

Specific Swiss micropollutants from municipal wastewater: CAS number, approval, legal basis and selection criteria (excluding transformation products). Table from the report "Evaluation concept for organic trace substances from municipal wastewater" (2010).

Substance	CAS No.	Legal basis	Approval / Regulation (as at April 2010)	Additional criteria for specific Swiss micropollutants in addition to water mobility, persistence and approval in Switzerland (One of the criteria must be met)		
				Widely detected in surface waters and WWTP (>20% above limit of determination)	Occasionally detected in high concentrations in surface waters (>100 ng/l) and widely in WWTP (>20%)	High specific toxicity
Pharmaceuticals						
Atenolol (Beta blocker)	29122-68-7	VAM	Swissmedic, HAM Category B	X	X	
Azithromycin (Antibiotic)	83905-01-5	VAM	Swissmedic, HAM Category A		X	
Bezafibrate (Lipid regulator)	41859-67-0	VAM	Swissmedic, HAM Category B		X	
Carbamazepine (Antiepileptic)	298-46-4	VAM	Swissmedic, HAM Category B	X	X	
Clarithromycin (Antibiotic)	81103-11-9	VAM	Swissmedic, HAM Category A	X	X	
Diatrizoate (=amidotrizoic acid)	117-96-4	VAM	Swissmedic, HAM Category B	X	X	
Diclofenac (Analgesic)	15307-86-5	VAM	Swissmedic, HAM Category B	X	X	
Erythromycin (Antibiotic)	114-07-8	VAM	Swissmedic, HAM Category B	X		
Ethinylestradiol (Synthetic oestrogen)	57-63-6	VAM	Swissmedic, HAM Category B			X
Ibuprofen (Analgesic)	15687-27-1	VAM	Swissmedic, HAM Category B-D		X	
Iomeprol (Contrast medium)	78649-41-9	VAM	Swissmedic, HAM Category B		X	
Iopamidol (Contrast medium)	62883-00-5	VAM	Swissmedic, HAM Category B	X	X	
Iopromide (Contrast medium)	73334-07-3	VAM	Swissmedic, HAM Category B	X	X	
Mefenamic acid (Analgesic)	61-68-7	VAM	Swissmedic, HAM Category B	X		
Metformin (Antidiabetic)	657-24-9	VAM	Swissmedic, HAM Category B	X	X	
Metoprolol (Beta blocker)	37350-58-6	VAM	Swissmedic, HAM Category B	X		
Naproxen (Analgesic)	22204-53-1	VAM	Swissmedic, HAM Category B		X	
Sotalol (Beta blocker)	3930-20-9	VAM	Swissmedic, HAM Category B	X		
Sulfamethoxazole (Antibiotic)	723-46-6	VAM / TAMV	Swissmedic, HAM+TAM Category A	X	X	
Trimethoprim (Antibiotic)	738-70-5	VAM / TAMV	Swissmedic, HAM+TAM Category A	X		
Substances with intended biocide properties which are subject to approval						
2,4-D (Herbicide)	94-75-7	PSMV	PSMV Annex 1	X	X	
Carbendazim (Fungicide)	10605-21-7	PSMV / VBP	PSMV Annex 1 / (EC) No. 1451/2007 ⁴⁾	X	X	
Diazinon (Insecticide)	333-41-5	PSMV / VBP	PSMV Annex 1 & 8 / (EC) No. 1451/2007 ⁶⁾	X	X	X
Diethyltoluamide (DEET) (Repellent)	134-62-3	VBP	(EC) No. 1451/2007 ²⁾	X	X	
Dimethoate (Insecticide)	60-51-5	PSMV / VBP	PSMV Annex 1 / (EC) No. 1451/2007 ⁷⁾		X	
Diuron (Herbicide)	330-54-1	PSMV / VBP	PSMV Annex 1 / (EC) No. 1451/2007 ⁵⁾		X	X
Glyphosate *) (Herbicide)	1071-83-6	PSMV	PSMV Annex 1	X	X	
Irgarol (Herbicide)	28159-98-0	VBP	(EC) No. 1451/2007 ¹⁾			X
Isoproturon (Herbicide)	34123-59-6	PSMV	PSMV Annex 1	X	X	
MCPA (Herbicide)	94-74-6	PSMV	PSMV Annex 1	X	X	

Substance	CAS No.	Legal basis	Approval / Regulation (at April 2010)	Additional criteria for specific Swiss micropollutants in addition to water mobility, persistence and approval in Switzerland (One of the criteria must be met)		
				Widely detected in surface waters and WTP (>20% above limit of determination)	Occasionally detected in high concentrations in surface waters (>100 ng/l) and widely in WTP (>20%)	High specific toxicity
Substances with intended biocide properties which are subject to approval						
Mecoprop and Mecoprop-P (Herbicide)	16484-77-8	PSMV	PSMV Annex 1	X	X	
Triclosan (Microbicide)	3380-34-5	VBP	(EC) No. 1451/2007 ³⁾	X		
Substances affecting hormonal balance (endocrinal materials not used as medicinal products)						
Bisphenol A (BPA) (Additive)	80-05-7			X	X	
Oestradiol (Natural oestrogen)	50-28-2		Natural substance			X
Oestrone (Natural oestrogen)	53-16-7		Natural substance			X
Nonylphenol (Additive, formulating agent)	104-40-5	ChemRRV	Restrictions	X	X	
Perfluorooctane sulfonate (PFOS)	1763-23-1	Chem RRV	Restriction from 2010 (with next ChemRRV revision)	X	X	
Other substances with environmentally relevant properties						
Acesulfame (E950) (Artificial sweetener)	55589-62-3	ZuV	ZuV Annex 1 (Approved as E950)	X	X	
Benzothiazole (Additive)	95-16-9			X	X	
Benzotriazole (Chelating agent, anti-EDTA ^{**})	95-14-7			X	X	
Methylbenzotriazole (Chelating agent, anti-NTA ^{**})	136-85-6			X	X	
Sucralose (E955) (Artificial sweetener)	56038-13-2	ZuV	ZuV Annex 1 (Approved as E955)	X	X	

VAM (CC 812.212.21): Ordinance on Medicinal Products, medicinal product approval by Swissmedic, HMP: Human medicinal product

TAMV (CC 812.212.27): Ordinance on Veterinary Medicinal Products, medicinal product approval by Swissmedic, VMP: Veterinary medicinal product
HMP and VMP: Categories: Medicinal products are classified in 5 categories:

- A: Single issue on medical or veterinary prescription
- B: Issue on medical or veterinary prescription
- C: Issue on specialist advice by health professionals
- D: Issue on specialist advice
- E: Issue without specialist advice

ChemV: Ordinance on Chemicals (813.11)

ChemRRV: Ordinance on Chemical Risk Reduction (CC 814.81)

ZuV: Ordinance on Additives of 22 June 2007 (817.022.31)

PSMV: Ordinance on the Sale of Plant Protection Products (CC 916.161), approved active agents are in listed Annex 1

Stockh. Conv.: Stockholm Convention (CC 0.814.03): All labelled substances are called "POPs" (Persistent Organic Pollutants) under the Stockholm Convention. They are included in the Swiss ChemRRV.

VBP: Ordinance on Biocide Products (CC 813.129): **PA:** Product type under Annex 10 Ordinance on Biocide Products

- 1) Review in EU Work Programme for PA 7, 9, 10, 21
- 2) Review in EU Work Programme for PA 19, 22
- 3) Review in EU Work Programme for PA 1, 2, 3, 7, 9
- 4) Review in EU Work Programme for PA 6, 7, 9, 10, 11, 12, 13; non-inclusion for PA 6, 13
- 5) Review in EU Work Programme for PA 6, 7, 10; non-inclusion for PA 6, 21
- 6) Review in EU Work Programme for PA 18
- 7) Review in EU Work Programme; non-inclusion for PA 18

^{*}) Glyphosate is "Ready-Biodegradable" under EPISuite (U.S. EPA 2007) which is used in the categorization method and would not be included under the methods described above. However, measurements show that it can occur in the environment. Glyphosate is one of the most widely sold plant protection products in the world, is frequently applied in the built environment and has been found in the µg/l range in surface waters (Battaglin et al. 2005; Hanke et al. 2008). The explanation for these high concentrations lies not so much in the environmental properties of Glyphosate (which are similar to other PPPs) but more in its very high use (pseudo-persistent).

^{**}) EDTA and NTA are "Ready-Biodegradable" under EPISuite (U.S. EPA 2007) which is used in the categorization method and would not be included under the methods described above. However, measurements of EDTA and NTA in surface waters and groundwater show that these substances do infiltrate the water even though the persistence criterion is not met according to the categorization by Götz et al (2010), therefore they have been added to this list.