

EVOFILTER · MULTI-PARAMETER FILTRATION TEST

Water Contaminant Removal

Defined concentrations of nitrate and nitrite, pesticides and their metabolites, heavy metals, sweeteners and pharmaceutical residues were spiked into water and measured before filtration, after filtration through the EVODROP EVOfilter, and in a blank of the source water.

PRODUCT TESTED EVOfilter filtration system	SAMPLE MATRIX Laboratory-prepared spiked test solutions
ANALYSIS PERIOD 4 July – 9 August 2024	ANALYSIS Independent accredited Swiss laboratory
COMMISSIONED BY Evodrop AG · Birkenstrasse 21 · CH-8306 Brüttsellen	METHODS DIN ISO 15923-1 · GC-MS/MS · LC-MS/MS · ISO 17294 · AAS

TEST PROCEDURE

Aqueous test solutions were prepared, each containing twice the limit value of the Swiss Drinking Water Ordinance (TBDV, SR 817.022.11) where feasible. For some metals (antimony, cadmium, copper) and individual pesticides (DEET, diazinon, carbendazim, dichlorprop (2,4-DP), diuron, isoproturon, metolachlor) this was not possible, as only multi-element standards of equal concentration were available. Each solution was filtered through the EVOfilter and the filtrate analysed. A blank of the source water used to prepare the solutions was measured for each substance group.

Results

Nitrite & Nitrate

Unit mg/l · Method DIN ISO 15923-1

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Nitrite NO ₂	0.21 ± 0.03	< 0.01	< 0.01	na / 0.01	> 95 %
Nitrate NO ₃	84.5 ± 8.5	0.9 ± 0.1	< 0.5	na / 0.5	98,9 %

Pesticides & Metabolites — GC-MS/MS

Unit µg/l · Method GC-MS/MS

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Ametryn	0.191 ± 0.048	< 0.010	< 0.010	na / 0.01	> 94 %
Chlorpyrifos	0.174 ± 0.044	< 0.010	< 0.010	na / 0.01	> 94 %
Cybutryn (Irgarol 1051)	0.197 ± 0.050	< 0.010	< 0.010	na / 0.01	> 94 %
DEET	0.351 ± 0.088	< 0.010	< 0.010	na / 0.01	> 97 %
Diazinon	0.607 ± 0.152	< 0.010	< 0.010	na / 0.01	> 98 %
Dimethachlor	0.191 ± 0.048	< 0.010	< 0.010	na / 0.01	> 94 %
Dimethenamid	0.185 ± 0.047	< 0.010	< 0.010	na / 0.01	> 94 %
Ethofumesate	0.206 ± 0.052	< 0.010	< 0.010	na / 0.01	> 95 %
Hexazinone	0.197 ± 0.050	< 0.010	< 0.010	na / 0.01	> 94 %
Malathion	0.107 ± 0.027	< 0.010	< 0.010	na / 0.01	> 90 %
Metribuzin	0.195 ± 0.049	< 0.010	< 0.010	na / 0.01	> 94 %
Pendimethalin	0.235 ± 0.059	< 0.010	< 0.010	na / 0.01	> 95 %
Pirimicarb	0.187 ± 0.047	< 0.010	< 0.010	na / 0.01	> 94 %
Prometon	0.186 ± 0.047	< 0.010	< 0.010	na / 0.01	> 94 %
Prometryn	0.195 ± 0.049	< 0.010	< 0.010	na / 0.01	> 94 %
Propachlor	0.196 ± 0.049	< 0.010	< 0.010	na / 0.01	> 94 %
Tebutam	0.186 ± 0.047	< 0.010	< 0.010	na / 0.01	> 94 %

Pesticides & Metabolites — LC-MS/MS

Unit µg/l · Method LC-MS/MS

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
2,6-Dichlorobenzamide	0.198 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Aclonifen	0.199 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Alachlor	0.237 ± 0.048	< 0.010	< 0.010	na / 0.010	> 95 %
Alachlor ESA	0.214 ± 0.065	< 0.010	< 0.010	na / 0.010	> 95 %
Alachlor-OXA	0.215 ± 0.054	< 0.010	< 0.010	na / 0.010	> 95 %
Atrazine	0.202 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Azoxystrobin	0.199 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Bentazone	0.176 ± 0.044	< 0.010	< 0.010	na / 0.010	> 94 %

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Bromacil	0.203 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Carbendazim	0.413 ± 0.083	0.016 ± 0.004	< 0.010	na / 0.010	96,1 %
Clopyralid	0.184 ± 0.056	< 0.010	< 0.010	na / 0.010	> 94 %
Chlorobromuron	0.190 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Chlorotoluron	0.188 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Cyanazine	0.226 ± 0.046	< 0.010	< 0.010	na / 0.010	> 95 %
Cyproconazole	0.166 ± 0.034	< 0.010	< 0.010	na / 0.010	> 93 %
Cyprodinil	0.196 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
D, 2,4-	0.190 ± 0.048	< 0.010	< 0.010	na / 0.010	> 94 %
DB, 2,4-	0.301 ± 0.091	< 0.050	< 0.050	na / 0.050	> 83 %
Desamino metamitron	0.188 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Desethylatrazine	0.198 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Desethylterbuthylazine	0.185 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Desisopropylatrazine	0.185 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Dichlorprop (2,4-DP)	0.432 ± 0.109	< 0.010	< 0.010	na / 0.010	> 97 %
Dimethachlor CGA 369873	0.186 ± 0.056	< 0.010	< 0.010	na / 0.01	> 94 %
Dimethachlor ESA (CGA 354742)	0.219 ± 0.066	< 0.010	< 0.010	na / 0.010	> 95 %
Dimethachlor-OXA	0.264 ± 0.080	< 0.010	< 0.010	na / 0.01	> 96 %
Dimethenamid-ESA	0.172 ± 0.043	< 0.010	< 0.010	na / 0.010	> 94 %
Dimethenamid OXA	0.228 ± 0.069	< 0.010	< 0.010	na / 0.010	> 95 %
Dimethoate	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Diuron	0.424 ± 0.085	< 0.010	< 0.010	na / 0.010	> 97 %
Fenpropimorph	0.312 ± 0.063	< 0.010	< 0.010	na / 0.010	> 96 %
Fludioxonil CGA 192155	0.233 ± 0.070	< 0.020	< 0.020	na / 0.02	> 91 %
Flufenacet	0.198 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Fluroxypyr	0.155 ± 0.031	< 0.010	< 0.010	na / 0.010	> 93 %
Flusilazol	0.212 ± 0.043	< 0.010	< 0.010	na / 0.010	> 95 %
Haloxypop	0.243 ± 0.073	< 0.010	< 0.010	na / 0.010	> 95 %
Haloxypop-P-methyl	0.147 ± 0.045	< 0.010	< 0.010	na / 0.010	> 93 %

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Imidacloprid	0.194 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
Iodosulfuron-methyl	0.185 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Isoproturon	0.408 ± 0.082	< 0.010	< 0.010	na / 0.010	> 97 %
Linuron	0.180 ± 0.036	< 0.010	< 0.010	na / 0.010	> 94 %
MCPA	0.225 ± 0.068	< 0.010	< 0.010	na / 0.010	> 95 %
MCPB	0.183 ± 0.046	< 0.020	< 0.020	na / 0.020	> 89 %
Mesotrione	0.184 ± 0.037	< 0.010	< 0.010	na / 0.010	> 94 %
Metalaxyl	0.181 ± 0.037	< 0.010	< 0.010	na / 0.010	> 94 %
Metamitron	0.143 ± 0.029	< 0.010	< 0.010	na / 0.010	> 93 %
Metazachlor	0.186 ± 0.038	< 0.010	< 0.010	na / 0.010	> 94 %
Metazachlor BH 479-09	0.208 ± 0.063	< 0.010	< 0.010	na / 0.010	> 95 %
Metazachlor BH 479-11	0.197 ± 0.06	< 0.010	< 0.010	na / 0.010	> 94 %
Metazachlor-ESA	0.197 ± 0.05	< 0.010	< 0.010	na / 0.010	> 94 %
Metazachlor-OXA	0.269 ± 0.081	< 0.010	< 0.010	na / 0.010	> 96 %
Methabenzthiazuron	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Metobromuron	0.201 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Metolachlor	0.563 ± 0.113	< 0.010	< 0.010	na / 0.010	> 98 %
Metolachlor CGA 368208	0.193 ± 0.058	< 0.010	< 0.010	na / 0.010	> 94 %
Metolachlor NOA 413173	0.243 ± 0.073	< 0.010	< 0.010	na / 0.010	> 95 %
Metolachlor-ESA	0.155 ± 0.039	< 0.010	< 0.010	na / 0.010	> 93 %
Metolachlor-OXA	0.218 ± 0.066	< 0.010	< 0.010	na / 0.010	> 95 %
Metoxuron	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Metsulfuron-methyl	0.200 ± 0.06	< 0.010	< 0.010	na / 0.010	> 95 %
Monolinuron	0.202 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Napropamide	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Nicosulfuron	0.155 ± 0.047	< 0.010	< 0.010	na / 0.010	> 93 %
Oxadixyl	0.197 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Penconazole	0.202 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Pencycuron	0.199 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Pethoxamid MET-42	0.172 ± 0.052	< 0.010	< 0.010	na / 0.010	> 94 %
Propachlor-ESA	0.174 ± 0.044	< 0.010	< 0.010	na / 0.010	> 94 %
Propazine	0.200 ± 0.04	< 0.010	< 0.010	na / 0.010	> 95 %
Propiconazole	0.205 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Propyzamide	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Pyraclostrobin	0.215 ± 0.043	< 0.010	< 0.010	na / 0.010	> 95 %
Sebuthylazine	0.196 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Simazine	0.197 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Sulcotrione	0.200 ± 0.04	< 0.010	< 0.010	na / 0.010	> 95 %
T, 2,4,5-	0.185 ± 0.056	< 0.010	< 0.010	na / 0.010	> 94 %
Terbuthylazine CGA 324007 (LM5)	0.262 ± 0.079	< 0.010	< 0.010	na / 0.01	> 96 %
Terbuthylazine SYN 545666 (LM6)	0.193 ± 0.058	< 0.010	< 0.010	na / 0.01	> 94 %
Terbuthylazine	0.198 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Terbutryn	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Thiacloprid	0.192 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
Thiamethoxam	0.207 ± 0.042	< 0.010	< 0.010	na / 0.010	> 95 %
Thifensulfuron-methyl	0.229 ± 0.046	< 0.010	< 0.010	na / 0.010	> 95 %
Triclopyr	0.260 ± 0.065	< 0.020	< 0.020	na / 0.020	> 92 %
Trifloxystrobin	0.226 ± 0.046	< 0.010	< 0.010	na / 0.010	> 95 %
Tritosulfuron	0.116 ± 0.024	< 0.010	< 0.010	na / 0.010	> 91 %
Chloridazone	0.191 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
Chloridazone-desphenyl	0.201 ± 0.041	< 0.010	< 0.010	na / 0.010	> 95 %
Chloridazone-methyl-desphenyl	0.207 ± 0.042	< 0.010	< 0.010	na / 0.010	> 95 %
N,N-Dimethylsulfamide	0.212 ± 0.043	< 0.010	< 0.010	na / 0.010	> 95 %

Chlorothalonil Metabolites

Unit µg/l · Method LC-MS/MS

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Chlorothalonil R182281	0.160 ± 0.032	n.d.	n.d.	0.010 / 0.030	> 93 %
Chlorothalonil R417888	0.159 ± 0.032	n.d.	n.d.	0.010 / 0.030	> 93 %
Chlorothalonil R418503	0.203	n.d.	n.d.	0.050 / na	> 75 %
Chlorothalonil R419492	0.203 ± 0.041	n.d.	n.d.	0.020 / 0.050	> 90 %
Chlorothalonil R471811	0.252 ± 0.051	n.d.	n.d.	0.010 / 0.030	> 96 %
Chlorothalonil R611553	0.187 ± 0.038	n.d.	n.d.	0.010 / 0.030	> 94 %
Chlorothalonil R611965	0.233 ± 0.047	n.d.	n.d.	0.010 / 0.030	> 95 %
Chlorothalonil R611968	0.197 ± 0.040	n.d.	n.d.	0.010 / 0.030	> 94 %
Chlorothalonil SYN 507900	0.235 ± 0.047	n.d.	n.d.	0.010 / 0.030	> 95 %
Chlorothalonil SYN 548008	0.218 ± 0.044	n.d.	n.d.	0.020 / 0.050	> 90 %
Chlorothalonil SYN 548580	0.196 ± 0.040	n.d.	n.d.	0.010 / 0.030	> 94 %
Chlorothalonil SYN 548581	0.240 ± 0.048	n.d.	n.d.	0.010 / 0.030	> 95 %

Sweeteners

Unit µg/l · Method LC-MS/MS

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Acesulfame	0.232 ± 0.047	< 0.010	0.032 ± 0.007	na / 0.010	> 95 %
Cyclamate	0.195 ± 0.04	< 0.020	< 0.020	na / 0.020	> 89 %
Saccharine	0.218 ± 0.044	< 0.010	< 0.010	na / 0.010	> 95 %
Sucralose	0.308 ± 0.062	< 0.010	0.104 ± 0.021	na / 0.010	> 96 %

Drug Residues & Micropollutants

Unit µg/l · Method LC-MS/MS

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
4-Methyl-1H-benzotriazole	0.182 ± 0.037	< 0.010	< 0.010	na / 0.010	> 94 %
Amidotrizoic acid	0.199 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
Amisulprid	0.192 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
1H-Benzotriazole	0.183 ± 0.037	< 0.010	< 0.010	na / 0.010	> 94 %
Candesartan	0.192 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
Carbamazepine	0.178 ± 0.036	< 0.010	< 0.010	na / 0.010	> 94 %
Citalopram	0.200 ± 0.04	< 0.010	< 0.010	na / 0.010	> 95 %
Clarithromycin	0.208 ± 0.042	< 0.010	< 0.010	na / 0.010	> 95 %
Diazepam	0.177 ± 0.036	< 0.010	< 0.010	na / 0.010	> 94 %
Diclofenac	0.173 ± 0.035	< 0.010	< 0.010	na / 0.010	> 94 %
Hydrochlorothiazide	0.244 ± 0.049	< 0.010	< 0.010	na / 0.010	> 95 %
Iopamidol	0.189 ± 0.038	< 0.010	0.023 ± 0.005	na / 0.010	> 94 %
Irbesartan	0.143 ± 0.029	< 0.010	< 0.010	na / 0.010	> 93 %
Lamotrigin	0.206 ± 0.042	< 0.010	< 0.010	na / 0.010	> 95 %
Metoprolol	0.191 ± 0.039	< 0.010	< 0.010	na / 0.010	> 94 %
Sotalol	0.195 ± 0.04	< 0.010	< 0.010	na / 0.010	> 94 %
N-Acetylsulfamethoxazole	0.170 ± 0.034	< 0.010	< 0.010	na / 0.010	> 94 %
Sulfamethoxazole	0.179 ± 0.036	< 0.010	< 0.010	na / 0.010	> 94 %
Venlafaxine	0.184 ± 0.037	< 0.010	< 0.010	na / 0.010	> 94 %

Heavy Metals

Unit mg/l · Method ISO 17294 (Mercury: AAS)

PARAMETER	BEFORE	AFTER	BLANK	LOD / LOQ	REMOVAL RATE
Aluminium Al	0.296 ± 0.060	< 0.001	< 0.001	na / 0.001	> 99 %
Antimony Sb	0.0217 ± 0.0044	< 0.001	< 0.001	na / 0.001	> 95 %
Arsenic As	0.0175 ± 0.0036	< 0.0002	< 0.0002	na / 0.0002	> 98 %
Lead Pb	0.0105 ± 0.0022	< 0.001	< 0.001	na / 0.001	> 90 %
Cadmium Cd	0.0223 ± 0.0045	< 0.0001	< 0.0001	na / 0.0001	> 99 %
Chromium Cr	0.0187 ± 0.0038	< 0.001	< 0.001	na / 0.001	> 94 %
Iron Fe	0.391 ± 0.079	< 0.001	< 0.001	na / 0.001	> 99 %
Copper Cu	0.0210 ± 0.0043	0.0191 ± 0.0039	< 0.001	na / 0.001	9,0 %
Manganese Mn	0.0968 ± 0.0194	< 0.001	< 0.001	na / 0.001	> 98 %
Nickel Ni	0.0398 ± 0.0080	< 0.001	< 0.001	na / 0.001	> 97 %
Mercury Hg	0.0020 ± 0.0004	< 0.0005	< 0.0005	na / 0.0005	> 75 %
Selenium Se	0.0208 ± 0.0042	< 0.001	< 0.001	na / 0.001	> 95 %
Zinc Zn	10.8 ± 2.2	0.0502 ± 0.0101	< 0.001	na / 0.001	99,5 %

n.d. = not detectable (below limit of detection) · < = below limit of quantification · ± = measurement uncertainty · LoD / LoQ = limit of detection / limit of quantification · na = not applicable · Blank = source water used to prepare the test solutions. Removal rate = (before – after) / before; where the filtered value was not detectable or below the limit of quantification, a conservative lower bound (>...) is calculated using the respective LoD or LoQ.

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