40 (2017)	
Cattle	Kidney	100	40 (2017)	
Cattle	Fat	400	40 (2017)	
Cattle	Milk	10	26 (2003)	
Pig	Muscle	15	46 (2023)	
Pig	Liver	30	46 (2023)	
Pig	Kidney	20	46 (2023)	
Pig	Fat	50	46 (2023)	
Sheep and goats	Muscle	30	46 (2023)	
Sheep and goats	Liver	60	46 (2023)	
Sheep and goats	Kidney	20	46 (2023)	
Sheep and goats	Fat	100	46 (2023)	

LASALOCID SODIUM (antiparasitic agent)				
JECFA evaluation		78 (2013)		
Acceptable daily intake		0–5 µg/kg bw on the basis of a NOAEL of 0.5 mg/kg bw per day from a developmental toxicity study in rabbits and a multigeneration reproductive toxicity study in rats, with application of an uncertainty factor of 100 for interspecies and intraspecies variability. (JECFA78)		
Estimated dietary exposure		80 µg/person per day was calculated, which represents approximately 27% of the upper bound of the ADI. (JECFA78)		
Residue definition		Lasalocid A		
Note		JECFA78 extended the MRLs in chicken to turkey and quail and extrapolated the MRLs in chicken to pheasant. No information was available for duck, including on approved uses. As the compound is not registered for use in laying hens, according to the sponsor, it is not appropriate to recommend MRLs for egg.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Chicken	Muscle	400	40 (2017)	
Chicken	Liver	1 200	40 (2017)	
Chicken	Kidney	600	40 (2017)	
Chicken	Skin + Fat	600	40 (2017)	
Turkey	Muscle	400	40 (2017)	
Turkey	Liver	1 200	40 (2017)	
Turkey	Kidney	600	40 (2017)	
Turkey	Skin + Fat	600	40 (2017)	
Quail	Muscle	400	40 (2017)	
Quail	Liver	1 200	40 (2017)	
Quail	Kidney	600	40 (2017)	
Quail	Skin + Fat	600	40 (2017)	
Pheasant	Muscle	400	40 (2017)	
Pheasant	Liver	1 200	40 (2017)	
Pheasant	Kidney	600	40 (2017)	
Pheasant	Skin + Fat	600	40 (2017)	

LEVAMISOLE (anthelmintic agent)				
JECFA evaluation		36 (1990); 42 (1994)		
Acceptable daily intake		0–6 µg/kg bw (JECFA42)		
Residue definition		Levamisole		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	10	22 (1997)	
Cattle	Liver	100	22 (1997)	
Cattle	Kidney	10	22 (1997)	
Cattle	Fat	10	22 (1997)	
Pig	Muscle	10	22 (1997)	
Pig	Liver	100	22 (1997)	
Pig	Kidney	10	22 (1997)	
Pig	Fat	10	22 (1997)	
Poultry	Muscle	10	22 (1997)	
Poultry	Liver	100	22 (1997)	
Poultry	Kidney	10	22 (1997)	
Poultry	Fat	10	22 (1997)	
Sheep	Muscle	10	22 (1997)	
Sheep	Liver	100	22 (1997)	
Sheep	Kidney	10	22 (1997)	
Sheep	Fat	10	22 (1997)	

LINCOMYCIN (antimicrobial agent)				
JECFA evaluation		54 (2000); 58 (2002); 62 (2004)		
Acceptable daily intake		0–30 µg/kg bw (JECFA54)		
Residue definition		Lincomycin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Milk	150	26 (2003)	
Chicken	Muscle	200	26 (2003)	
Chicken	Liver	500	26 (2003)	
Chicken	Kidney	500	26 (2003)	
Chicken	Fat	100	26 (2003)	Additional MRL for skin with adhering fat of 300 µg/kg
Pig	Muscle	200	26 (2003)	
Pig	Liver	500	26 (2003)	
Pig	Kidney	1 500	26 (2003)	
Pig	Fat	100	26 (2003)	Additional MRL for skin with adhering fat of 300 µg/kg

LUFENURON (insecticide)				
JECFA evaluation		85 (2017)		
Acceptable daily intake		0–0.02 mg/kg bw based on the NOAEL of 1.93 mg/kg bw per day for tonic-clonic seizures and findings in lungs, gastrointestinal tract, liver and urinary tract in a 2-year dietary study in rats and using a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability).		
Acute reference dose		Unnecessary, in view of lufenuron low acute oral toxicity and the absence of developmental toxicity and other toxicological effects likely to be elicited by a single dose.		
Estimated chronic dietary exposure		1.1 µg/kg bw per day (for the general population), which represents 5.5% of the upper bound of the ADI. As lufenuron is also used as pesticide, the overall dietary exposure was estimated. The assumptions and detailed results will be displayed in the JECFA85 report. Results below are only for use as veterinary drug.		
Residue definition		Lufenuron		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Salmon	Fillet	1 350	41 (2018)	Muscle plus skin in natural proportion
Trout	Fillet	1 350	41 (2018)	Muscle plus skin in natural proportion

MELENGESTROL ACETATE (production aid)				
JECFA evaluation		54 (2000); 58 (2002); 62 (2004); 66 (2006) 70 (2008)		
Acceptable daily intake		0–0.03 µg/kg bw (JECFA54)		
Residue definition		Melengestrol acetate		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	1	32 (2009)	
Cattle	Liver	10	32 (2009)	
Cattle	Kidney	2	32 (2009)	
Cattle	Fat	18	32 (2009)	

MONENSIN (antimicrobial agent)				
JECFA evaluation		70 (2008); 75 (2011)		
Acceptable daily intake		0–10 µg/kg bw on the basis of a NOAEL of 1.14 mg/kg bw per day and a safety factor of 100 and rounding to one significant figure (JECFA70)		
Estimated dietary exposure		Using the revised MRL, the TMDI from JECFA70 was recalculated, resulting in a value of 481 µg/person, which represents 80% of the upper bound of the ADI. (JECFA75)		
Residue definition		Monensin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	10	32 (2009)	
Cattle	Liver	100	35 (2012)	
Cattle	Kidney	10	32 (2009)	
Cattle	Fat	100	32 (2009)	
Cattle	Milk	2	32 (2009)	
Sheep	Muscle	10	32 (2009)	
Sheep	Liver	20	32 (2009)	
Sheep	Kidney	10	32 (2009)	
Sheep	Fat	100	32 (2009)	
Goats	Muscle	10	32 (2009)	
Goats	Liver	20	32 (2009)	
Goats	Kidney	10	32 (2009)	
Goats	Fat	100	32 (2009)	
Chicken	Muscle	10	32 (2009)	
Chicken	Liver	10	32 (2009)	
Chicken	Kidney	10	32 (2009)	
Chicken	Fat	100	32 (2009)	
Turkey	Muscle	10	32 (2009)	
Turkey	Liver	10	32 (2009)	
Turkey	Kidney	10	32 (2009)	
Turkey	Fat	100	32 (2009)	
Quail	Muscle	10	32 (2009)	
Quail	Liver	10	32 (2009)	
Quail	Kidney	10	32 (2009)	
Quail	Fat	100	32 (2009)	

MONEPANTEL (anthelmintic agent)				
JECFA evaluation		75 (2011); 78 (2013), 85 (2017)		
Acceptable daily intake		0–0.02 mg/kg bw based on the NOAEL of 1.93 mg/kg bw per day for tonic-clonic seizures and findings in lungs, gastrointestinal tract, liver and urinary tract in a 2-year dietary study in rats, and using a safety factor of 100 (10 for interspecies variability and 10 for intraspecies variability)		
Acute reference dose		Unnecessary		
Estimated chronic dietary exposure		13.7 µg per kg bw per day (for the general population), which represents 68% of the upper bound of the ADI. 5.0 µg per kg bw per day (for children), which represents 22% of the upper bound of the ADI. 4.4 µg per kg bw per day (for infants), which represents 25% of the upper bound of the ADI.		
Residue definition		Monepantel sulfone, expressed as monepantel		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Sheep	Muscle	500	38 (2015)	
Sheep	Liver	7 000	38 (2015)	
Sheep	Kidney	1 700	38 (2015)	
Sheep	Fat	13 000	38 (2015)	
Cattle	Fat	7 000	41 (2018)	
	Kidney	1 000	41 (2018)	
	Liver	2 000	41 (2018)	
	Muscle	300	41 (2018)	

MOXIDECTIN (anthelmintic agent)				
JECFA evaluation		45 (1995); 47 (1996); 48 (1998); 50 (1998)		
Acceptable daily intake		0–2 µg/kg bw (JECFA45)		
Residue definition		Moxidectin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	20	22 (1997)	Very high concentration and great variation in the level of residues at the injection site in cattle over a 49-day period after dosing.
Cattle	Liver	100	22 (1997)	
Cattle	Kidney	50	22 (1997)	
Cattle	Fat	500	22 (1997)	
Deer	Muscle	20	23 (1999)	
Deer	Liver	100	23 (1999)	
Deer	Kidney	50	23 (1999)	
Deer	Fat	500	23 (1999)	
Sheep	Muscle	50	22 (1997)	
Sheep	Liver	100	22 (1997)	
Sheep	Kidney	50	22 (1997)	
Sheep	Fat	500	22 (1997)	

NARASIN (antimicrobial agent)				
JECFA evaluation		70 (2008); 75 (2011)		
Acceptable daily intake		0–5 µg/kg bw on the basis of a NOAEL of 0.5 mg/kg bw per day and a safety factor of 100 (JECFA70)		
Residue definition		Narasin A		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	15	35 (2012)	
Cattle	Liver	50	35 (2012)	
Cattle	Kidney	15	35 (2012)	
Cattle	Fat	50	35 (2012)	
Chicken	Muscle	15	32 (2009)	
Chicken	Liver	50	32 (2009)	
Chicken	Kidney	15	32 (2009)	
Chicken	Fat	50	32 (2009)	
Pig	Muscle	15	34 (2011)	
Pig	Liver	50	34 (2011)	
Pig	Kidney	15	34 (2011)	
Pig	Fat	50	34 (2011)	

NEOMYCIN (antimicrobial agent)				
JECFA evaluation		43 (1994); 47 (1996); 52 (1999); 58 (2002); 60 (2003)		
Acceptable daily intake		0–60 µg/kg bw (JECFA47)		
Residue definition		Neomycin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	500	23 (1999)	
Cattle	Liver	500	28 (2005)	
Cattle	Kidney	10 000	28 (2005)	
Cattle	Fat	500	23 (1999)	
Cattle	Milk	1 500	28 (2005)	
Chicken	Muscle	500	23 (1999)	
Chicken	Liver	500	23 (1999)	
Chicken	Kidney	10 000	23 (1999)	
Chicken	Fat	500	23 (1999)	
Chicken	Eggs	500	23 (1999)	
Duck	Muscle	500	23 (1999)	
Duck	Liver	500	23 (1999)	
Duck	Kidney	10 000	23 (1999)	
Duck	Fat	500	23 (1999)	
Goat	Muscle	500	23 (1999)	
Goat	Liver	500	23 (1999)	
Goat	Kidney	10 000	23 (1999)	
Goat	Fat	500	23 (1999)	
Pig	Muscle	500	23 (1999)	
Pig	Liver	500	23 (1999)	
Pig	Kidney	10 000	23 (1999)	
Pig	Fat	500	23 (1999)	
Sheep	Muscle	500	23 (1999)	
Sheep	Liver	500	23 (1999)	
Sheep	Kidney	10 000	23 (1999)	
Sheep	Fat	500	23 (1999)	
Turkey	Muscle	500	23 (1999)	
Turkey	Liver	500	23 (1999)	
Turkey	Kidney	10 000	23 (1999)	
Turkey	Fat	500	23 (1999)	

NICARBAZIN (coccidiostat)				
JECFA evaluation		50 (1998), 94 (2021)		
Acceptable daily intake		0–0.9 mg/kg bw based on toxicological effects (JECFA94)		
Acute reference dose		Not necessary (JECFA94)		
Estimated chronic dietary exposure		<p>Based on incurred dinitrocarbanilide (DNC) residues in chicken muscle, offal, and skin with fat, at 24 hours withdrawal time and 125 mg/kg feed: the GECDE for adults and the elderly is 120 µg/kg body weight (bw) per day, which represents 13% of the upper bound of the ADI of 900 µg/kg bw;</p> <p>the GECDE for children and adolescents is 160 µg/kg bw per day, which represents 18% of the upper bound of the ADI of 900 µg/kg bw; and</p> <p>the GECDE for infants and toddlers is 210 µg/kg bw per day, which represents 23% of the upper bound of the ADI of 900 µg/kg bw.</p> <p>Based on incurred DNC residues in chicken muscle, offal, and skin with fat, at zero days withdrawal time and 50 mg/kg feed: the GECDE for adults and the elderly is 95 µg/kg bw per day, which represents 11% of the upper bound of the ADI of 900 µg/kg bw;</p> <p>the GECDE for children and adolescents is 120 µg/kg bw per day, which represents 14% of the upper bound of the ADI of 900 µg/kg bw; and</p> <p>the GECDE for infants and toddlers is 160 µg/kg bw per day, which represents 18% of the upper bound of the ADI of 900 µg/kg bw. (JECFA94)</p>		
Microbiological effects		Nicarbazin and/or its metabolites show no antimicrobial activity towards representative bacteria of the human intestinal microbiota.		
Microbiological ADI		JECFA concluded that it was not necessary to establish an mADI for nicarbazin.		
Toxicological effects		The NOAEL was 60 mg/kg bw per day (equivalent to 42.5 mg/kg bw per day of DNC) due to prominent liver lobulation, observed in a study of developmental toxicity in the rabbit.		
Uncertainty factor		When considering nicarbazin, it is DNC that is the toxic component, and its absorption alone or in a mixture with 2-hydroxy-4,6-dimethylpyrimidine (HDP) is substantially less (< 5%) than when formed from ingested nicarbazin. As DNC is the residue of concern and there is no nicarbazin in products from treated animals, JECFA concluded that despite limitations in the database, a reduction in the default safety factor of 100 used to account for interspecies and intraspecies variability, would be justified. JECFA was unable to quantify just how much of a reduction would be appropriate, but concluded that 50 could certainly be supported, and would still result in a conservative evaluation.		
Toxicological acceptable daily intake		The tADI for nicarbazin was established at 0–0.9 mg/kg bw (DNC).		
Residue definition		The marker residue in chickens is 4,4' DNC.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Chicken	Muscle	4 000	23 (1999)	Broilers
Chicken	Liver	15 000	23 (1999)	Broilers
Chicken	Kidney	8 000	23 (1999)	Broilers
Chicken	Fat/Skin (skin with fat)	4 000	23 (1999)	Broilers

PHOXIM (insecticide)				
JECFA evaluation		52 (1999); 62 (2004)		
Acceptable daily intake		0–4 µg/kg bw (JECFA52)		
Residue definition		Phoxim		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Goat	Muscle	50	26 (2003)	
Goat	Liver	50	26 (2003)	
Goat	Kidney	50	26 (2003)	
Goat	Fat	400	26 (2003)	
Pig	Muscle	50	26 (2003)	
Pig	Liver	50	26 (2003)	
Pig	Kidney	50	26 (2003)	
Pig	Fat	400	26 (2003)	
Sheep	Muscle	50	26 (2003)	
Sheep	Liver	50	26 (2003)	
Sheep	Kidney	50	26 (2003)	
Sheep	Fat	400	26 (2003)	

PIRLIMYCIN (antimicrobial agent)				
JECFA evaluation		62 (2004)		
Acceptable daily intake		0–8 µg/kg bw (JECFA62)		
Residue definition		Pirlimycin		
Species	Tissue	MRL (µg/kg)	CAC	Note
Cattle	Muscle	100	29 (2006)	
Cattle	Liver	1 000	29 (2006)	
Cattle	Kidney	400	29 (2006)	
Cattle	Fat	100	29 (2006)	
Cattle	Milk	100	29 (2006)	JECFA evaluated the effect of pirlimycin residues on starter cultures and for this reason recommended an MRL of 100 µg/kg of milk. Codex Members may therefore adapt national/regional MRLs in order to address this technological aspect for trade of fresh liquid milk intended for processing using starter culture.

PORCINE SOMATOTROPIN (production aid)				
JECFA evaluation		52 (1999)		
Acceptable daily intake		Not Specified (JECFA52)		
Residue definition		Not applicable		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Pig	Muscle	not specified	26 (2003)	
Pig	Liver	not specified	26 (2003)	
Pig	Kidney	not specified	26 (2003)	
Pig	Fat	not specified	26 (2003)	

PROGESTERONE (production aid)				
JECFA evaluation		25 (1981); 32 (1987); 52 (1999)		
Acceptable daily intake		0–30 µg/kg bw (JECFA52)		
Residue definition		Progesterone		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	unnecessary	21 (2005)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Liver	unnecessary	21 (2005)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Kidney	unnecessary	21 (2005)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Fat	unnecessary	21 (2005)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.

RACTOPAMINE (production aid)				
JECFA evaluation		40 (1992); 62 (2004); 66 (2006)		
Acceptable daily intake		0–1 µg/kg bw (JECFA66)		
Residue definition		Ractopamine		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	10	35 (2012)	
Cattle	Liver	40	35 (2012)	
Cattle	Kidney	90	35 (2012)	
Cattle	Fat	10	35 (2012)	
Pig	Muscle	10	35 (2012)	
Pig	Liver	40	35 (2012)	
Pig	Kidney	90	35 (2012)	
Pig	Fat	10	35 (2012)	The MRL includes skin + fat.

SARAFLOXACIN (antimicrobial agent)				
JECFA evaluation		50 (1998)		
Acceptable daily intake		0–0.3 µg/kg bw (JECFA50)		
Residue definition		Sarafloxacin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Chicken	Muscle	10	24 (2001)	
Chicken	Liver	80	24 (2001)	
Chicken	Kidney	80	24 (2001)	
Chicken	Fat	20	24 (2001)	
Turkey	Muscle	10	24 (2001)	
Turkey	Liver	80	24 (2001)	
Turkey	Kidney	80	24 (2001)	
Turkey	Fat	20	24 (2001)	

SPECTINOMYCIN (antimicrobial agent)				
JECFA evaluation		42 (1994); 50 (1998)		
Acceptable daily intake		0–40 µg/kg bw (JECFA42)		
Residue definition		Spectinomycin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	500	23 (1999)	
Cattle	Liver	2 000	23 (1999)	
Cattle	Kidney	5 000	23 (1999)	
Cattle	Fat	2 000	23 (1999)	
Cattle	Milk (µg/l)	200	23 (1999)	
Chicken	Muscle	500	23 (1999)	
Chicken	Liver	2 000	23 (1999)	
Chicken	Kidney	5 000	23 (1999)	
Chicken	Fat	2 000	23 (1999)	
Chicken	Eggs	2 000	23 (1999)	
Pig	Muscle	500	23 (1999)	
Pig	Liver	2 000	23 (1999)	
Pig	Kidney	5 000	23 (1999)	
Pig	Fat	2 000	23 (1999)	
Sheep	Muscle	500	23 (1999)	
Sheep	Liver	2 000	23 (1999)	
Sheep	Kidney	5 000	23 (1999)	
Sheep	Fat	2 000	23 (1999)	

SPIRAMYCIN (antimicrobial agent)				
JECFA evaluation		38 (1991); 43 (1994); 47 (1996); 48 (1997)		
Acceptable daily intake		0–50 µg/kg bw (JECFA43)		
Residue definition		Cattle and chickens, sum of spiramycin and neospiramycin; Pigs, spiramycin equivalents (antimicrobially active residues)		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	200	22 (1997)	
Cattle	Liver	600	22 (1997)	
Cattle	Kidney	300	22 (1997)	
Cattle	Fat	300	22 (1997)	
Cattle	Milk (µg/l)	200	22 (1997)	
Chicken	Muscle	200	22 (1997)	
Chicken	Liver	600	22 (1997)	
Chicken	Kidney	800	22 (1997)	
Chicken	Fat	300	22 (1997)	
Pig	Muscle	200	22 (1997)	
Pig	Liver	600	22 (1997)	
Pig	Kidney	300	22 (1997)	
Pig	Fat	300	22 (1997)	

SULFADIMIDINE (antimicrobial agent)				
JECFA evaluation		34 (1989); 38 (1991); 42 (1994)		
Acceptable daily intake		0–50 µg/kg bw (JECFA42)		
Residue definition		Sulfadimidine		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Milk (µg/l)	25	21 (1995)	
Not specified	Muscle	100	21 (1995)	
Not specified	Liver	100	21 (1995)	
Not specified	Kidney	100	21 (1995)	
Not specified	Fat	100	21 (1995)	

TEFLUBENZURON (insecticide)				
JECFA evaluation		81 (2015)		
Acceptable daily intake		0–5 µg/kg bw on the basis of a lower 95% confidence limit on the benchmark dose for a 10% response (BMDL10) of 0.54 mg/kg bw per day for hepatocellular hypertrophy in male mice observed in a carcinogenicity study, with application of an uncertainty factor of 100 to account for interspecies and intraspecies variability. (JECFA81)		
Estimated chronic dietary exposure		The EDI is 42.9 µg/person per day, on the basis of a 60 kg individual, which represents approximately 14% of the upper bound of the ADI. The GECDE for the general population is 1.6 µg/kg bw per day, which represents 31% of the upper bound of the ADI. The GECDE for children is 2.1 µg/kg bw per day, which represents 43% of the upper bound of the ADI. The GECDE for infants is 0.9 µg/kg bw per day, which represents 18% of the upper bound of the ADI. (JECFA81)		
Residue definition		Teflubenzuron		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Salmon	Muscle	400	40 (2017)	
Salmon	Fillet	400	40 (2017)	Muscle plus skin in natural proportion.

TESTOSTERONE (production aid)				
JECFA evaluation		25 (1981); 32 (1987); 52 (1999)		
Acceptable daily intake		0–2 µg/kg bw (JECFA52)		
Residue definition		Testosterone		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	unnecessary	21 (1995)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Liver	unnecessary	21 (1995)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Kidney	unnecessary	21 (1995)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.
Cattle	Fat	unnecessary	21 (1995)	Residues resulting from the use of this substances as a growth promoter in accordance with good animal husbandry practice are unlikely to pose a hazard to human health.

THIABENDAZOLE (anthelmintic agent)				
JECFA evaluation		40 (1992); 48 (1997); 58 (2002)		
Acceptable daily intake		0–100 µg/kg bw (JECFA40)		
Residue definition		Sum of thiabendazole and 5-hydroxythiabendazole		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Cattle	Liver	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Cattle	Kidney	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Cattle	Fat	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Cattle	Milk (µg/l)	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Goat	Muscle	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Goat	Liver	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Goat	Kidney	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Goat	Fat	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Goat	Milk (µg/l)	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Pig	Muscle	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Pig	Liver	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Pig	Kidney	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Pig	Fat	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Sheep	Muscle	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.

Species	Tissue	MRL (µg/kg)	CAC	Notes
Sheep	Liver	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Sheep	Kidney	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.
Sheep	Fat	100	21 (1995)	The MRL also covers residues derived from feed containing the residues resulted from agricultural use.

TILMICOSIN (antimicrobial agent)				
JECFA evaluation		47 (1996); 54 (2000); 70 (2008)		
Acceptable daily intake		0–40 µg/kg bw (JECFA47)		
Residue definition		Tilmicosin		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	23 (1999)	
Cattle	Liver	1 000	23 (1999)	
Cattle	Kidney	300	23 (1999)	
Cattle	Fat	100	23 (1999)	
Chicken	Muscle	150	34 (2011)	
Chicken	Liver	2 400	34 (2011)	
Chicken	Kidney	600	34 (2011)	
Chicken	Skin/Fat	250	34 (2011)	
Pig	Muscle	100	23 (1999)	
Pig	Liver	1 500	23 (1999)	
Pig	Kidney	1 000	23 (1999)	
Pig	Fat	100	23 (1999)	
Sheep	Muscle	100	23 (1999)	
Sheep	Liver	1 000	23 (1999)	
Sheep	Kidney	300	23 (1999)	
Sheep	Fat	100	23 (1999)	
Turkey	Muscle	100	34 (2011)	
Turkey	Kidney	1 200	34 (2011)	
Turkey	Liver	1 400	34 (2011)	
Turkey	Skin/Fat	250	34 (2011)	

TRENBOLONE ACETATE (growth promoter)				
JECFA evaluation		26 (1982); 27 (1983); 32 (1987); 34 (1989)		
Acceptable daily intake		0–0.02 µg/kg bw (JECFA34)		
Residue definition		Cattle muscle, beta-Trenbolone; Cattle liver, alpha-Trenbolone		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	2	21 (1995)	
Cattle	Liver	10	21 (1995)	

TRICHLORFON (Metrifonate) (insecticide)				
JECFA evaluation		54 (2000); 60 (2003); 66 (2006)		
Acceptable daily intake		0–2 µg/kg bw (JECFA60)		
Residue definition		JECFA54 confirmed the MRL for cows' milk and the guidance levels for muscle, liver, kidney, and fat of cattle recommended (WHO TRS 900, 2001).		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Milk	50	29 (2006)	

TRICLABENDAZOLE (anthelmintic agent)				
JECFA evaluation		40 (1992); 66 (2006); 70 (2008)		
Acceptable daily intake		0–3 µg/kg bw (JECFA40)		
Residue definition		Ketotriclabnedazole		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	250	32 (2009)	
Cattle	Liver	850	32 (2009)	
Cattle	Kidney	400	32 (2009)	
Cattle	Fat	100	32 (2009)	
Sheep	Muscle	200	32 (2009)	
Sheep	Liver	300	32 (2009)	
Sheep	Kidney	200	32 (2009)	
Sheep	Fat	100	32 (2009)	

TYLOSIN (antimicrobial agent)				
JECFA evaluation		70 (2008)		
Acceptable daily intake		0–30 µg/kg bw based on a microbiological end-point derived from in vitro minimum inhibitory concentration (MIC) susceptibility testing and faecal binding data (MIC _{calc} = 1.698) (JECFA70)		
Residue definition		Tylosin A		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	100	32 (2009)	
Cattle	Liver	100	32 (2009)	
Cattle	Kidney	100	32 (2009)	
Cattle	Fat	100	32 (2009)	
Cattle	Milk	100	32 (2009)	
Pig	Muscle	100	32 (2009)	
Pig	Liver	100	32 (2009)	
Pig	Kidney	100	32 (2009)	
Pig	Fat	100	32 (2009)	
Chicken	Muscle	100	32 (2009)	
Chicken	Liver	100	32 (2009)	
Chicken	Kidney	100	32 (2009)	
Chicken	Fat/Skin	100	32 (2009)	
Chicken	Eggs	300	32 (2009)	

ZERANOL (growth promoter)				
JECFA evaluation		26 (1982); 27 (1983); 32 (1987)		
Acceptable daily intake		0–0.5 µg/kg bw (JECFA32)		
Residue definition		Zeranol		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Muscle	2	21 (1995)	
Cattle	Liver	10	21 (1995)	

ZILPATEROL HYDROCHLORIDE		(β2-adrenoceptor agonist)		
JECFA evaluation		81 (2015), 85 (2017)		
Acceptable daily intake		ADI is 0–0.04 µg/kg bw established at JECFA78 (WHO TRS No. 988, 2014) and reaffirmed at JECFA81 and JECFA85.		
Acute reference dose		ARfD is 0.04 µg/kg bw based on a lowest-observed-adverse-effect level (LOAEL) of 0.76 µg/kg bw for acute pharmacological effects observed in a single-dose human study, with application of an uncertainty factor of 20, comprising a default uncertainty factor of 10 for human individual variability and an additional uncertainty factor of 2 to account for use of a LOAEL for a slight effect instead of a NOAEL (JECFA81).		
Global estimated acute dietary exposure		GEADE is 1.9 µg/day for the general population, which represents approximately 80% of the ARfD. The GEADE is 0.57 µg/day for children, which represents approximately 94% of the ARfD (JECFA81).		
Residue definition		Zilpaterol (free base) in muscle, liver, and kidney.		
Species	Tissue	MRL (µg/kg)	CAC	Notes
Cattle	Kidney	3.3	46 (2023)	
Cattle	Liver	3.5	46 (2023)	
Cattle	Muscle	0.5	46 (2023)	

PART II**MAXIMUM RESIDUE LIMITS FOR RESIDUES OF VETERINARY DRUGS IN FOODS EXTRAPOLATED IN ACCORDANCE WITH THE APPROACH FOR THE EXTRAPOLATION OF MRLs FOR VETERINARY DRUGS TO ONE OR MORE SPECIES****Extrapolation to ruminants****AMOXICILLIN**

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	50	MRL extrapolated
All other ruminants	Fat	50	MRL extrapolated
All other ruminants	Liver	50	MRL extrapolated
All other ruminants	Kidney	50	MRL extrapolated
All other ruminants	Milk	4	MRL extrapolated

BENZYL PENICILLIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	50	MRL extrapolated
All other ruminants	Liver	50	MRL extrapolated
All other ruminants	Kidney	50	MRL extrapolated
All other ruminants	Milk	4	MRL extrapolated

CYHALOTHRIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	20	MRL extrapolated
All other ruminants	Fat	400	MRL extrapolated
All other ruminants	Liver	20	MRL extrapolated
All other ruminants	Kidney	20	MRL extrapolated
All other ruminants	Milk	30	MRL extrapolated

CYPERMETHRIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	50	MRL extrapolated
All other ruminants	Fat	1 000	MRL extrapolated
All other ruminants	Liver	50	MRL extrapolated
All other ruminants	Kidney	50	MRL extrapolated

DELTAMETHRIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	30	MRL extrapolated
All other ruminants	Fat	500	MRL extrapolated
All other ruminants	Liver	50	MRL extrapolated
All other ruminants	Kidney	50	MRL extrapolated

LEVAMISOLE

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	10	MRL extrapolated
All other ruminants	Fat	10	MRL extrapolated
All other ruminants	Liver	100	MRL extrapolated
All other ruminants	Kidney	10	MRL extrapolated

MOXIDECTIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	20	MRL extrapolated
All other ruminants	Fat	500	MRL extrapolated
All other ruminants	Liver	100	MRL extrapolated
All other ruminants	Kidney	50	MRL extrapolated

SPECTINOMYCIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	500	MRL extrapolated
All other ruminants	Fat	2 000	MRL extrapolated
All other ruminants	Liver	2 000	MRL extrapolated
All other ruminants	Kidney	5 000	MRL extrapolated
All other ruminants	Milk	200	MRL extrapolated

TETRACYCLINES

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	200	MRL extrapolated
All other ruminants	Liver	600	MRL extrapolated
All other ruminants	Kidney	1 200	MRL extrapolated
All other ruminants	Milk	100	MRL extrapolated

TILMICOSIN

Species	Tissue	MRL (µg/kg)	Note
All other ruminants	Muscle	100	MRL extrapolated
All other ruminants	Fat	100	MRL extrapolated
All other ruminants	Liver	1 000	MRL extrapolated
All other ruminants	Kidney	300	MRL extrapolated

Extrapolation to finfish

DELTAMETHRIN

Species	Tissue	MRL (µg/kg)	Note
All other finfish	Muscle	30	MRL extrapolated

FLUMEQUINE

Species	Tissue	MRL (µg/kg)	Note
All other finfish	Muscle	500	MRL extrapolated

PART III**RISK MANAGEMENT RECOMMENDATIONS (RMRs) FOR RESIDUES OF VETERINARY DRUGS****CARBADOX** (growth promoter)**JECFA evaluation:** 36 (1990); 60 (2003)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions on the available scientific information, there is no safe level of residues of carbadox or its metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of carbadox in food. This can be accomplished by not using carbadox in food-producing animals.

CHLORAMPHENICOL (antimicrobial agent)**JECFA evaluation:** 12 (1968); 32 (1987); 42 (1994); 62 (2004)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions on the available scientific information, there is no safe level of residues of chloramphenicol or its metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of chloramphenicol in food. This can be accomplished by not using chloramphenicol in food-producing animals.

CHLORPROMAZINE (tranquillizer agent)**JECFA evaluation:** 38 (1991)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of chlorpromazine or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of chlorpromazine in food. This can be accomplished by not using chlorpromazine in food-producing animals.

DIMETRIDAZOLE (antiprotozoal agent)**JECFA evaluation:** 34 (1989)**CAC adoption:** 38 (2015)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of dimetridazole or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of dimetridazole in food. This can be accomplished by not using dimetridazole in food-producing animals.

FURAZOLIDONE (antimicrobial agent)**JECFA evaluation:** 40 (1992)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions on the available scientific information, there is no safe level of residues of furazolidone or its metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of furazolidone in food. This can be accomplished by not using furazolidone in food-producing animals.

GENTIAN VIOLET (antibacterial, antifungal and anthelmintic agent)**JECFA evaluation:** 78 (2013)**CAC adoption:** 41 (2018)**Recommended risk management measures**

In view of the JECFA conclusions on the available scientific information, there is no safe level of residues of gentian violet or its metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of gentian violet in food. This can be accomplished by not using gentian violet in food-producing animals.

IPRONIDAZOLE (antiprotozoal agent)**JECFA evaluation:** 34 (1989)**CAC adoption:** 38 (2015)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of ipronidazole or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of ipronidazole in food. This can be accomplished by not using ipronidazole in food-producing animals.

MALACHITE GREEN (antifungal and antiprotozoal agent)**JECFA evaluation:** 70 (2008)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions on the available scientific information, there is no safe level of residues of malachite green or its metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of malachite green in food. This can be accomplished by not using malachite green in food-producing animals.

METRONIDAZOLE (antiprotozoal agent)**JECFA evaluation:** 34 (1989)**CAC adoption:** 38 (2015)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of metronidazole or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of metronidazole in food. This can be accomplished by not using metronidazole in food-producing animals.

NITROFURAL (antimicrobial agent)**JECFA evaluation:** 40 (1992)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of nitrofurazone or its metabolites* in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of nitrofurazone in food. This can be accomplished by not using nitrofurazone in food-producing animals.

* Semicarbazide is not a unique indicator of nitrofurazone use and low levels can be associated with other legitimate sources.

OLAQUINDOX (antibacterial agent)**JECFA evaluation:** 36 (1990); 42 (1994)**CAC adoption:** 37 (2014)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of olaquinox or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of olaquinox in food. This can be accomplished by not using olaquinox in food-producing animals.

RONIDAZOLE (antiprotozoal agent)**JECFA evaluation:** 34 (1989); 42 (1994)**CAC adoption:** 38 (2015)**Recommended risk management measures**

In view of the JECFA conclusions, although insufficient data were available or there was a lack of data to establish a safe level of residues of ronidazole or its metabolites in food representing an acceptable risk to consumers, significant health concerns were identified. For this reason, competent authorities should prevent residues of ronidazole in food. This can be accomplished by not using ronidazole in food-producing animals.

STILBENES (growth promoter)

JECFA evaluation: 5 (1960)

IARC evaluation: monograph 100 AA (2012)

CAC adoption: 37 (2014)

Recommended risk management measures

In view of the available scientific information, there is no safe level of residues of stilbenes or their metabolites in food that represents an acceptable risk to consumers. For this reason, competent authorities should prevent residues of stilbenes in food. This can be accomplished by not using stilbenes in food-producing animals.