ANNEX I

No	EC No	Additive	Chemical formula, or description	Species or category of animal	Maximum age	Minimum content	Maximum content	Other provisions	Duration of authorisation
						mg/kg of complete feedingstuff			
		Colouring matters including pigments							
		1.	Carotenoids and xanthophylls						
	E 160a	Beta-carotene	$C_{40}H_{56}$	Canaries	—	—	—	—	30.9.1999
	E 160c	Capsanthin	$C_{40}H_{56}O_3$	Poultry	—	—	80 (alone or with the other carotenoids and xanthophylls)	—	Without a time limit
	E 160e	Beta-apo-8′-carotenal	$C_{30}H_{40}O$	Poultry	—	—	80 (alone or with the other carotenoids and xanthophylls)	—	Without a time limit
	E 160f	Ethyl ester of beta-apo-8′-carotenoic acid	$C_{32}H_{44}O_2$	Poultry	—	—	80 (alone or with the other carotenoids and xanthophylls)	—	Without a time limit
	E 161b	Lutein	$C_{40}H_{56}O_2$	Poultry	—	—	80 (alone or with the other carotenoids and xantho-phylls)	—	Without a time limit

	E 161c	Cryptoxanthin	$C_{40}H_{56}O$	Poultry	—	—	80 (alone or with the other carotenoids and xantho-phylls)	—	Without a time limit
	E 16lg	Canthaxanthin	$C_{40}H_{52}O_2$	Poultry	—	—	80 (alone or with the other carotenoids and xantho-phylls)	—	Without a time limit
				Salmon, trout	—	—	80	Use permitted from the age of six months onwards The mixture of canthaxanthin with astaxanthin is allowed provided that the total concentration of the mixture does not exceed 100 mg/kg in the complete feedingstuff	Without a time limit
				Dogs, cats and	—	—	—	—	Without a time limit

				ornamental fish					
				Pet and ornamental birds	—	—	—	—	30.9.1999
	E 161h	Zeaxanthin	$C_{40}H_{56}O_2$	Poultry	—	—	80 (alone or with the other carotenoids and xanthophylls)	—	Without a time limit
	E 16li	Citranaxanthin	$C_{33}H_{44}O$	Laying hens	—	—	80 (alone or with the other carotenoids and xanthophylls)	—	Without a time limit
	E 161j	Astaxanthin	$C_{40}H_{52}O_4$	Salmon, trout	—	—	100	Use only permitted from the age of six months onwards The mixture of astaxanthin with canthaxanthin is allowed provided that the total concentration of the mixture does not exceed 100 mg/kg in the	Without a time limit

								complete feedingstuff	
				Ornamental fish	—	—	—		Without a time limit
11		Astaxanthin-rich *Phaffia rhodozyma* (CBS 116.94)	Concentrated biomass of the yeast *Phaffia rhodozyma* (CBS 116.94), killed, containing at least 2,5 g astaxanthin per kilogram additive	Salmon, trout	—	—	100	The maximum content is expressed as astaxanthin Use only permitted from the age of six months onwards The mixture of the additive with canthaxanthin is allowed provided that the total concentration of astaxanthin and canthaxanthin does not exceed 100 mg/kg in the complete feedingstuff	21.4.1999
12		Astaxanthin-rich *Phaffia rhodozyma* (ATCC 74219)	Concentrated biomass of the yeast *Phaffia rhodozyma* (ATCC	Salmon, trout	—	—	100	The maximum content is expressed as astaxanthin	30.9.1999

			74219), killed, containing at least 4,0 g astaxanthin per kilogram of additive and having a maximum ethoxyquin content of 2 000 mg/kg					Use permitted only from the age of six months onwards The mixture of the additive with canthaxanthin is allowed provided that the total concentration of astaxanthin and canthaxanthin does not exceed 100 mg/kg in the complete feedingstuff Ethoxyquin content to be declared	

ANNEX II

EC No	**Element**	**Additive**	**Chemical formula**	**Maximum content of the element in mg/kg of the complete feedingstuff**	**Other provisions**	**Duration of authorisation**
E4	Copper-Cu	Cupric acetate, monohydrate	$Cu(CH_3COO)_2$. H_2O	Pigs for fattening:	—	Without a time limit

	Basic cupric carbonate, monohydrate	$CuCO_3 . Cu(OH)_2 . H_2O$	in Member States where the mean density of the porcine population is equal to or higher than 175 pigs per 100 ha of utilisable agricultural land: — up to 16 weeks: 175 (total) — from 17th week up to slaughter: 35 (total) in Member States where the mean density of the porcine population is lower than 175 pigs per 100 ha of utilisable agricultural land: — up to 16 weeks: 175 (total) — from 17th week up	—	Without a time limit
	Cupric chloride, dihydrate	$CuCl_2 . 2H_2O$		—	Without a time limit
	[F1]				
	Cupric oxide	CuO		—	Without a time limit
	Cupric sulphate, pentahydrate	$CuSO_4 . 5H_2O$		—	Without a time limit

				to 6 months: 100 (total) — over six months up to slaughter: 35 (total) Breeding pigs: 35 (total) Calves: — milk replacers: 30 (total) — other complete feedingstuffs: 50 (total) Ovines: 15 (total) Other species or categories of animals: 35 (total)		
		Cupric sulphate, monohydrate	$CuSO_4 . H_2O$	Pigs for fattening: in Member States where the mean density of the porcine population is equal to or higher than 175 pigs per 100 ha of utilisable agricultural land: — up to	Denatured skimmed milk powder and compound feedingstuffs manufactured from denatured skimmed milk powder — subject to the relevant provisions of Commission	Without a time limit
		Cupric sulphate, pentahydrate	$CuSO_4 . 5H_2O$			

				16 weeks: 175 (total) — from 17th week — up to slaughter: 35 (total) in Member States where the mean density of the porcine population is lower than 175 pigs per 100 ha of utilisable agricultural land: — up to 16 weeks: 175 (total) — from 17th week up to 6 months: 100 (total) — over six months up to slaughter: 35 (total) Breeding pigs: 35 (total)	Regulations (EEC) No 368/77 and (EEC) No 443/77 declaration of the amount of copper added, expressed as the element, on the label or package or container of denatured skimmed milk powder

			Ovines: 15 (total) Other species or categories of animals with the exception of calves: 35 (total)		
	Cupric chelate of amino acids hydrate	$Cu\ (x)_{1-3}\ .\ nH_2O$ (x = anion of any amino acid derived from hydrolysed soya protein) Molecular weight not exceeding 1 500	Pigs for fattening: in Member States where the mean density of the porcine population is equal to or higher than 175 pigs per 100 ha of utilisable agricultural land: — up to 16 weeks: 175 (total) — from 17th week up to slaughter: 35 (total) in Member States where the mean density of the porcine population is lower than 175 pigs per 100 ha of	Not more than 20 mg/kg of copper in the complete feedingstuff may come from cupric chelate of amino acids hydrate	Without a time limit

				utilisable agricultural land: — up to 16 weeks: 175 (total) — from 17th week up to six months: 100 (total) — over six months up to slaughter: 35 (total) Breeding pigs: 35 (total) Other species or categories of animals, with the exception of calves prior to the start of rumination and sheep: 35 (total)		
E5	Manganese-Mn	[F1Manganous carbonate]	[F1$MnCO_3$]	[F1250 (total)]	[F1—]	[F1Without a time limit]
		Manganous chloride, tetrahydrate	$MnCl_2 . 4H_2O$	250 (total)	—	Without a time limit
		[F1]				
		Manganous oxide	MnO	250 (total)	—	Without a time limit

		[F1]				
		[F1]				
		Manganous sulphate, monohydrate	$MnSO_4 . H_2O$	250 (total)	—	Without a time limit
		Manganese chelate of amino acids hydrate	$Mn (x)_{1-3} . nH_2O$ (x = anion of any amino acid derived from hydrolysed soya protein) Molecular weight not exceeding 1 500	250 (total)	Not more than 40 mg/kg of manganese in the complete feedingstuff may come from manganese chelate of amino acids hydrate	Without a time limit
E6	Zinc-Zn	[F1Zinc lactate, trihydrate]	[F1$Zn(C_3H_5O_3)_2 . 3H_2O$]	F1250 (total)]	[F1—]	[F1Without a time limit]
		Zinc acetate, dihydrate	$Zn(CH_3COO)_2 . 2H_2O$	250 (total)	—	Without a time limit
		[F1]				
		[F1]				
		Zinc oxide	ZnO	250 (total)	Maximum content of lead: 600 mg/kg	Without a time limit
		Zinc sulphate, heptahydrate	$ZnSO_4 . 7H_2O$	250 (total)	—	Without a time limit
		Zinc sulphate, monohydrate	$ZnSO_4 . H_2O$	250 (total)	—	Without a time limit
		Zinc chelate of amino acids hydrate	$Zn (x)_{1-3} . nH_2O$ (x = anion of any amino acid derived from hydrolysed	250 (total)	Not more than 80 mg/kg of zinc in the complete feedingstuff may come from zinc chelate of	Without a time limit

			soya protein) Molecular weight not exceeding 1 500		amino acids hydrate	

Textual Amendments

F1 Deleted by Commission Implementing Regulation (EU) 2017/1145 of 8 June 2017 on the withdrawal from the market of certain feed additives authorised pursuant to Council Directives 70/524/EEC and 82/471/EEC and repealing the obsolete provisions authorising those feed additives (Text with EEA relevance).

ANNEX III

EC No	Additive	Chemical formula, description	Species or category of animal	Maximum age	Minimum content mg/kg of complete feedingstuff	Maximum content	Other provisions	Duration of authorisation
E 320	Butylated hydroxyanisole (BHA)	$C_{11}H_{16}O_2$	All species or categories of animals except dogs	—	—	150: alone or together	All feedingstuffs	Without time limit
E 321	Butylated hydroxytoluene (BHT)	$C_{15}H_{24}O$		—	—			
E 324	Ethoxyquin	$C_{14}H_{19}ON$		—	—			
E 320	Butylated hydroxyanisole (BHA)	$C_{11}H_{16}O_2$	Dogs	—	—	150: alone or together	The mixture of ethoxyquin with BHA and/or BHT is allowed provided the total concentration of the mixture does not exceed 150 mg/kg of	Without a time limit
E 321	Butylated hydroxytoluene (BHT)	$C_{15}H_{24}O$		—	—			
E 324	Ethoxyquin	$C_{14}H_{19}ON$	Dogs	—	—	100		

							complete feedingstuff	

ANNEX IV

No	Additive	Chemical formula, description	Species or category of animal	Maximum age	Minimum activity Unit of activity per kg of complete feedingstuff	Maximum activity	Other provisions	Duration of authorisation
1	3-phytase (EC 3.1.3.8)	Preparation of 3-phytase produced by *Aspergillus niger* (CBS 114.94) having a minimum phytase activity of 5 000 FTU[a]/g for solid and liquid preparations	Pigs (all categories of animals)	—	—	—	—	21.4.1999
			Chickens (all categories of animals)	—	—	—	—	21.4.1999
			Turkeys	—	125 FTU	—	1. Indicate in the directions for use for the additive and the premixture the storage temperature, storage duration and stability on pelleting 2. Recommended dose per	30.9.1999

a 1 FTU is the amount of enzyme which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at pH 5,5 and 37 °C.

								kg of complete feedingstuff: 200-800 FTU
							3.	For use in compound feedingstuffs with a minimum content of 0,3 % phytate, e.g. 20 % wheat

a 1 FTU is the amount of enzyme which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at pH 5,5 and 37 °C.

Changes to legislation:
There are currently no known outstanding effects for the Commission Regulation (EC) No 2316/98.