Sweco Environment

Screening Report 2013

Occurrence of additional WFD priority substances in Sweden

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Sweco Environment AB
Södra regionen

Project number: 1270592

Project manager: Niklas Törneman

Supporting staff: Pär Hallgren, Martin Bjarke

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

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NATIONELL
MILJÖÖVERVAKNING
PÅ UPPDRAG AV
NATURVÅRDSVERKET

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PROGRAMOMRÅDE Mijögiftssamordning
DELPROGRAM Screening

Screening av tillkommande vattendirektivsämnen

Rapportförfattare
Niklas Törneman, Sweco Environment AB
Pär Hallgren, Sweco Environment AB
Martin Bjarke, Sweco Environment AB

Utgivare
SWECO
Postadress
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon
040-16 70 00

Rapporttitel och undertitel
Occurence of additional WFD priority substances in Sweden

Beställare
Naturvårdsverket
106 48 Stockholm
Finansiering
nationell och regional miljöövervakning

Nyckelord för plats
Sverige

Nyckelord för ämne
vattendirektivet, prioriterade ämnen, COM(2011)876), Dikofol, PFOS, dioxin, PCB, HBCD, heptaklor, heptaklorepoxid, kinoxifen, aklonifen, bifenox, irgarol, cybutryn, cypermetrin, diklorvos, terbutryn, 17-alfa-etinylöstradiol, 17-beta-östradiol, diklofenak, fisk, passiv provtagare

Tidpunkt för insamling av underlagsdata
2012 – 2013

Sammanfattning
Nationell förekomst av de 15 föreslaget tillkommande prioriterade ämnena (COM(2011)876) utvärderades. Undersökningen omfattade provtagning vid 73 inlandsytvatten, 10 kustnära ytvatten samt 17 provtagningspunkter för biota. Mestadels provtogs platser nedströms avloppsreningsverk, dels med direkt provtagning av vatten och dels med passiva provtagare. För 5 av de 15 ämnena kunde analysmetoderna ej uppfylla LOQ<EQS.
De ämnen som oftast förekom över sin bestämningsgräns i ytvatten var diklofenak, terbutryn och 17beta-estradiol ekvivalenter mätt med CALUX. För fisk indikerade resultaten förekomst av punktkällor för HBCD och PFOS. De ämnen som oftast förekom över sitt AA-MKN värde i inlandsvatten var diklorvos (ca 10 % av mätningarna) och Cybutrun/Irgarol (ca 5%). Vidare förekom 17-beta-estradiol ekvivalenter (CALUX), 17-alfa-ethinylestradiol samt diklofenak över det tidigare föreslagna AA-MKN i 10 %, 8 % respektive 3 % av mätningarna i inlandsvatten. Sammantaget överskreds AA-MKN för något ämne i ca 10 % av alla provpunkter i inlandsvatten. För biota överskreds MKN-värdet vid 20 % av provtagningspunkterna.
De huvudsakliga rekommendationerna är:
Heptaklor och heptaklorepoxid behöver möjligen mätas i fiskprov med bättre analysmetoder för att säkerhetsställa att dessa ämnens förekomst inte påverkar kemisk ytvattenstatus i Sverige.
Bättre analytismetoder behöver utvecklas för 17alfa-ethinylestradiol, 17beta-estradiol, cypermetrin och diklorvos.
En uppföljningsstudie bör omfatta färre provtagningspunkter och högre upplösning över tid för 8 utvalda ämnen. En separat uppföljningsstudie bör också via mätningar och/eller litteraturstudier fastställa de viktigaste källorna till dessa ämnen samt ge rekommendationer för uppströmsarbete.

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SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

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Sammanfattning

Bakgrund och metoder

Inom ramen för Naturvårdsverkets screeningprogram[1] har SWECO Environment fått i uppdrag av Naturvårdsverket att mäta och utvärdera förekomsten av tillkommande prioriterade ämnena i inlandsytvatten och kustnära ytvatten. Screeningundersökningen omfattade de 15 föreslaget tillkommande prioriterade (COM(2011)876) varav endast 12 införlivades i bilaga 10 till förordningen (2013/39/EU).

Syftena med projektet var att:

- konstatera om och i vilken omfattning vattendirektivets tillkommande prioriterade ämnen förekommer i inlandsytvatten och kustnära ytvatten i Sverige
- utvärdera om det finns geografiska skillnader i uppmätta halter av de tillkommande prioriterade ämnena
- översiktligt utvärdera i vilken omfattning den kemiska statusklassningen påverkas av tillkommande prioriterade ämnen

Undersökningen omfattade provtagning vid 73 inlandsytvatten, 11 kustnära ytvatten samt 17 provtagningspunkter för biota. Hela Sverige omfattades av provtagningen, även om provpunkter i Södra Sverige dominerade. Provtagningspunkterna återfanns mestadels nedströms avloppsreningsverk, men provtagningspunkter med bakgrundspåverkan ingick också.

Provtagningen av vatten genomfördes November 2012 och Maj-Juli 2013 medan fiskprovtagning pågick under en längre period under höst och vår. Vattenprovtagning genomfördes dels med direkt provtagning av vatten och dels med passiva provtagare som var utplacerade ca tre veckor. Provtagningen genomfördes kvalitetssäkrat.

För många av ämnena användes certifierade analysmetoder, medan metodutveckling krävdes för vissa ämnen. Kvalitetssäkring med metodblankar, interna och externa standarder etc. användes för alla analyser. I stort uppfyllde analysmetoderna behovet av att LOQ < EQS. För vissa ämnen var detta dock inte möjligt vilket var mest påtagligt för 17alfa-ethinylestradiol, 17beta-estradiol, cypermetrin och diklorvos och heptaklor/ heptaklorepoxid.

[1] http://www.naturvardsverket.se/sv/Tillstandet-i-miljon/Miljoovervakning/Programomraden/Miljogiftssamordning/Screening/

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Resultat och slutsatser

För de ämnen som ofta förekom över sin bestämningsgräns i ytvatten (diklofenak, terbutryn och 17beta-estradiol ekvivalenter mätt med CALUX) fanns inga tydliga geografiska skillnader i koncentrationer sett över hela Sverige. För fisk indikerade resultaten förekomst av punktkällor för HBCD och PFOS.

Vid en jämförelse av mätningar uppströms och nedströms reningsverk var det förhållandevis tydligt att avloppsreningsverk utgjorde de viktigaste källorna av tillkommande prioriterade ämnen till ytvatten. Det tydligaste undantaget var diklorvos. Resultaten visade också att metallkoncentrationer inte var tydligt korrelerade med förekomst av de aktuella tillkommande prioriterade ämnena.

De tillkommande prioriterade ämnen som oftast förekom över sitt AA-MKN värde i inlandsvatten var diklorvos (ca 10 % av mätningarna) och Cybutrun/Irgarol (ca 5%). Vidare förekom 17-beta-estradiol ekvivalenter (CALUX), 17-alfa-ethinylestradiol samt diklofenak över det tidigare föreslagna AA-MKN i 10 %, 8 % respektive 3 % av mätningarna i inlandsvatten.

Sammantaget överskreds AA-MKN för något ämne i ca 10 % av alla provpunkter i de inlandsvatten som ingick i studien. Om även 17-beta-estradiol ekvivalenter (CALUX), 17-alfa-ethinylestradiol samt diklofenak räknas in överstegs AA-MKN i ca 20 % av alla inlandsvatten. För kustnära ytvatten överskreds AA-MKN i ca 40 % av alla provpunkter om 17-beta-estradiol ekvivalenter (CALUX), 17-alfa-ethinylestradiol samt diklofenak räknas in. För biota överstegs MKN-värdet vid 20 % av provtagningspunkterna. Notera dock att endast 11 punkter ingick i kustnära ytvatten. Notera också att tidigare mätningar av HBCD och PFOS i fisk i Sverige indikerar högre koncentrationer än vad denna studie tyder på.

Slutligen var det tydligt att variationen i koncentrationer mellan provtagningspunkter var större än mellan årstider.

Rekommendationer

De huvudsakliga rekommendationerna är:

- Heptaklor och heptaklorepoxid behöver möjligen mätas i ett begränsat antal fiskprov med bättre analysmetoder för att säkerhetsställa att dessa ämnens förekomst inte påverkar kemisk ytvattenstatus i Sverige
- Bättre analytiska metoder behöver utvecklas för 17alfa-ethinylestradiol, 17beta-estradiol, cypermetrin and diklorvos
- En uppföljningsstudie bör omfatta färre provtagningspunkter och högre upplösning över tid (lämpligen månadsprov) och följande ämnen:
    - diklorvos (alla ytvatten)

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

  - cybutryn/irgarol (alla ytvatten)
  - 17beta-estradiol ekvivalenter mätt med CALUX (alla ytvatten)
  - 17alfa-ethinylestradiol och 17beta-estradiol (alla ytvatten)
  - cypermetrin (kustvatten, möjligtvis inklusive analytisk metodutveckling)
  - diklofenak (alla ytvatten)
  - PFOS (vattenprov, alla ytvatten), för PFOS kan det dock vara tillräckligt med sammanställning av existerande miljödata från ytvatten.
  - HBCDs (fisk, alla ytvatten)

- En separat uppföljningsstudie bör också via mätningar och/eller litteraturstudier fastställa de viktigaste källorna till dessa ämnen samt ge rekommendationer för uppströmsarbete

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Summary

Background and Methods

In 2012, a proposal was published with 15 additional priority substances to be amended to the water framework directive (COM(2011)876). In directive 2013/39/EU a list of priority substances to be amended to the water framework directive was published. Diclofenac, 17-alpha-ethinylestradiol and 17-beta-estradiol were not included in this list but were instead added to a watch list. Within the screening program of 2012 SWECO Environment has had the assignment from the Swedish Environmental Protection Agency to measure the occurrence of these 15 substances in surface waters of Sweden to investigate if these are of national or regional interest.

Given the scope of the study, and in order to facilitate data evaluation, two clearly stated objectives were decided upon:

- To assess the geographical variability of additional WFD priority substances in Sweden on a large scale
- To assess to what degree the additional priority substances will affect the chemical status of surface waters in Sweden.

The screening involved water sampling (direct water samples and passive samplers - POCIS and SPMD) at 73 inland (limnic) and 11 coastal locations, and 17 samples of biota. Sampling was done on two occasions in 2012 and 2013. The sampling stations were mostly situated downstream waste water treatment plants (WWTPs). Sampling followed a predetermined sampling plan which included quality assurance procedures.

All substances were extracted and analysed for the 15 substances using pre-determined analytical protocols. Quality assurance procedures (e.g. EN ISO/IEC) were used for all analytical work. Despite this, target LOQ was not achieved in all cases. The presence of estrogenic substances in water was evaluated with a cell based test system (ER-CALUX). Metals were used as reference substances.

Results and conclusions

In the case of substances that were often above LOQ (diklofenac, terbutryne and 17beta-estradiol equivalents using CALUX) there were no clear geographical patterns on a national level. When comparing results upstream and downstream of WWTPs, it was obvious that outgoing waste water was a major source of several substances to surface water systems. The clearest exception was dichlorvos. The results also indicated that metal concentrations were not in general correlated to the occurrence of the investigated organic substances.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

The substances that most often occurred above AA-EQS were dichlorvos (ca. 10% of the samples) and cubytrune (ca. 5%). Furthermore, 17-beta-estradiol equivalents, 17-alfa-ethinylestradiole and diclofenac occurred above the earlier suggested AA-EQS (COM(2011)876) in 10%, 8% and 3% of the inland water samples respectively.

In total, AA-EQS was exceeded in approximately 10% of the sampling points of the inland water systems. If 17-beta-estradiol equivalents, 17-alfa-ethinylestradiole and diklofenac were included this number would increase to approximately 20%. In coastal waters, AA-EQS was exceeded in approximately 40% of the sampling points if 17-beta-estradiol equivalents, 17-alfa-ethinylestradiole and diklofenac were included, although it should be noted that only 11 coastal sampling points were included in the study. The AA-EQS was exceeded in approximately 20% of the fish samples.

It was also evident that the variability between sampling points was much greater than the variability between 2012 and 2013. This would tentatively indicate a low temporal variability in surface waters of these substances.

Recommendations

- Heptachlor and heptachlor epoxide need to be measured in a limited number of fish samples, with a more sensitive analytical method
- Better analytical techniques needs to be developed for 17-alfa-ethinylestradiol, 17-beta-estradiol, cypermethrin and dichlorvos
- A follow up study should include fewer sampling stations, measurements with a higher temporal resolution for water sampling (at least monthly) and possibly the following substances:
    - dichlorvos (all waters)
    - cybutryne (all waters)
    - 17-beta-estradiol equivalents measured with ER-CALUX (all waters)
    - 17-alfa-ethinylestradiol and 17beta-estradiol (all waters)
    - cypermethrin (coastal waters, could include development of analytical methods)
    - diclofenac (all waters)
    - PFOS (all waters) (could be replaced with a compilation of literature data)
    - HBCDs (in fish with high fat content, e.g. eel)
- A separate study could also focus on the sources of the substances that are identified as important.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

1 Introduction

1.1 Background

At present there is a lack of knowledge regarding the emission, distribution and exposure for many of the chemicals emitted to the environment. The aim of the screening program financed by the Swedish Environmental Protection Agency is to alleviate this lack of knowledge by estimating the occurrence of different chemicals in the environment in relevant matrices (soil, water etc.).

To maximize the information gained from the screening program measurements are made in many matrices at many sites, but with few samples per site. The Swedish EPA is responsible for the screening at the national level and selects the chemicals that are to be included. County Administrative Board's choose to participate in regional screening studies whose function is to increase the density of sampling point at a regional level. Consequently, the Administrative Board in each county select regionally important sample points.

In 2008, the European Commission issued a list of environmental quality standards (EQS) for concentrations of chemicals in surface water (2008/105/EC). These standards relate to chemical pollutants identified as 'priority substances' under the European water framework directive (WFD, 2000/60/EC). In 2012, a proposal was published with 15 additional priority substances to be amended to the water framework directive (COM(2011)876).

Within the screening program of 2012 SWECO Environment has had the assignment from the Swedish Environmental Protection Agency to measure the occurrence of these 15 additional priority substances in surface waters of Sweden to investigate if these are of national or regional interest.

In directive 2013/39/EU a list of priority substances to be amended to the water framework directive was published. Diclofenac, 17-alpha-ethinylestradiol and 17-beta-estradiol were not included in this list but were instead added to a watch list

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

1.2 Objectives

Given the scope of the study, and in order to facilitate data evaluation, two clearly stated objectives were decided upon:

- To assess the geographical variability of additional WFD priority substances in Sweden on a large scale
- To assess to what degree the additional priority substances will affect the chemical status of surface waters in Sweden.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

2 Water Framework Directive and Priority Substances

The Water Framework Directive (WFD, 2000/60/EC) is a European Union directive which commits member states to making all water bodies (surface, estuarine and groundwater) of good qualitative and quantitative status by 2015. A first list of priority substances was established in 2001 (Decision 2455/2001/EC) as Annex X to the WFD, on the basis of their risk to the aquatic environment, or to human health via the aquatic environment. This first list was replaced by Annex II of the Directive on Environmental Quality Standards (Directive 2008/105/EC) (EQSD), also known as the Priority Substances Directive, which set environmental quality standards (EQS) for the substances in surface waters (river, lake, transitional and coastal) and confirmed their designation as priority or priority hazardous substances, the latter being a subset of particular concern. In 2012, 15 additional substances were proposed to be included as priority substances (COM(2011)876), (Table 2-1). The inclusion of additional substances was finalized in 2013 (2013/39/EU). The final list of additional substances contained 12 substances since Diclofenac, 17-beta-estradiol and 17-alpha-ethinylestradiol was instead transferred to a watch list. Chemicals in the watch list will be monitored by the member states in order to gather data so that appropriate measures to address the risk posed by those substances can be determined.

For each of the priority substances, an environmental quality standard (EQS) has been established. The EQS are limits to the degree of concentration, i.e. the concentration in water or biota (fish) of the substances concerned must not exceed certain thresholds. The directive sets out three types of standards:

- AA-EQS - the average concentration of the substance concerned calculated over a one-year period. The purpose of this standard is to ensure the long-term quality of the aquatic environment;
- MAC-EQS - the maximum allowable concentration of the substance measured. The purpose of this second standard is to limit peaks of pollution.
- EQS biota – Some very hydrophobic substances accumulate in biota and are hardly detectable in water even using the most advanced analytical techniques. For such substances, EQS should be set for biota (2013/39/EU).

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

The quality standards are differentiated for inland surface waters and transitional, coastal and territorial waters. Member States must ensure compliance with these standards. They must also verify that the concentrations of substances concerned do not increase in sediments or in organisms living in surface water. A list of the 12 additional priority substances and the three pharmaceuticals to be covered by the first watch list is presented Table 2-1, together with some short information on their usage.

Table 2-1.Summary information on the additional WFD priority substances included in the study.

Substance	CAS	Usage	Matrix	Included in 2013/39/EU
Dicofol	115-32-2	Forbidden to produce and use in the EU. Earlier application was for the control of mites. In Sweden, a total of six products have been approved, of which the last was banned at the end of 1990.	Whole fish	Yes
PFOS	1763-23-1	Has been used for the treatment of textiles and other coatings to protect against water, oil and grease. They have also been important ingredients in firefighting foam. PFOS is banned for use in Sweden apart from usage hydraulic fluids. There are no registered products in Sweden and the biggest source at present is probably import.	Fish, muscle	Yes
Dioxins and dioxin-like compounds (PCDD, PCDF, PCB-DL)		Formed through incineration or other thermal processes. The countries around the Baltic Sea have adopted an agreement that anthropogenic emissions shall be discontinued by 2020.	Fish, muscle	Yes
HBCDs		Used as a flame retardant in insulation materials (EPS and XPS), in plastics for electronic equipment (HIPS) and the textile industry. In Sweden, virtually all use has been banned with the possible exception of the construction/building industry. 118 tonnes were used/registered in 1997 with, which decreased to 2,5 tons in 2004.	Whole fish	Yes
Heptachlor and heptachlor epoxide	76-44-8/ 1024-57-3	Used as an insecticide in agriculture and in buildings. The usage was banned in Sweden due to the ban of chlordane in 1971 and heptachlor in EU 1984.	Fish, muscle	Yes
Quinoxyfen	124495-18-7	Used for treating powdery mildew on cereals, grapes, sugar beet, hops and strawberries. Not used in Sweden, and only reaches Sweden through the import of these agricultural products.	Water, fish, muscle	Yes
Aclonifen	74070-46-5	Use for weed control in crops. Currently used as an active ingredient in one product in Sweden (approved until 2014). 1996 - 2009, 204.5 tons was used in two products. The usage is declining and in 2009 15.5 tonnes was used.	Water	Yes
Bifenox	42576-02-3	Used as a herbicide in the growing of rapeseed. 3.7 tonnes used in one product 2009.	Water	Yes

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Substance	CAS	Usage	Matrix	Included in 2013/39/EU
Cybutryne (Irgarol)	28159-98-0	Used as a biocide in boat bottom paints. This usage is discontinued for boats of > 25 m length in Sweden. In 2009 there were 1.4 tonnes registered for usage in Sweden in 73 products. 2002 – 2009 156 tonnes was registered in Sweden.	Water	Yes
Cypermetrin	52315-07-8	Mainly used within forestry as an insecticide. Also household usage as an insecticide. Usage increased 2005 - 2006 due to timber storage after major storms. In 2009, the usage had decreased to 0,1 tonnes in 13 products.	Water, passive sampler	Yes
Dichlorvos	62-73-7	Previous usage as an insecticide in agriculture and fishfarming. A phase out substance in the EU and prohibited for usage in Sweden. Degradation product of the insecticide Chlorophos which is also prohibited for usage in Sweden. 14 tonnes of Chlorophos was used in Sweden 1992 – 2009	Water, passive sampler	Yes
Terbutryn	886-50-0	Agricultural pesticide and biocide in paint formulations. Usage in Sweden was 125.4 tonnes 1992 – 2009 in 152 products, mainly water based paints.	Water, passive sampler	Yes
17-alfa-etinylestradiol	57-63-6	A synthetic steroid and used in contraceptives and medicines for the treatment of e.g. menopausal symptoms. In 2006-2009, 2.7 g was used in Sweden.	Water	No
17-beta-estradiol	50-28-2	Used for hormone replacement therapy of estrogen deficiency at menopause. It is a naturally occurring hormone and is also an intermediate in the manufacture of other estrogens. 2006-2009 56.8 kg was used in medicines in Sweden.	Water	No
Diclofenac	15307-79-6	Used in non-steroidal, antipyretic, anti-inflammatory, analgesic drugs. In EU, the use for veterinary purposes is banned. The total amount of diclofenac in medicine between the years 2006-2009 was about 16 tons, and the trend for the annual consumption over the period was slightly rising.	Water, passive sampler	No

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

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3 Methods

3.1 Study areas

The screening involved water sampling at 73 inland (limnic) and 11 coastal locations, and 17 samples of biota. The sampling stations were mostly situated downstream waste water treatment plants given that the most common source to the environment is probably waste water treatment plants. In addition, background localities were also included (Ljusacksen) as well as localities influenced by general anthropogenic load (for example “Skitviken” - Västerås, Malmö Harbour – Malmö, Motala ströms utlopp – Norrköping and Göta älv – Göteborg).

The sampling locations are briefly described in appendix 1. An overview of the position of the sampling stations is presented in Figure 3-1.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

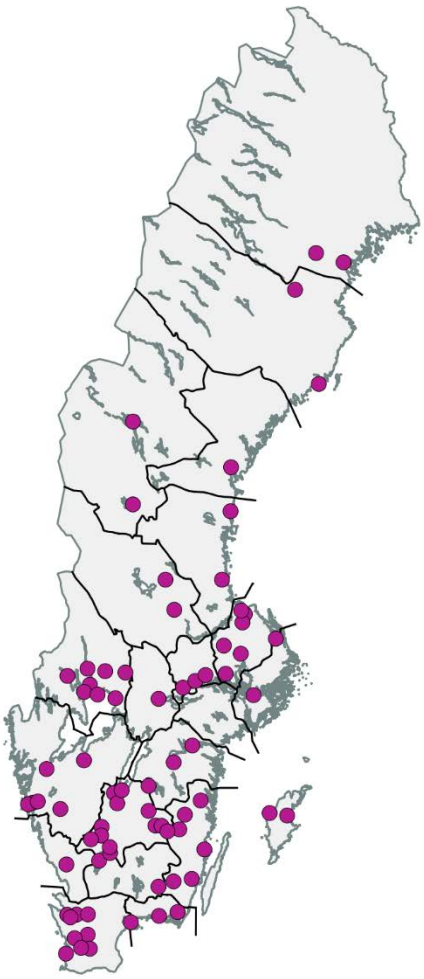

Figure 3-1.Overview of sampling stations.

3.2 Sampling

Sampling was done within the same period of four weeks for all sampling stations once during the autumn of 2012 and once in late spring of 2013. Water samples were mainly taken in November while fish samples were taken during November – December due to continuing work of finding proper sampling locations and fish at these sampling locations. In 2013 water samples were taken in May – July while fish samples were taken May – September due to continuing complications with fish samples and locations.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Generally the sampling were delayed in the northern half of Sweden due to ice on lakes and rivers following the long winter season, some samples that where intended for 2012 were delayed to 2013 and the sampling in 2013 got delayed for some points. Three passive samplers that were deployed in May 2013 in Västra Götaland were removed on purpose (sabotaged) but could be replaced by new samplers at slightly different locations in June.

Sampling were primarily performed by personnel from the regional county boards, but also by Swecos own personnel and contractors.

Samples that were sent to Amsterdam for analysis (aclonifen, bifenox, cybutryne, quinoxyfen and ER-CALUX) were sent to Sweco in Malmö where they were kept refrigerated for 1-3 days and then transported by a refrigerator transport to Amsterdam.

Sampling followed a predetermined sampling plan which included the following quality assurance procedures:

1. Before sampling commenced labels were pre-developed by the involved laboratories for most of the analyses. The labels were attached to the bottles by the laboratories before being sent out to the sampling personnel. Bottles sent to Amsterdam were labelled by the sampling personnel at site.
2. Contamination of samples was avoided by rinsing the equipment for water sampling at least three times before sampling to avoid cross- contamination, and ensuring that the equipment was stored in containers between sampling occasions.
3. Water samples were about 1 m below the surface. In some cases, samples were taken closer to the water surface to prevent impact from bottom sediments.
4. From each sampling point 6 litres of water was sampled from each site in 1 litre glass flasks. Water for metal analyses was additionally sampled in 125 ml acid rinsed plastic bottles.
5. All sampled water was kept cool by using ice packs during transport to the laboratory. At the lab, the samples were refrigerated (5-8 ° C) and were analysed mostly within one week, but up to one month in some cases (within the limits of the laboratory standards used) Transportation from Malmö to Amsterdam were made by a refrigerator truck. Samples were conserved if needed according to laboratory standards.
6. Water samples were sent to the laboratory on the day of sampling occurred or within 12 - 14 hours after sampling to minimize abiotic and biotic losses in sample bottles. For samples that were sent to Amsterdam, the transportation time were about 5-7 days from sampling until delivery at the laboratory.
7. For each sampling point a field protocol was completed that included information about:

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

a) Position of sampling, GPS coordinates and / or sketch and a text description.

b) Water sampling depth.

c) Estimated water conditions such clear, humic, brown water, particle rich etc.

d) Estimated wind

e) The presence of boat traffic near the sampling point

f) Estimated bottom type if possible.

g) Other observations, such as occurrence of algal blooms.

h) Distance to land

i) Any deviations during sampling , such as wind and weather conditions which may indicate a greater impact from sediment to surface waters , deviations in the sampling procedure , and deviations in transport and/or storage procedures

Passive samplers (POCIS and SPMD, see Appendix 2 for details on sampling and calculations) were deployed for three weeks and where retrieved on the same day as the spot sampling of water according to strict protocols to ensure that no cross contamination occurred.

Fish were sampled using either net or rod fishing. Fish between 15 and 20 cm in length were recommended, but in some cases it was not possible to obtain fish of this size and larger fish was used. Lipid content was not analysed. Filleting was done either immediate after fishing or at the laboratory. Mostly a composite sample of 10-15 fishes were used, but in some cases (larger fish) 4-5 fishes were used. See Table 3-1 for sample details, coordinates for fishing locations is reported in Appendix 1.

In all cases clean procures were used to avoid contamination. Fish samples were kept cold until analysis. Perch was the sampled species from all sampling points except Göta älv 2012 (river mouth) where eelpout was sampled and Göta älv 2013 (Risholmen) where trout was sampled. Perch from Krankesjön (from 2011 or 2012) were obtained from the National Swedish Monitoring Programme in Fresh Water Biota (Naturhistoriska riksmuseet).

The extent of sampling and analysed substances as well as the distribution of national and regional samples is presented in Table 3-2.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Table 3-1. Fish samples.

Region	Location	Year	Species	N	Size (cm)	Fishing technique
Jämtland	Storsjön	2012	Pearch	10	22-25	net
Jönköping	Hären	2013	Pearch	Ca 15	15-20	net
Jönköping	Munksjön	2013	Pearch	Ca 15	15-20	net
Jönköping	Sjunnendammen	2013	Pearch	Ca 15	15-20	net
Jönköping	Vidöstern	2013	Pearch	Ca 15	15-20	net
Jönköping	Vättern	2013	Pearch	Ca 15	>30	net
Kronoberg	Bolmen	2013	Pearch	Ca 15	15-20	net
Skåne	Krankesjön***	2012	Pearch	15	-	net
Södermanland	Mellanfjärden	2013	Pearch	5	24-32	net
Värmland	Åsfjorden Grums	2012	Pearch	15	<10 (7 fishes) 10-15 (8 fishes)	net
Västerbotten	Lapp-Arvträsket	2013	Pearch	5-15	18-22	rod
Västerbotten	Norsjön	2013	Pearch	5-15	18-22	net
Västerbotten	Österfjärden	2013	Pearch	5-15	18-22	net
Västra Götaland	Göta Älv 1 Risholmen Göteborg	2013	Trout *Salmo trutta*	10	25- 38	Fly fishing
Västra Götaland	Göta Älv river mouth Göteborg	2012	Eelpout	-	-	net
Västra Götaland	Göta älv Trollhättan O11	2013	Pearch	15	18-30	Spin fishing
Västra Götaland	Säve ån Gamlestaden O 13	2013	Pearch	10	13-20	rod

Table 3-2. The extent of sampling and analysed substances as well as the distribution of national and regional samples

	Direct water sampling					Passive samplers	Fish
Number of samples	**Estradiols**	**Aclonifen, bifenox, cybutryne, quinoxyfen**	**Reference metals**	**ER-CALUX**	**TOC**	**Diclofenac, terbutryn, dichlorvos, cypermethrin**	
National samples	40	41	40	20	21	40	5
2012	19	20	20	4		19	2
2013	21	21	20	16	21	21	3
Additional regional samples	33	35	10	30	22	29	12
2012	9	8	10	6		7	1
2013	24	27		16	22	22	11
2012	28	28	30	10		26	3
2013	45	48	20	32	43	43	14
Total:	73	76	53	50	44	69	17

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

3.3 Analytical methods

3.3.1 Extraction and analysis

All substances were extracted and analysed according to Table 3-3.

Table 3-3. Analytical methods for extraction and analysis of additional WFD priority substances.

Substance	Matrix	Preparation	Extraction	Clean Up/other	Method	Instrument
Dikofol	Whole fish	Freeze drying.	Acetonitrile and hexane	Silica Gel	Non- accredited	GC-MS
PFOS	Fish, muscle	Freeze drying	Methanol		Accredited	LC-MS
Dioxins	Fish, muscle	Freeze drying	Hexane and dichloromethane	Activated carbon + cellite	Accredited	GC-HRMS
HBCDs	Whole fish	Freeze drying	Hexane	Dialysis + sulphuric acid and silica gel	Non- accredited	LC-MS
Heptachlor and heptachlor epoxide	Fish, muscle	Freeze drying	Hexane and dichloromethane	None (2012) None (2013)*	Accredited**	GC-HRMS
Quinoxyfen	Fish, muscle	Freeze drying.	Acetonitrile and hexane	Silica Gel	Accredited	GC-MS
17-alfa-etinylestradiol	Water	Glass filter	SPE column extraction	NH2 SPE-column	Non- accredited	LC-MS
17-beta-estradiol	Water	Glass filter	SPE column extraction	NH2 SPE-column	Non- accredited	LC-MS
Quinoxyfen	Water		Solid phase extraction	Pre-concentration	Accredited	LC-MS/MS
Aclonifen	Water		Solid phase extraction	Pre-concentration	Accredited	LC-MS/MS
Bifenox	Water		Solid phase extraction	Pre-concentration	Accredited	LC-MS/MS
Cybutryne (Irgarol)	Water		Solid phase extraction	Pre-concentration	Accredited	LC-MS/MS
Cypermetrin	Water, passive sampler	SPMD	Extraction of SPMD with methanol	Silica Gel	Non- accredited (new method)	GC-MS/MS
Dichlorvos	Water, passive sampler	POCIS	Extraction of POCIS with methanol	none	Non- accredited (new method)	LC-MS
Terbutryn	Water, passive sampler	POCIS	Extraction of POCIS with methanol	none	Accredited	LC-MS
Diclofenac	Water, passive sampler	POCIS	Extraction of POCIS with methanol	none	Accredited	LC-MS

* Fish samples were re-analyzed 2013 due to high LOQ. The new method included heptachlor and heptachlor epoxide

** SOP OV 327.03 (see appendix 3)

3.3.2 Estrogenic and androgenic effects

The presence of estrogenic substances in water was evaluated with a cell based test system; ”Estrogenic Responsive - Chemically Activated Luciferase eXpression” (ER-CALUX) by BioDetection Systems, The Netherlands.

The sample extract was cleaned-up and fractionated after which the clean extract was dissolved in DMSO. BDS' CALUX® cells were cultured and grown in 96-well plates under standardized conditions. Once a confluent monolayer was obtained, the cells were exposed to the diluted cleaned extracts. After lysation and adding luciferin, the luciferase activity was quantitated using a luminometer. Detected luminescense from the analysed samples was compared to the detected luminescense from a standard curve and reported as estrogen equivalents (ng 17-β-estradiol eq./liter).

3.3.3 Dioxin and dioxin-like compounds

Results for dioxin and dioxin-like compounds is listed in Appendix 7 reported as a TEQ for the sum of PCDDs/Fs + NO and MO PCBs. TEQ value is given as a sum of values of concentrations of individual PCDD/F multiplied by a value of TEF (Toxic Equivalency Factor). The value PCBs is a sum of non-ortho (NO) and mono-ortho (MO) congeners.

If a concentration is below LOD (limit of detection), LOD is taken for the TEQ calculation.

TEF values are used in accordance with The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin- like Compounds (van den Berg M. et. al, 2006).

Analysis was performed according to SOP OV 332.04 using HRMS instrument (modification of EPA 1613).

3.3.4 HBCDs

HBCDs (Hexabromocyclododecanes) is reported as a sum of isomers alfa, beta and gamma.

3.3.5 Quinoxyfen, aclonifen, bifenox and cybutryne

Measurements of quinoxyfen, aclonifen, bifenox and cybutrynewere were made by Omegam Laboratories, Amsterdam. LOQ for these substances were established before the analyses were performed and they were reported by the laboratory as below these predetermined LOQs. The laboratory has however indicated that significantly lower LOQs could be possible, and in future projects these could possibly be used.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

3.3.6 Reference measurement of metals

Reference metals have been analysed in relevant surface water samples and all biota samples. For water, metals were analysed in unfiltered samples according to method SS-EN ISO 17294-2:2005 (SS-EN 1483:2007 for mercury). For fish, metals were analysed in muscle according to the method NMKL No 161 1998 mod. / ICP-MS.

3.3.7 Quality assurance

3.3.7.1 COMMENT ON LABORATORY

The analytical subcontractor for fish, passive samplers and estradiols in water is a public, accredited laboratory/institute in the Czech Republic (Institute of Public Health, Ostrava, Czech Republic). The company is one of the few labs in Europe that routinely uses passive samplers for quantification of contaminants at low concentrations. References from this laboratory regarding the analytical methods used and the experiences from the laboratory are given separately in the last chapter.

3.3.7.2 QUALITY ASSURANCE PROCEDURE

A blank sample that followed the entire analytical process was added to every series of samples. To control the extraction efficiency, internal standards were added prior to sample extraction. Certified reference materials (CRM) were used when commercially available. When such standards were unavailable synthetic standards were used. To control the reproducibility within the laboratory, one sample in every batch was run in duplicate. The entire analytical procedure followed EN ISO/IEC 17025.

3.3.7.3 LOQ AND EQS

Several of the compounds of this study are complex to analyse at low concentrations and the target LOQ was not always reached. In some instances the achieved LOQ varied due to matrix disturbances and was acceptably close to the target LOQ and below EQS (terbutryn, diclofenac, dicofol, PFOS). For some substances the LOQ was not reached due to methodological problems. This was mainly the case for heptachlor + heptachlor epoxide, dichlorvos and direct water sampling for estradiols (Table 3-5).

3.3.7.4 ESTRADIOLS

17-alfa- ethinylestradiol is rarely found in surface waters given that it is a synthetic hormone while 17-beta-estradiol is more common since this is a natural hormone. In most instances in this study, both substances are below LOQ and the concentrations cannot be compared. In one sample the concentrations of beta is higher than alfa (as expected) while in a few samples, 17-alfa- ethinylestradiol was found at concentrations higher than 17-beta-estradiol (Table 3-4). These results have been re-assessed, but no methodological problems have been found. It should be noted that at least three of these cases are surface waters with a known history of high levels of priority substances due to influence from WWTPs (Fyrisån, Svartån and Höje Å) while one of these is suspected to be very much influenced by the local WWTP (Vege Å downstream Ekebro ARV). One possible reason for these results may be that 17-alfa- ethinylestradiol is more persistent than 17-beta-estradiol (Moschet 2009), so that 17-beta-estradiol may be degraded during transport to the laboratory. This has not been confirmed but needs to be considered when assessing the results.

Table 3-4. The ratio between 17-beta-estradiol (natural hormone) and 17-alfa-ethinylestradiol (synthetic).

Sampling station	beta/alfa ratio for estradiols
Höje å nedstr Källby ARV	0,04
Hyndalsån Tolerudsbäcken	0,1
Vege å nedstr Ekebro ARV	0,2
Svartån nedstr Skebäcks ARV	0,6
Fyrisån nedstr Kungsängsverket ARV	0,7
Hallstavik 1, Edeboviken	0,8
Hamnbassängen Oskarshamn	2

Table 3-5. Comparison between expected and achieved LOQ and EQS (µg/l or µg/kg fresh weight for biota).

Substance	Matrix, sampling method	Accredited analysis	Expected LOQ µg/l, µg/kg f.w = fresh weight	Achieved LOQ	AA-EQS
Dicofol	Fish, whole	No	0,013 f.w.	0,2-0,83	33
PFOS	Fish, muscle	Yes	0,013 f.w.	0,31*	9,1
Quinoxyfen	Fish, muscle	No	0,013 f.w.	0,33-0,85	13000*
Sum of PCDDs/Fs+NO/MO PCBs	Fish, muscle	Yes	0,001 f.w.		0,0067
Sum of HBCDs	Fish, muscle	No	0,001 f.w.	0,001	167
Heptaklor och heptaklorepoxid	Fish, muscle	Yes	0,025 f.w.	0,06-0,78	0,0067
Quinoxyfen	Water, direct sample	Yes	0,003	0,01**	0,15

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Substance	Matrix, sampling method	Accredited analysis	Expected LOQ µg/l, µg/kg f.w = fresh weight	Achieved LOQ	AA-EQS
Aclonifen	Water, direct sample	No	0,01	0,01**	0,12
Bifenox	Water, direct sample	Yes	0,008	0,008**	0,012
Cybutryne (Irgarol)	Water, direct sample	No	0,0025	0,0025**	0,0025
Cypermethrin	Water, passive sampler	No	$3 \cdot 10^{-6}$	$6 \cdot 10^{-5} – 15 \cdot 10^{-3}$	$8 \cdot 10^{-5}$
Dichlorvos	Water, passive sampler	No	$4 \cdot 10^{-6}$	$1,4 \cdot 10^{-3} – 5,6 \cdot 10^{-3}$	$6 \cdot 10^{-4}$
Terbutryn	Water, passive sampler	Yes	$0,13 \cdot 10^{-3}$	$0,028 \cdot 10^{-3} – 0,09 \cdot 10^{-3}$	0,065
17alfa-ethinylestradiol***	Water, direct sample	No	$0,1 \cdot 10^{-3}$	$0,1 \cdot 10^{-3} – 2,2 \cdot 10^{-3}$	$3,5 \cdot 10^{-5}$
17beta-estradiol***	Water, direct sample	No	$0,1 \cdot 10^{-3}$	$0,1 \cdot 10^{-3} – 2,2 \cdot 10^{-3}$	$4 \cdot 10^{-4}$
Diclofenac***	Water, passive sampler	Yes	$0,4 \cdot 10^{-3}$	$0,6 \cdot 10^{-3} – 2 \cdot 10^{-3}$	0,1

* Only one value below LOQ

** Values below LOQ reported as a pre-established limit for all samples.

*** Not priority substances.

4 Results

4.1 Summary statistics water

A guide to interpreting the summary statistic figures is presented in Figure 4-1.

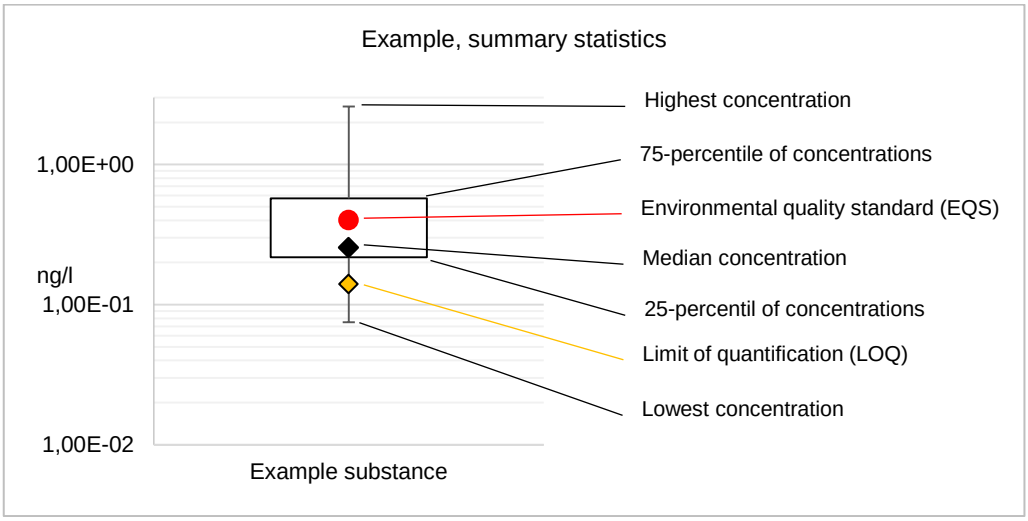

Figure 4-1. Guide to interpreting the summary statistics.

4.1.1 Inland waters

Statistics on the levels of priority substances in inland surface water is summarized in Table 4-1. Some priority substances were frequently measured above the limit of quantification (LOQ), these include:

- Diclofenac
- Terbutryn

Some substances were intermittently measured above the LOQ:

- Dichlorvos
- Cybutryne (Irgarol)
- 17beta-estradiol equivalents measured indirectly with CALUX

Most priority substances were consistently measured below LOQ:

- Aclonifen
- Bifenox
- Quinoxyfen

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

- 17alfa-ethinylestradiol measured analytically
- 17beta-estradiol measured analytically
- Cypermethrin

Notice that the detection frequency is biased towards substances measured using passive samplers since these lower the LOQ significantly.

Table 4-1. Summary statistics of concentrations in inland surface waters. Note that concentrations of diclofenac, terbutryn, dichlorvos and cypermethrin have been recalculated as total concentrations from concentrations in passive samplers according to appendix 2.

ng/l	Sampling matrix	Min	25-percentile	Median	75-percentile	Max	LOQ	No. of samples	No. of samples >LOQ	AA-EQS
Aclonifen	Water	<10	<10	<10	<10	<10	10	65	0	120
Bifenox	Water	<8	<8	<8	<8	<8	8	65	0	12
Cybutryne (Irgarol)	Water	<2,5	<2,5	<2,5	<2,5	6,7	2,5	65	3	2,5
Quinoxyfen	Water	<3	<3	<3	<3	<3	3	65	0	150
17alfa-ethinylestradiol	Water	<0,1	<0,1	<0,44	<0,74	2,5	0,1-2,2	62	5	0,035
17beta-estradiol	Water	<0,1	<0,1	<0,58	<0,73	<2,2	0,1-2,2	62	0	0,4
17beta-estradiol eq, (CALUX)	Water	<0,038	<0,045	<0,073	0,22	2,6	0,038-0,14	40	14	
Diclofenac	POCIS	<0,6	<1,3	3	14	151	0,6-2,0	59	44	100
Terbutryn	POCIS	<0,028	<0,050	0,081	0,18	1,7	0,028-0,09	59	34	65
Dichlorvos	POCIS	<14	<20	<25	<38	1267	14-44	59	6	0,6
Cypermethrin	SPMD	<0,06	<0,12	<0,19	<0,30	<15	0,06-15	60	0	0,08

Figure 4-2 to Figure 4-4 presents the data in more detail together with comparisons to the annual average environmental quality standards (AA-EQS). Data on the number of concentrations above LOQ that occurs above the AA-EQS and 10 and 50 percent of the AA-EQS is presented in Table 4-2 and Table 4-3. The same information is graphically shown in Figure 4-5. These data demonstrates that aclonifen, quinoxyfen, diclofenac and terbutryn occur well below the EQS values even though they are not above LOQ.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

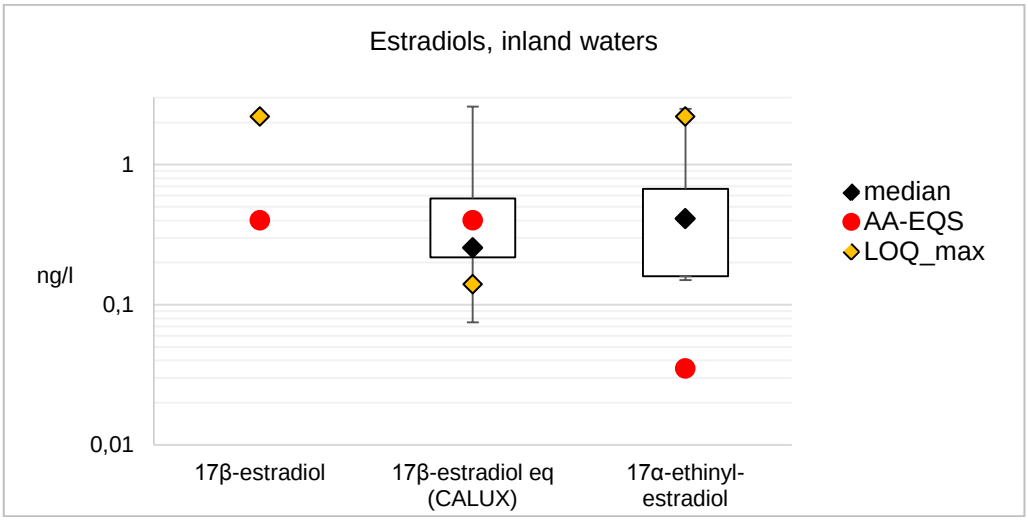

Figure 4-2. Summary statistics for estradiols in inland waters compared to AA-EQS. For each substance/analysis the highest LOQ is shown. Min – max (error bars), 25 – 75 percentile (box).

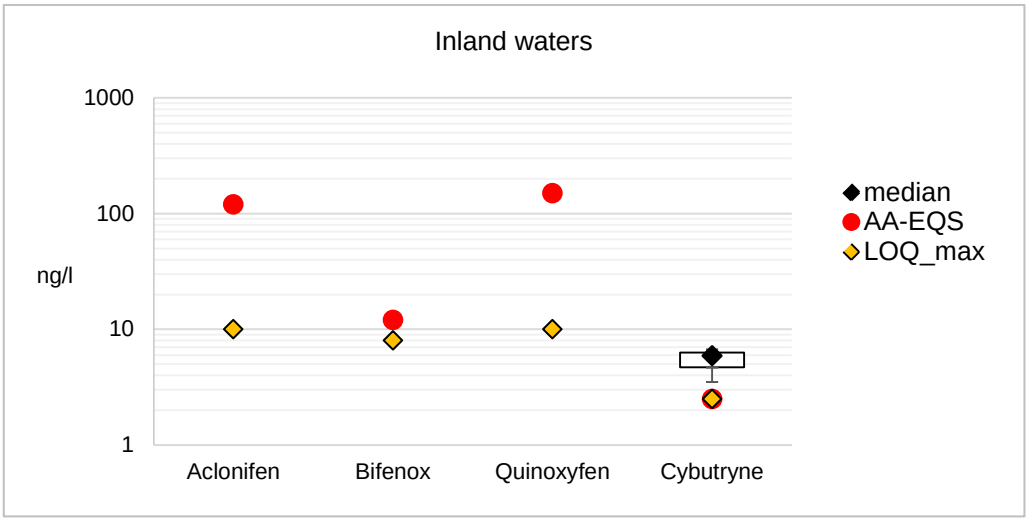

Figure 4-3. Summary statistics for aclonifen, bifenox, cybutryne and quinoxyfen in inland waters compared to AA-EQS. For each substance/analysis the highest LOQ is shown. Min – max (error bars), 25 – 75 percentile (box).

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

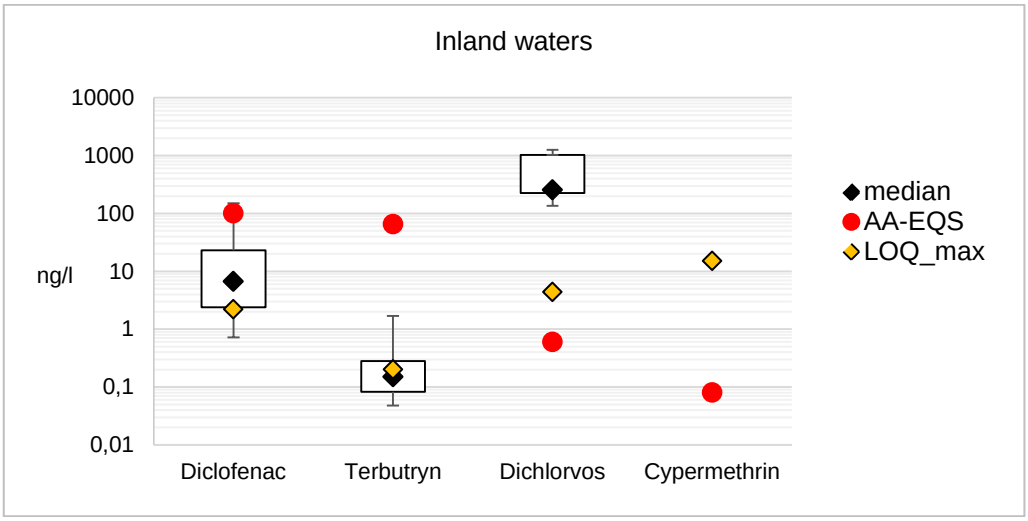

Figure 4-4. Summary statistics for diclofenac, terbutryn, dichlorvos and Cypermethrin in inland waters compared to AA-EQS. For each substance/analysis concentrations <LOQ are included shown to the left while only concentrations > LOQ is shown on the right. Min – max (error bars), 25 – 75 percentile (box).

Table 4-2. Summary of concentrations exceeding EQS in inland surface waters. Values below LOQ excluded. Numbers in red where LOQ is above EQS or fraction of EQS.

Substance ng/l	LOQ	AA-EQS	No. of samples		
			> 0,1 x AA-EQS	> 0,5 x AA-EQS	>AA-EQS
Aclonifen	10	120	0	0	0
Bifenox	8	12	**0**	**0**	0
Cybutryne (Irgarol)	2,5	2,5	**3**	**3**	3
Quinoxyfen	3	150	0	0	0
17alfa-ethinylestradiol*	**0,1-2,2**	0,035	**5**	**5**	**5**
17beta-estradiol*	**0,1-2,2**	0,4	**0**	**0**	**0**
17beta-estradiol eq, (CALUX)*	0,038-0,14	0,4	**14**	11	4
Diclofenac*	0,6-2,0	100	18	5	2
Terbutryn	0,028-0,09	65	0	0	0
Dichlorvos	**14-44**	0,6	**6**	**6**	**6**
Cypermethrin	0,06-**15**	0,08	**0**	**0**	**0**

*Proposed EQS. Not priority substances.

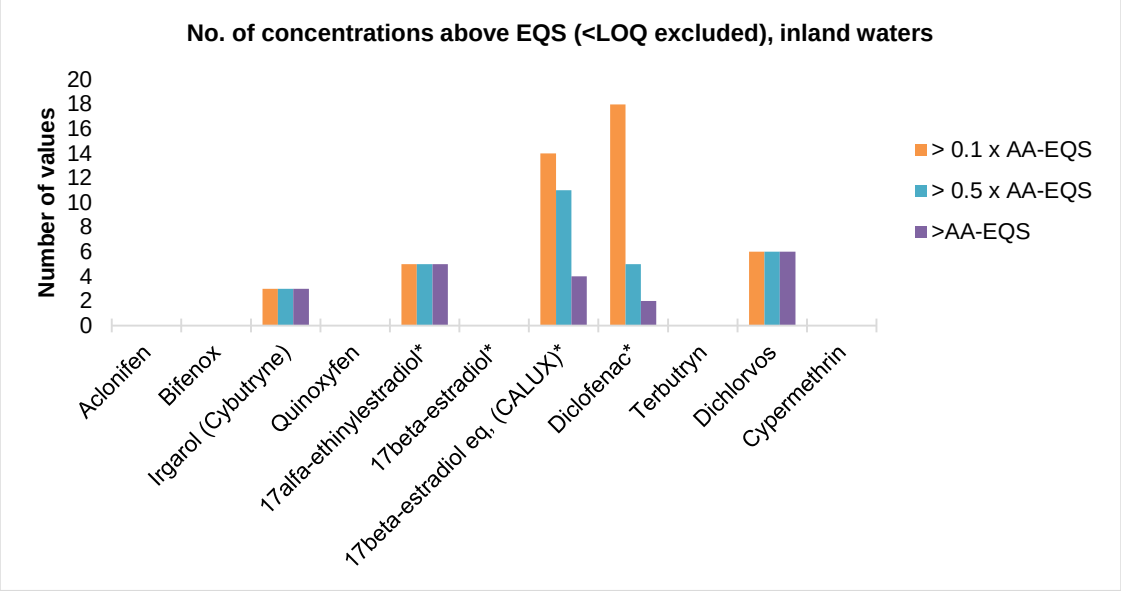

Figure 4-5. Number of samples above EQS (only values >LOQ included). *Not priority substances.

4.1.2 Coastal waters

Statistics on the levels of priority substances in coastal surface waters is summarized in Table 4-3

In coastal surface water the following substances were frequently were measured above the limit of quantification (LOQ):

- Dichlofenac
- Terbutryn

Some substances were intermittently measured above the LOQ:

- 17alfa-ethinylestradiol
- Cypermethrin
- 17beta-estradiol measured measured analytically

Most priority substances were consistently measured below LOQ:

- Aclonifen
- Bifenox
- Cybutryne
- 17beta-estradiol measured measured with CALUX
- Dichlorvos

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Notice that the levels that these substances were measured at may be the result of LOQ and sampling methods rather than actual occurrence since substances measured with passive samplers (e.g. low LOQ) occurred frequently above LOQ.

Figure 4-6 to Figure 4-8 presents the data in more detail together with comparisons to the annual average environmental quality standards (AA-EQS). Data on the number of concentrations above LOQ that occurs above the AA-EQS and 10 and 50 percent of the AA-EQS is presented in Table 4-4. The same information is graphically shown in Figure 4-9. These data demonstrates that quinoxyfen, diclofenac and terbutryn occur well below the EQS values in coastal waters.

Table 4-3. Summary statistics of concentrations in coastal surface waters. Note that concentrations of diclofenac, terbutryn, dichlorvos and cypermethrin have been recalculated as total concentrations from concentrations in passive samplers according to appendix 2.

ng/l	Sampling matrix	Min	25-percentile	Median	75-percentile	Max	LOQ	Number of samples	Number of samples >LOQ	AA-EQS
Aclonifen	Water	<10	<10	<10	<10	<10	10	11	0	12
Bifenox	Water	<8	<8	<8	<8	<8	8	11	0	1,2
Cybutryne (Irgarol)	Water	<2,5	<2,5	<2,5	<2,5	6,7	2,5	11	0	2,5
Quinoxyfen	Water	<3	<3	<3	<3	<3	3	11	0	15
17alfa-ethinyl-estradiol	Water	<0,1	<0,11	<0,28	<0,52	1,2	0,1-0,84	11	3	0,007*
17beta-estradiol	Water	<0,1	<0,1	<0,38	<0,55	1,1	0,1-0,82	11	1	0,08*
17beta-estradiol eq, (CALUX)	Water	<0,094				<0,11	0,094-0,11	2	0	
Diclofenac	POCIS	<0,64	<1,2	2,6	4,7	493	0,64-1,2	10	7	10
Terbutryn	POCIS	<0,032	<0,036	<0,066	0,09	2,4	0,032-0,09	10	4	6,5
Dichlorvos	POCIS	<15	<20	<26	<32	<56	15-56	10	0	0,06
Cypermethrin	SPMD	<0,053	<0,12	<0,21	<0,36	189	0,053-0,39	11	1	0,008

* Not a priority substance, proposed EQS.

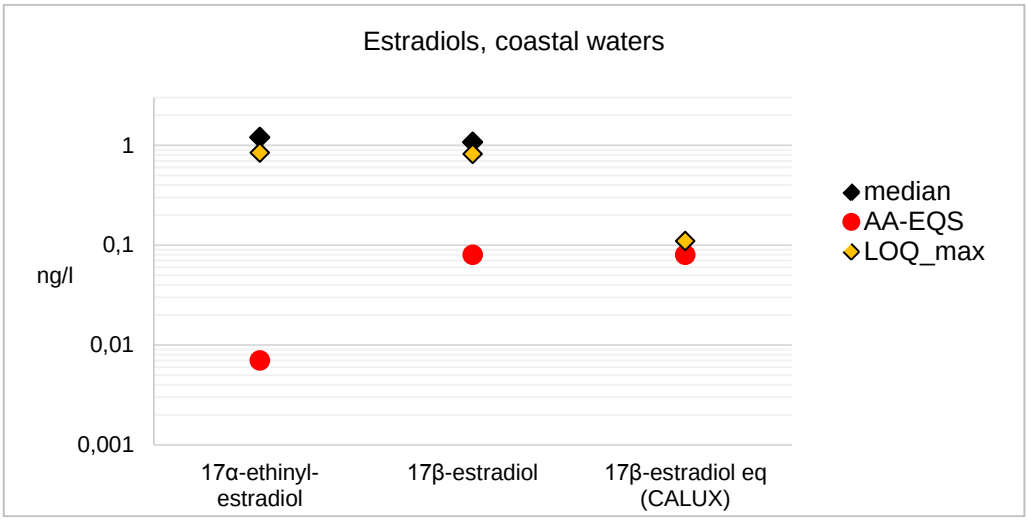

Figure 4-6. Summary statistics for estradiols in coastal waters compared to AA-EQS. For each substance/analysis the highest LOQ is shown. No observations above LOQ for CALUX. Concentrations above LOQ for 17-alfa-ethinylestradiol and 17-betaestradiol only for one sample each (not the same location).

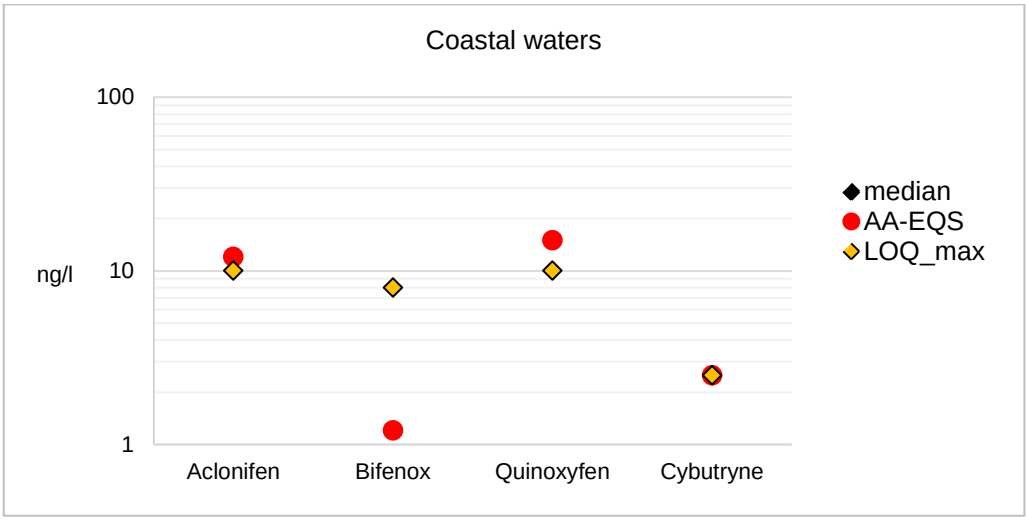

Figure 4-7. Summary statistics for aclonifen, bifenox, cybutryne and quinoxyfen in coastal waters compared to AA-EQS. For each substance/analysis the highest LOQ is shown. No concentrations above LOQ where observed.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

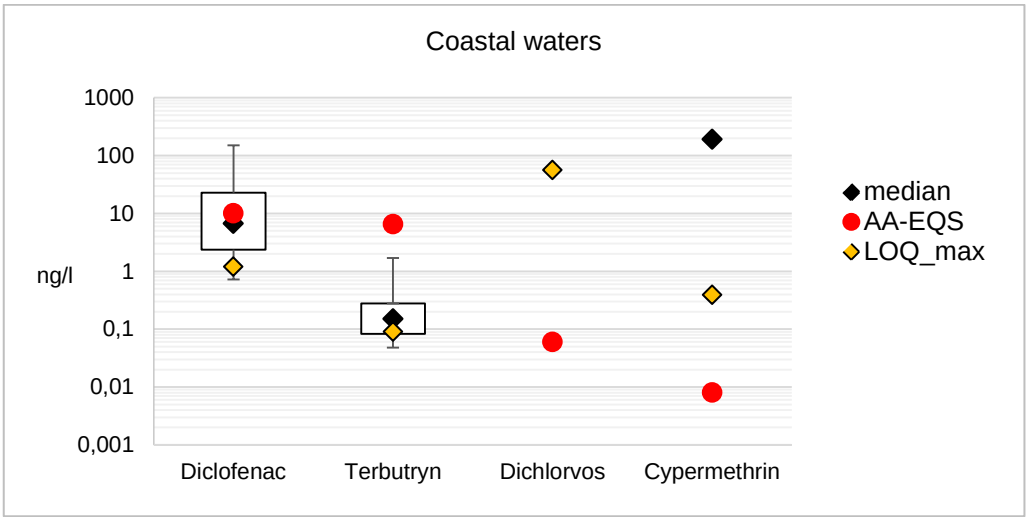

Figure 4-8. Summary statistics for diclofenac, terbutryn, dichlorvos and cypermethrin in coastal waters compared to AA-EQS. For each substance/analysis the highest LOQ is shown. Min – max (error bars), 25 – 75 percentile (box). No concentrations above LOQ for dichlorvos, and one concentration above LOQ for cypermethrin.

Table 4-4. Summary of concentrations exceeding EQS in coastal surface waters. Values below LOQ excluded. Numbers in red where LOQ is above EQS or fraction of EQS.

Substance ng/l	LOQ	AA-EQS	No. of samples		
			> 0,1 x AA-EQS	> 0,5 x AA-EQS	>AA-EQS
Aclonifen	10	12	**0**	**0**	0
Bifenox	**8**	1,2	**0**	**0**	**0**
Cybutryne (Irgarol)	2,5	2,5	**0**	**0**	0
Quinoxyfen	3	15	**0**	0	0
17alfa-ethinylestradiol*	**0,1-0,84**	0,007	**3**	**3**	**3**
17beta-estradiol*	**0,1-0,82**	0,08	**1**	**1**	**1**
17beta-estradiol eq, (CALUX)*	**0,094-0,11**	0,08	**0**	**0**	**0**
Diclofenac*	0,64-1,2	10	**7**	2	1
Terbutryn	0,032-0,09	6,5	1	0	0
Dichlorvos	**15-56**	0,06	**0**	**0**	**0**
Cypermethrin	**0,053-0,39**	0,008	**1**	**1**	**1**

*Proposed EQS. Not a priority substance.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

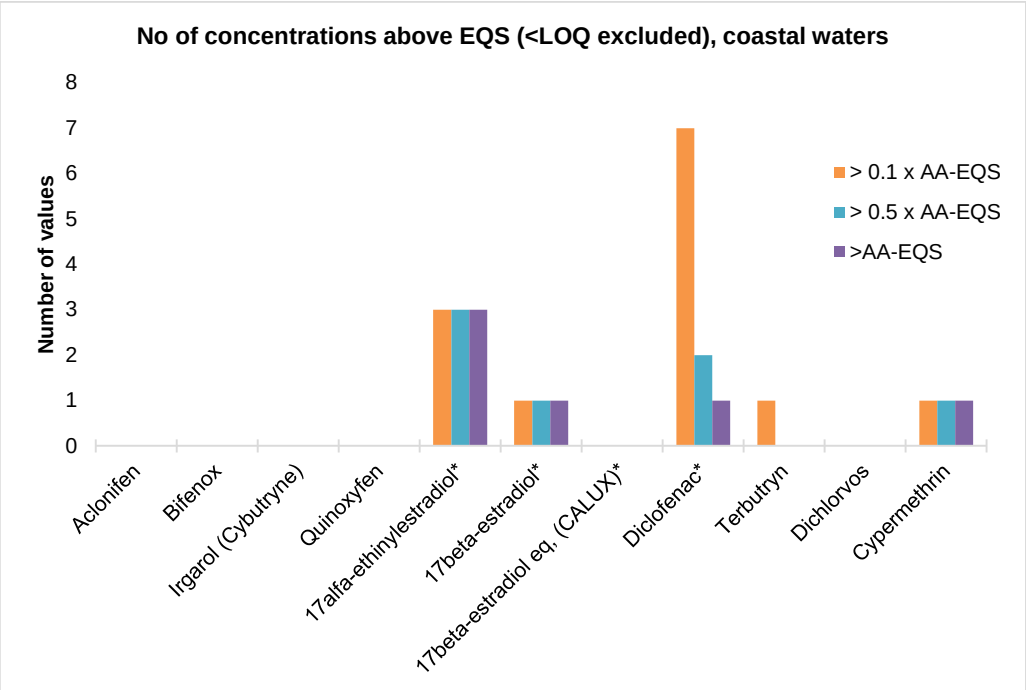

Figure 4-9. Number of concentrations exceeding EQS in coastal surface waters. Values below LOQ excluded.

4.2 Summary statistics fish

Statistics on levels of priority substances in fish are summarized in Table 4-5. The data is shown in greater detail in Figure 4-10.

Data on the number of occurrences above the EQS and 10 and 50 percent of the EQS is presented in Table 4-6. The same information is graphically shown in Figure 4-11. These data clearly demonstrates that in most instances, the new priority substances occur well below the EQS values in coastal waters.

PCDDs/Fs + PCBs, HBCD and PFOS was found above LOQ in all fish samples. They are all designated as persistent organic pollutants according to the Stockholm Convention. Other substances never occurred above LOQ.

Table 4-5. Summary statistics of levels of priority substances in fish.

µg/kg fresh weight	Min	25-percentile	Median	75-percentile	Max	LOQ	Number of samples	Number of samples >LOQ	EQS
Quinoxyfen	<0,33	<0,44	<0,50	<0,66	<0,85	0,33-0,85	17	0	N/A
Sum of HBCDs	<0,001	0,10	0,39	1,2	4,3	0,0010	17	16	167
Dicofol	<0,20	<0,57	<0,63	<0,71	<0,83	0,20-0,83	17	0	33
Heptachlor + heptachlorepoxide	<0,060	<0,071	<0,095	<0,16	<0,78	0,060-0,78	17	0	0,0067
PFOS	<0,31	0,72	1,8	5,3	15	0,31	17	16	9,1
Sum of PCDDs/Fs+ NO/MO PCBs	0,00014	0,00022	0,00046	0,00077	0,001549		17	17	0,0065

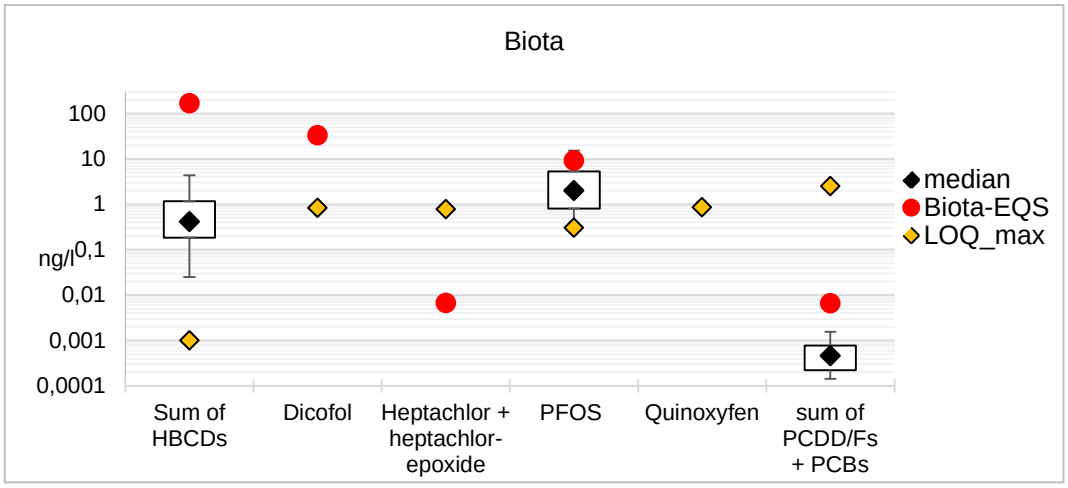

Figure 4-10. Summary statistics for HBCDs, dicofol, heptachlor + heptachlorepoxide, PFOS, quinoxyfen and sum of PCDD/Fs in fish compared to Biota-EQS. For each substance/analysis the highest LOQ is shown. Min – max (error bars), 25 – 75 percentile (box). There is no EQS for quinoxyfen in biota.

Table 4-6. Summary of concentrations exceeding EQS in biota (fish). Values below LOQ excluded.

Substance µg/kg fresh weight	LOQ	AA-EQS	No. of samples		
			> 0,1 x AA-EQS	> 0,5 x AA-EQS	>AA-EQS
Sum of HBCDs	0,0010	167	0	0	0
Dicofol	0,20-0,83	33	0	0	0
Heptachlor + heptacholepoxide	0,060-0,78	0,0067	0	0	0
PFOS	0,31	9,1	11	6	2
Quinoxyfen	0,33-0,85	13000*	0	0	0
Sum of PCDDs/Fs + NO/MO PCBs		0,0065	7	0	0

*No EQS for biota established, this is a proposed value.

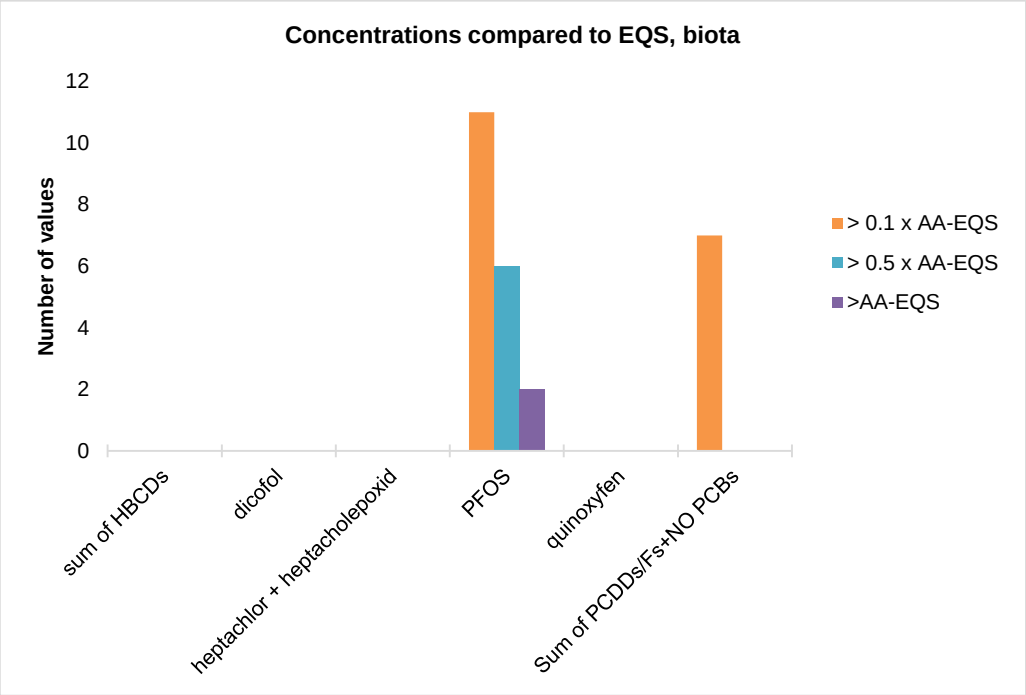

Figure 4-11. Number of concentrations exceeding fractions of EQS in biota (fish). Values below LOQ excluded.

5 Discussion

5.1 General observations

The geographical variability was only evaluated for diclofenac, terbutryn and 17beta-estradiol equivalents measured with ER-CALUX in water and HBCD, PCDD + PCBs and PFOS in fish. Other substances where not detected to that extent that would make such an analysis meaningful. From Figure 5-1 and Figure 5-2, it can be seen that there is no discernible geographical differences in the distribution of diclofenac, terbutryn and 17beta-estradiol equivalents in water in Sweden. This is logical given that their usage is not connected to any specific region and/or type of industrial activity. Diclofenac is a widely used active ingredient in anti-inflammatory and analgesic drugs while terbutryn is a common biocide in water based paints.

Concentrations of HBCDs and PFOS in fish are not evenly distributed geographically (Figure 5-4 and Figure 5-6) which may indicate the presence of point sources, either connected to local municipal WWTPs, landfills or in the watershed (e.g. contaminated sites). The differences may also be dependent on fish characteristics such as age, sex and lipid content. This has not been evaluated. For PFOS a number of local contamination sources exist all over Sweden at municipal firefighting training sites which are known to affect surface water even at a distance. PCDD + PCBs is possibly more evenly distributed in fish which is expected of a Global POP with e.g. multiple incineration sources.

WWTPs are probably important sources of many of the substances measured; in almost all cases where these measurements have been made, the concentration downstream is higher than the concentration upstream the WWTP. The observed occurrence of diclofenac and 17beta-estradiol may consequently be explained by the quotient between the hydraulic turnover/flow in the surface waters and the number of people connected to the WWTPs (i.e. small surface water recipients result in higher concentrations). Several of the localities with high concentrations are downstream WWTPs in relatively small streams where the dilution is low. It may also be a result of the type of municipalities connected to the WWTP. High levels of estradiols and diclofenac downstream WWTPs in Fyrisån (Uppsala Municipality) and Höje Å (Lund Municipality) may be related to the fact that these are some of Scandinavia's biggest student cities. On the other hand, elevated dichlorvos concentrations above the EQS (six localities where LOQ is exceeded) does not seem to be related to WWTP sources probably because this substance is related to uses at e.g. plant nurseries.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

The co-occurrence between substances can indicate possible sources. As an example, the co-occurrence between concentrations of terbutryn and diclofenac (Figure 5-7) indicates that terbutryn in surface waters originates from the WWTPs rather than agricultural usage since the source of diclofenac is outgoing water from WWTPs. This also indicates that terbutryn usage as biocide in paint formulations is the main reason for its occurrence in surface waters in Sweden.

Metals were included in the study as indicators of general anthropogenic influence in the surface waters to understand whether this was correlated to the occurrence of priority substances. There was however no or very weak correlation between metals and priority substances that commonly occurred > LOQ (Figure 5-7). Thus metal concentrations are not good indicators of these substances. There was some correlation between metals in surface water which is expected since they have multiple common sources, e.g. traffic, corrosion, industrial usage etc.

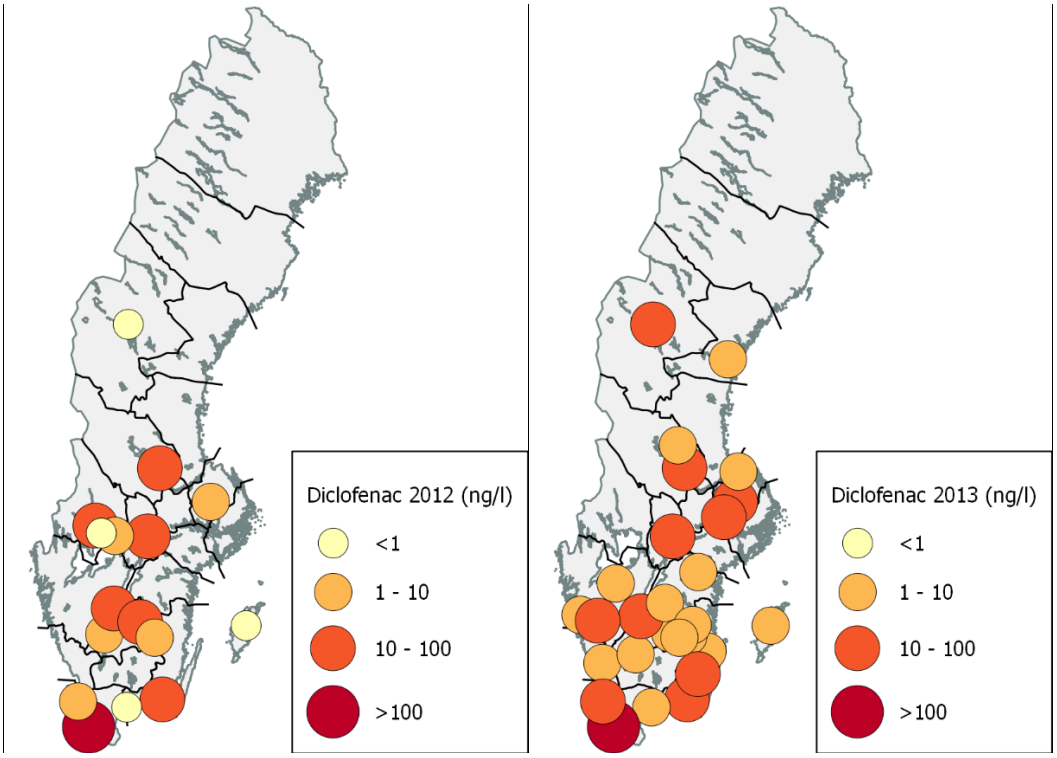

Figure 5-1. Concentrations of diclofenac in Sweden 2012 and 2013 (only values >LOQ). Earlier proposed EQS is 100 ng/l for inland waters.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

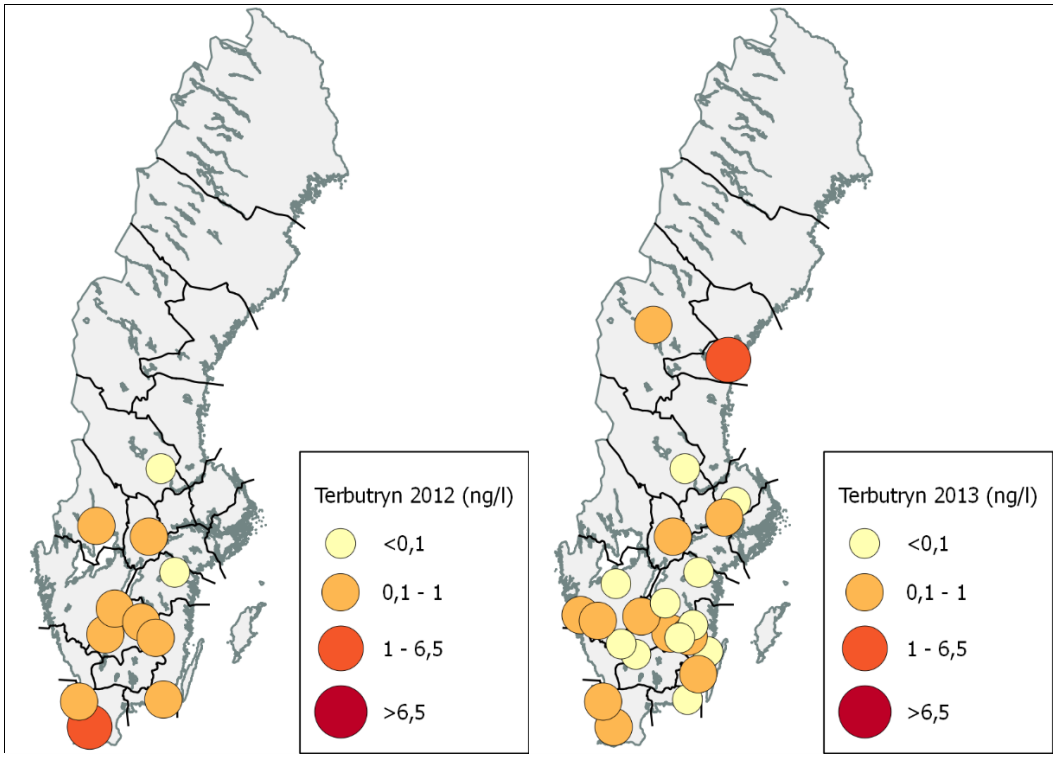

Figure 5-2. Concentrations (ng/l) of terbutryn in Sweden 2012 and 2013 (only values >LOQ). EQS is 6,5 ng/l for inland waters.

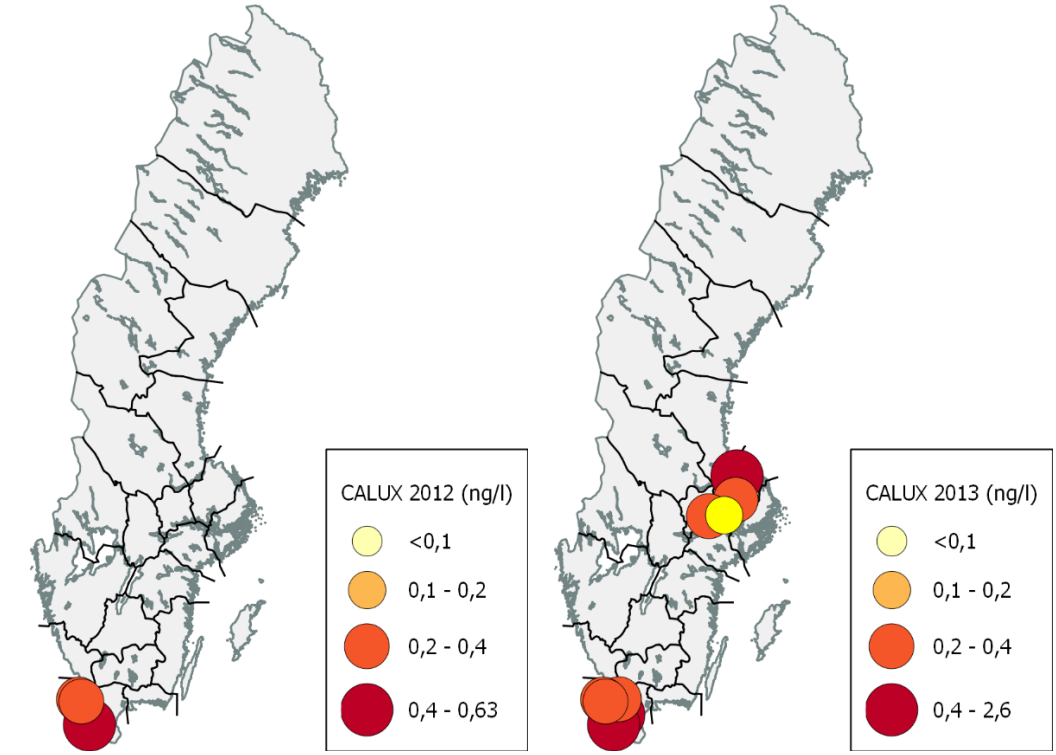

Figure 5-3. Results (ng 17-β-estradiol eq./l) of ER-CALUX in Sweden 2012 and 2013 (only values >LOQ). Earlier proposed EQS is 0,4 ng/l for inland waters.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
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Telefax 040-15 43 47

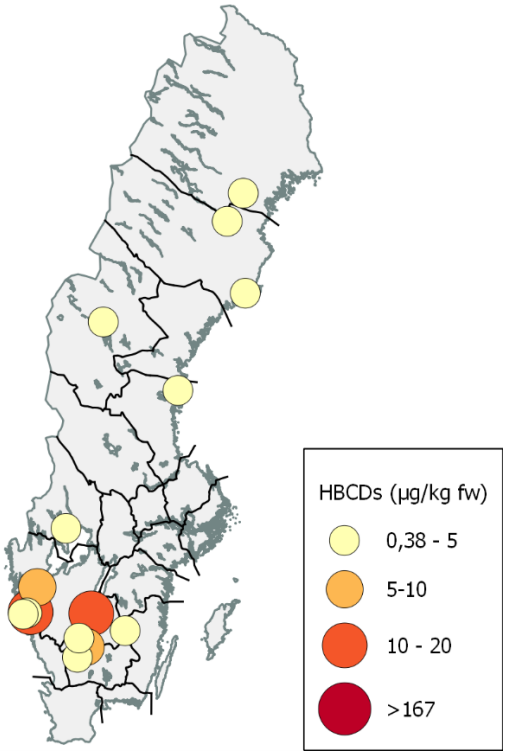

Figure 5-5. Results of HBCDs in fish 2012 and 2013 (only values >LOQ). EQS for biota is 167 µg/kg fresh weight.

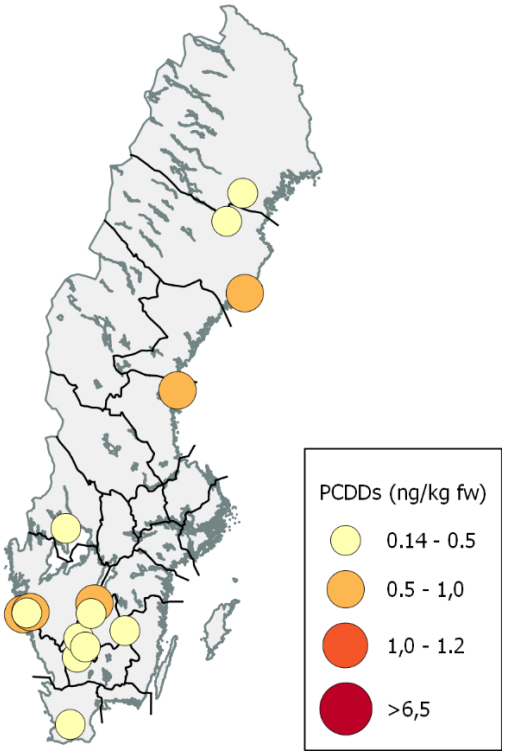

Figure 5-4. Results of PCDD + PCBs in fish 2012 and 2013 (only values >LOQ). EQS for biota is 6,5 ng/kg fresh weight.

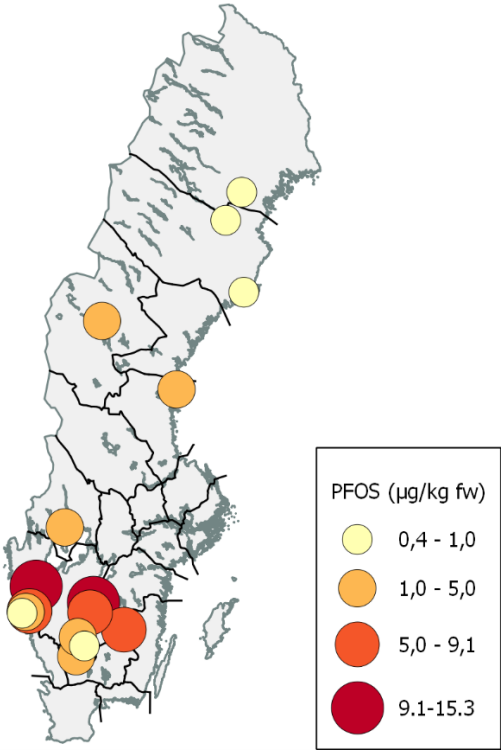

Figure 5-6. Results of PFOS in fish 2012 and 2013 (only values >LOQ). EQS for biota is 9,1 µg/kg fresh weight.

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Telefon 040-16 70 00
Telefax 040-15 43 47

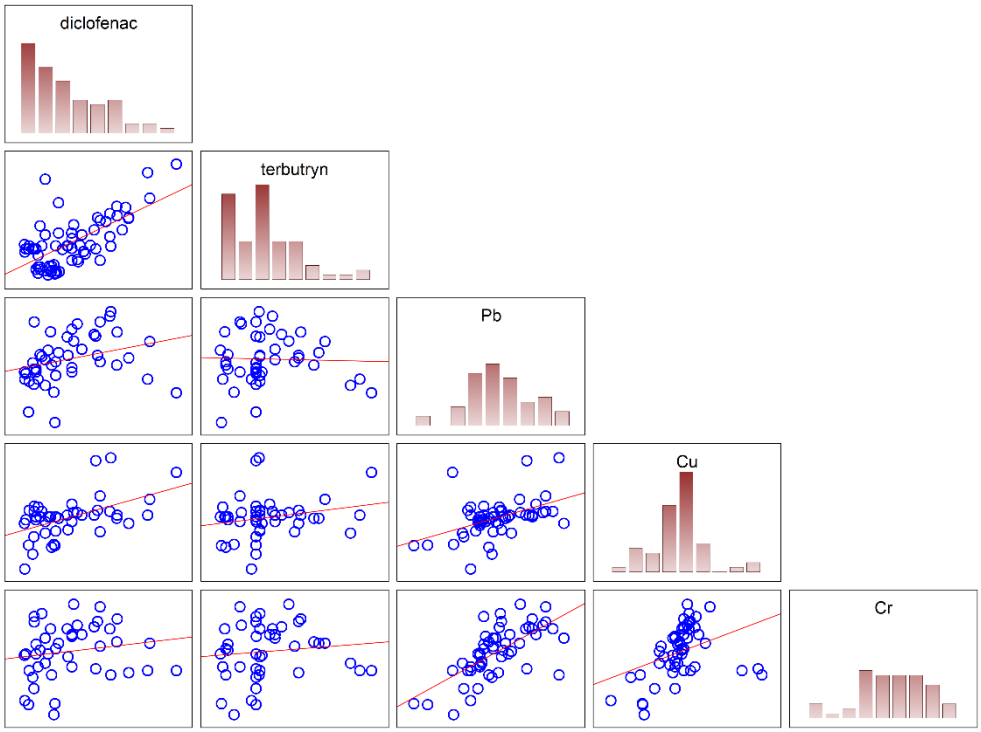

Figure 5-7. Co-occurrence of of terbutryne, diclofenac and some metals in surface water.

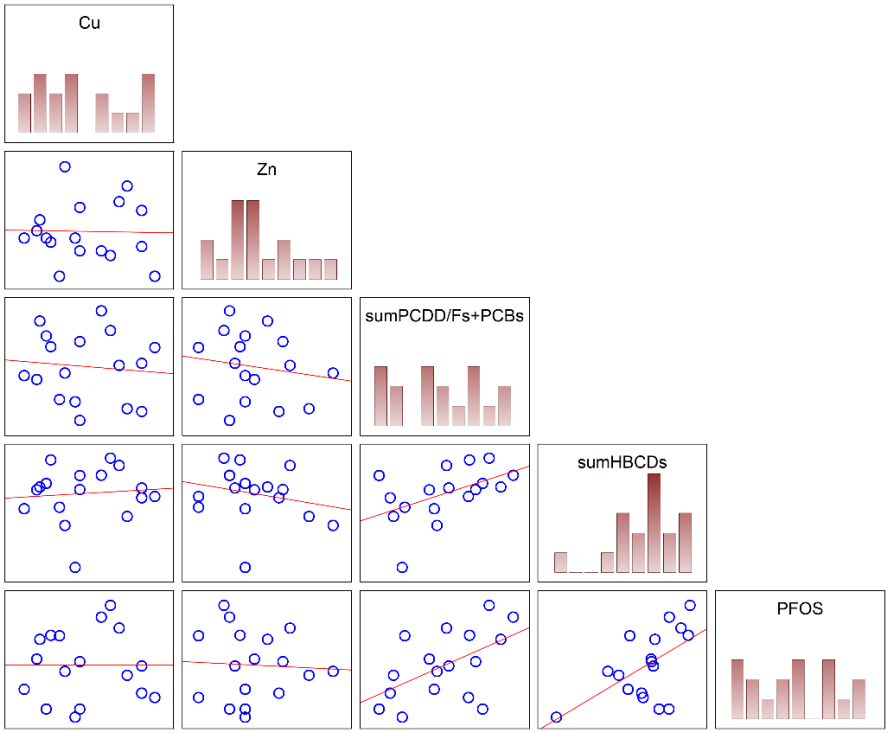

Figure 5-8. Co-occurrence of substances in fish.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

5.2 Exceedance of EQS

For several substances the obtained LOQ was above the EQS value and it is consequently not possible to assess how the presence of these substances will affect the chemical status of surface waters in Sweden. Better analytical techniques is needed in these instances. For inland surface waters these substances are:

- 17alfa-ethinylestradiol
- 17beta-estradiol
- Cypermethrin
- Dichlorvos

Note that the estradiols are not priority substances at present, instead they have been placed on a watch list for possible later inclusion. Consequently, the need for better analytical techniques is more urgent for cypermethrin and dichlorvos.

In fish, it was mainly the LOQ of heptachlor and heptachlor epoxide that was far above the EQS value. This is problematic since there exists a method for achieving lower LOQ, close to or below the EQS value (EC JRC 2012). A previous study in Sweden in fish (Sweco 2011 and Table 5-3) did not achieve lower LOQs than the present study. Given the non-existent usage for many years (Table 2-1), it may be that this substance is not important for the chemical status of surface waters in Sweden.

The substances that occurred most frequently above EQS in inland surface waters were:

- Dichlorvos (approximately 10 % of the samples)
- 17beta-estradiol equivalents measured with CALUX (approximately 10 % of the samples)
- 17alfa-ethinylestradiol (approximately 8 % of the samples)
- Cybutryne (approximately 5 % of the samples)
- Diclofenac (approximately 3 % of the samples)

Of these, only dichlorvos and cybutryne has any effect on status classification at present. Consequently, dichlorvos seems to be the most important new priority substance which highlights the need for better analytical methods for this substance. It can be noted that dichlorvos is prohibited for usage in Sweden. It may be that dichlorvos in surface waters is a degradation product of the insecticide chlorophos which is also prohibited for usage in Sweden, but was used until 2009 (14 tonnes in Sweden 1992 – 2009).

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Diclofenac is the substance that most frequently occur at levels above 10-50 % of·EQS in inland waters (30% of all samples, Table 4-2) showing the potential for this substance to affect the chemical status of surface waters. Diclofenac was also the only substance above LOQ in the supposedly regional background lake Ljusacksen. Either, diclofenac is atmospherically deposited at background localities, or there is a local unknown source to the lake (e.g. adjacent cabins, fishing activities etc.).

The substances that occurred most frequently above EQS in coastal surface waters were:

- 17alfa-ethinylestradiol (approximately 30 % of the samples)
- Cypermethrin (approximately 10 % of the samples)
- Diclofenac (approximately 10 % of the samples)
- 17beta-estradiol (approximately 10% of the samples)

These numbers are uncertain since only 10 coastal samples were included. Of these, only cypermethrin is included as a priority substance at present.

In fish, only PFOS occurred above the EQS value, in both cases in limnic localities.

Overall, if ignoring the fact that not all parameters have been analysed at all sampling stations, approximately 10 % of the inland sampling stations had concentrations of priority substances above LOQ (20 % when including estradiols and diclofenac). The same number for coastal surface waters was 10% (Table 5-1). If estradiols and diclofenac is included (using the earlier EQS proposal for these substances) the number is significantly increased showing the potential importance of these substances. These percentages do probably not represent Sweden as a whole given that the strategy for choosing sampling locations has been based on finding the “worst cases”. Also, the above method of estimating the exceedance frequency is probably an underestimation since it is possible that more stations would have concentrations above EQS for substances that has not been analysed.

Table 5-1. Exceedance of AA-EQS in surface waters and biota. All stations where AA-EQS is exceeded by at least one parameter divided by all sampling stations, regardless of which parameters have been analysed at the different stations. Note that this method probably underestimates the frequency of sampling stations where at least one AA-EQS is exceeded.

	% sampling stations in this study where EQS is exceeded	
	Priority substances	**Estradiols and diclofenac included**
Inland waters	10 %	20 %
Coastal waters	10 %	40 %
Biota	20 %	-

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

5.2.1 MAC-EQS

It should also be noted that annual average EQS (AA-EQS) has been used in this comparison, even though the concentrations represent only one or two samples from each sampling point. A comparison with the EQS for maximum allowable concentration (MAC-EQS) yields:

- For inland waters: The number of samples exceeding MAC-EQS is the same for dichlorvos, but for the other parameters none of the detected concentrations exceeds MAC-EQS (for estradiols and diclofenac there are no proposed MAC-EQS).
- For coastal waters: The number of samples exceeding MAC-EQS is the same as for AA-EQS, only relevant for cypermethrin.

MAC-EQS is not applicable on biota samples.

5.3 Comparison with earlier studies in Sweden

Table 5-2 and Table 5-3 compares concentrations found in this study with previous measurement in Sweden. Details are given in a literature review by Sweco (2012).

Aclonifen, cybutryne, terbutryn, PFOS and HBCD has previously been found in higher concentrations in Sweden. In some cases this is because of larger number of analyses increasing the probability of higher detecting high concentrations, and in some cases these studies has focused explicitly on finding sources of these substances to the aquatic environment which increase the possibility of identifying worst case concentrations.

The results from earlier studies should possibly be taken into consideration when assessing the new priority substances:

- Terbutryn has previously been found in higher concentrations in Sweden, but it should be noted that the frequency of detection was much higher in the present study compared to the earlier studies (> LOQ in 5 of 861 samples – the Swedish regional pesticide database).
- Aclonifen has previously been found in concentrations above the EQS in inland surface waters, but in a similar fashion as for terbutryn, the frequency of detection and concentrations above LOQ is very low (data from the Swedish regional pesticide database)
- Cybutryne was previously found at high concentrations (> EQS) at a small boats harbour, and it may be that this should be taken into consideration when assessing cybutryne as a priority substance
- PFOS is mainly found at higher concentrations (above EQS) in marine and coastal fish and the importance of PFOS as a priority substance should not be based solely on the present study

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

- Between 1999 and 2003 HBCD where frequently measured in marine fish, and occasionally at concentrations above EQS. Consequently, the importance of HBCD as a priority substance should not be based solely on the present study.

Table 5-2. Concentrations of additional priority substances in inland surface waters in the present study compared to earlier measurements in Sweden.

Substance	Current study inland waters ng/l			Current study coastal waters ng/l			Earlier studies in Sweden, water ng/l			AA-EQS
	Min	Max	LOQ	Min	Max	LOQ	Min	Max	LOQ	
Aclonifen	<1,0	33	10	<1,0	<9,0	10	25	200	4,0-100	12
Bifenox	<0,10	<1,6	8,0	<0,20	<0,80	8,0	-	-	-	1,2
Cybutryne (Irgarol)	<0,10	6,7	2,5	<0,10	<1,6	2,5	11	170	-	2,5
Quinoxyfen	<0,10	<0,60	3,0	<0,10	<0,40	3,0	-	-	-	15
17alfa-ethinylestradiol	<0,10	2,5	0,10-2,2	<0,10	1,2	0,10-0,84		<LOQ	0,2-2	0,007*
17beta-estradiol	<0,10	<2,2	0,10-2,2	<0,10	1,1	0,10-0,82		<LOQ	0,1-3	0,08*
17beta-estradiol eq. (CALUX)	<0,038	2,6	0,038-0,14	<0,094	<0,11	0,094-0,11				
Diclofenac	<0,60	150	0,60-2,0	<0,64	490	0,64-1,2	1	170	2-34	10
Terbutryn	<0,028	1,7	0,028-0,090	<0,032	2,4	0,032-0,090	7,0	35	2,0-40	6,5
Dichlorvos	<14	1300	14-44	<15	<56	15-56	-	300	-	0,06
Cypermethrin	<0,060	<15	0,060-15	<0,053	190	0,053-0,39	<LOQ	60	0,90-50	0,008

Table 5-3. Concentrations of additional priority substances in coastal surface waters in the present study compared to earlier measurements in Sweden.

Substance µg/kg fresh weight	Current study, biota			Earlier studies in Sweden, biota			EQS biota
	Min	Max	LOQ	Min	Max	LOQ	
Quinoxyfen	<0,33	<0,85	0,33-0,85	-	-	-	
Sum of HBCDs	<0,0010	4,3	0,0010	0,025	1800*	0,05	167
Dicofol	<0,20	<0,83	0,20-0,83	-	-	-	33
Heptachlor + heptachlor epoxide	<0,060	<0,78	0,060-0,78	<LOQ		1-2** 0,5-1***	0,0067
PFOS	<0,31	15	0,31	1,2	1500		9,1
Sum of PCDDs/Fs + NO/MO PCBs	0,00014	0,0015	-	-	-	-	0,0065

* Measured in eel, year 2000

** Heptachlor

*** Heptachlor epoxide

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

5.4 Temporal variability

The temporal variability in concentrations of priority substances may depend on a number of factors; the temporal variability in the load of pollutants from different sources such as industrial activities and waste water municipal plants is probably important. One other reason for differing concentrations may be physiochemical conditions. It is for example well known that the water solubility of ionizing/charged organic substances is partly dependent on the pH of the surface water. It may also depend on the amount of water in the surface water system. If the sources of contaminants remain constant, the amount of water in the system will influence the dilution and concentrations. These parameters are in themselves influenced by a number of variables. The water flow in surface water may for example, be influenced by the rainfall intensity and snow melt periods as well as properties of the catchment area. Furthermore, many variables will exert their effects on surface water concentrations independently of each other. Consequently it is very difficult to understand and explain causes of observed temporal variability.

In the present study concentrations between seasons (spring and autumn) was the only temporal variability that could be evaluated, and only for diclofenac and terbutryn which were the only substances that frequently occurred > LOQ (Figure 5-1 and Figure 5-2). For these substances there is scant indication of any differences between spring and autumn. Instead, the differences in concentrations are in general larger between sampling stations than between sampling dates (Figure 5-9, Figure 5-10 and Figure 5-11). This would indicate that monitoring of these priority substances can take place both during spring and autumn. In a previous screening study there were noticeable differences between concentrations of some metals and nonylphenol between autumn and spring with the general pattern that the levels of these substances seemed to be lower during the autumn and winter (Sweco 2011). Since diclofenac is continuously delivered to the surface water systems from WWTPs, a pattern similar to nonylphenol could have been expected.

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

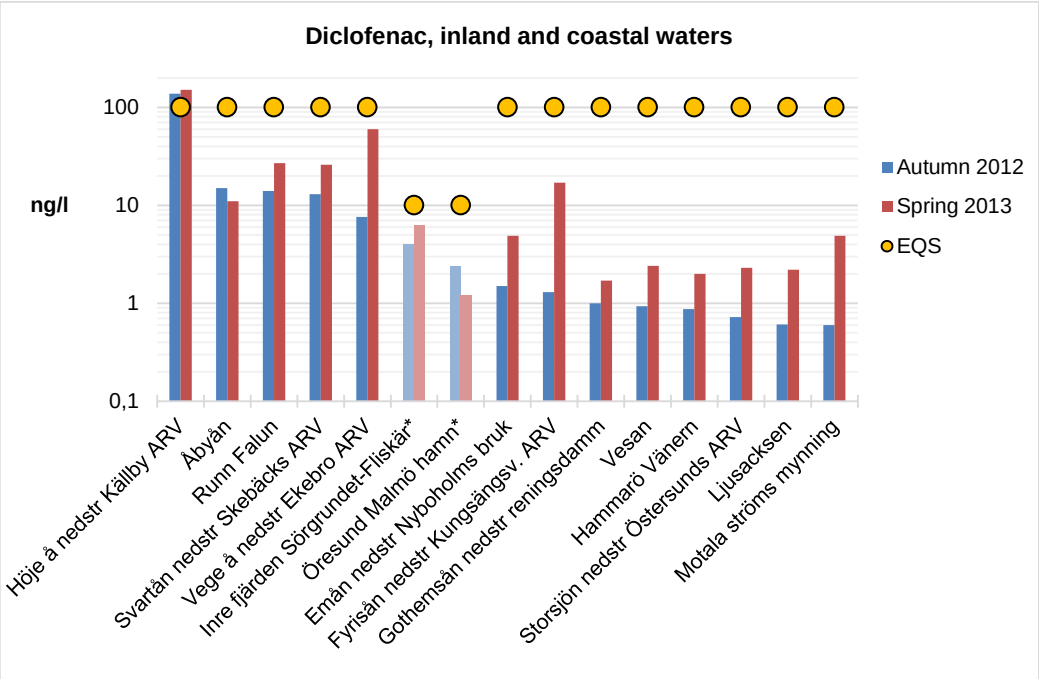

Figure 5-9. Concentrations (ng/l) of diclofenac in Sweden 2012 and 2013 in sampling stations where it has been measured both years (>LOQ for at least one year).
* Coastal sampling point.

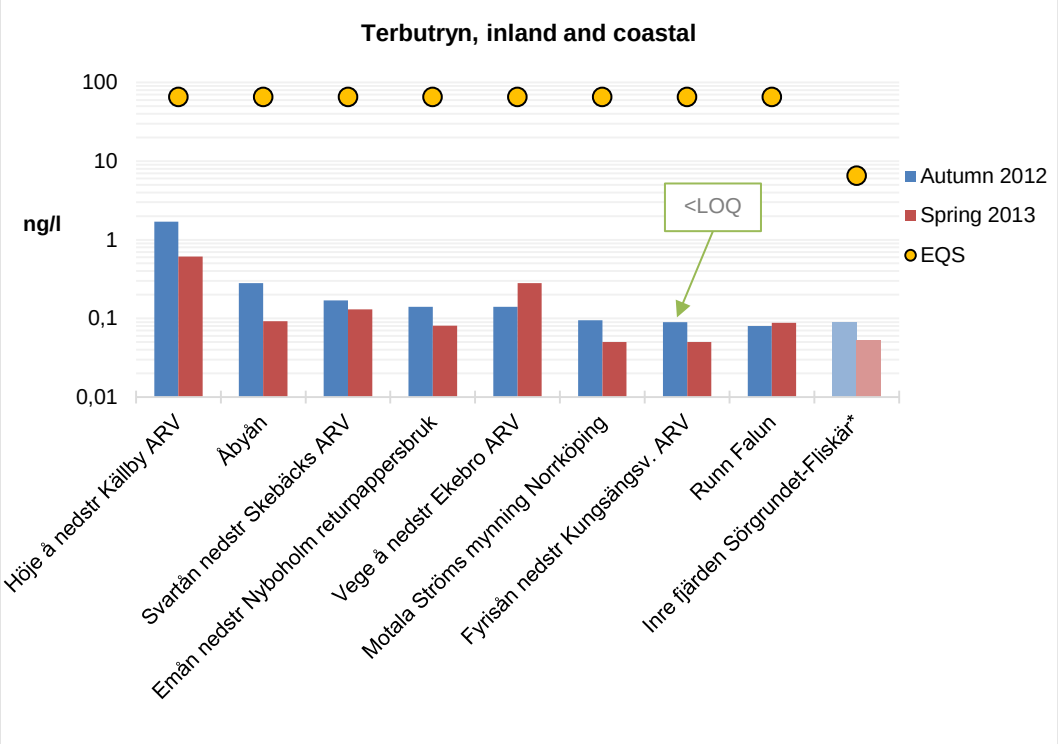

Figure 5-10. Concentrations (ng/l) of terbutryn in Sweden 2012 and 2013 in inland and coastal sampling stations where it has been measured both years (>LOQ for at least one year).
* Coastal sampling point.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

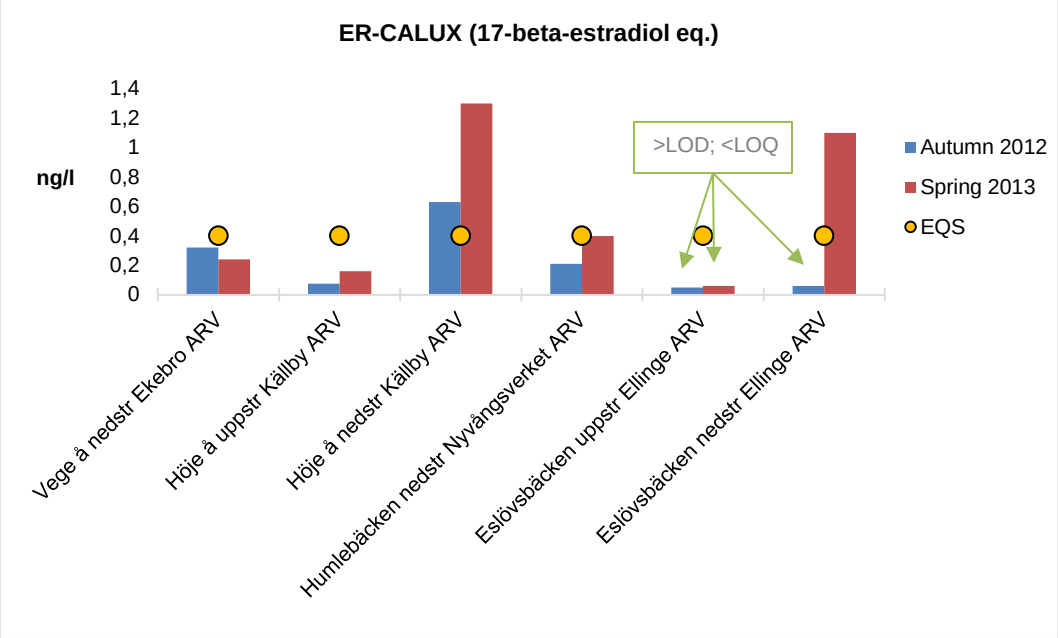

Figure 5-11. Concentrations (ng/l) of 17beta-estradiol equivalents (ER-CALUX) in Sweden 2012 and 2013 in inland sampling stations where it has been measured both years. Only inland sampling stations represented. In Eslövsbäcken concentrations is below LOQ but above LOD for the samples as indicated in the figure.

5.5 Conclusions and future work

The main *conclusions* from this study are:

- There were no discernible geographical differences in the distribution of diklofenac, terbutryne and 17beta-estradiol equivalents
- Concentrations of HBCDs and PFOS in fish were not evenly distributed geographically which may indicate the presence of point sources,
- WWTPs are probably important sources of many of the substances measured, except perhaps for dichlorvos
- Metal concentrations are not good indicators for the occurrence of the priority substances that frequently occurred above LOQ
- Better analytical techniques is needed for17alfa-ethinylestradiol, 17beta-estradiol, cypermethrin and dichlorvos and heptachlor/heptachlor epoxide to assess their influence on chemical status in surface waters
- The additional priority substances that occurred most frequently above EQS in inland surface waters were dichlorvos (approximately 10 %) and cybutryne (approximately 5 %)

SWECO
Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

- The non-priority substances that occurred most frequently above EQS in inland surface waters were 17beta-estradiol equivalents measured with CALUX (approximately 10 %), 17alfa-ethinylestradiol (approximately 8 %) and diclofenac (approximately 3 %)
- The additional priority substance that occurred most frequently above EQS in coastal surface waters was cypermethrin (approximately 10 %). Note that LOQ > EQS for cypermethrin.
- The non-priority substances that occurred most frequently above EQS in coastal surface waters were 17beta-estradiol equivalents measured with CALUX (approximately 10 %), 17alfa-ethinylestradiol (approximately 30 %) and diclofenac (approximately 10 %)
- EQS was exceeded in approximately 10% of the inland sampling stations if only priority substances are evaluated
- If all substances are evaluated, EQS was exceeded in 20 and 40% for inland and coastal waters receptively
- In biota, EQS was exceeded in 20% of the sampling stations
- The importance of PFOS and HBCD as priority substances should not be based solely on the present study since other studies in Sweden partly indicates other concentrations
- The differences in concentrations for diclofenac and terbutryn was larger between sampling stations than between sampling dates. This would indicate that monitoring of these priority substances can take place both during spring and autumn.

The main recommendations are:

- Heptachlor and heptachlor epoxide need to be measured in a limited number of fish samples, with a more sensitive analytical method, to confirm that they are not of interest for the chemical status classification
- Better analytical techniques needs to be developed for17alfa-ethinylestradiol, 17beta-estradiol, cypermethrin and dichlorvos which could be supported by the Swedish EPA.
- A follow up study should include fewer sampling stations, measurements with a higher temporal resolution for water sampling (at least monthly) and at least the following substances:
    - dichlorvos (all waters)
    - cybutryne (all waters)
    - 17beta-estradiol equivalents measured with ER-CALUX (all waters)
    - 17alfa-ethinylestradiol and 17beta-estradiol (all waters)
    - cypermethrin (coastal waters, could include development of analytical methods)

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

- diclofenac (all waters)
- PFOS (all waters)
- HBCDs (in fish with high fat content, e.g. eel)

Comment 1: For PFOS it is known from several projects outside the national and regional environmental monitoring program that concentrations in surface waters may exceed the AA-EQS. It may not be necessary with additional measurement, instead a comprehensive literature study on PFOS in surface waters of Sweden may be sufficient.

Comment 2: For HBCDs it may be the case that EQS in biota is exceeded more than the present study indicates since data from the national screening database indicates higher concentrations, in e.g. eel.

- A separate study could also focus on the sources of the substances that are identified as important. This could be done through a combination of measurements if the data is scarce and literature studies. The report should give recommendations for up-stream/source reductions.

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
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Telefax 040-15 43 47

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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
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Hans Michelsensgatan 2
Box 286, 201 22 Malmö
Telefon 040-16 70 00
Telefax 040-15 43 47

Appendix 1
Sampling stations

Overview of sampling stations.

No.	Administrative region	Sampling station	Inland/ coastal	Anthropogenic influence	Coordinates (RT 90)	
					X	Y
1	Västmanland	Arboga	Inland	Diffuse impact	6586450	1504844
2	Kronoberg	Bolmen	Inland	Background	6291867**	1368700**
3	Kalmar	Bottorpsströmmen downstr Ankarsrum	Inland	Downstream WWTP	6393722	1532229
4	Skåne	Bäljaneån downstr Klippan ARV	Inland	Downstream WWTP	6226934	1333920
5	Skåne	Bäljaneån upstr Klippan ARV	Inland	Upstream WWTP	6226945	1333923
6	Halland	Bölarpsån (N1)	Inland	Downstream WWTP, paper industry, agri-cultural area	6275495	1337762
7	Stockholm	Edeboviken 1 Hallstavik	Coastal	Downstream WWTP, paper industry	6664839	1654849
8	Stockholm	Edeboviken 2 Hallstavik	Coastal	Downstream WWTP, paper industry	6664041	1655007
9	Stockholm	Edeboviken 3 Hallstavik	Coastal	Downstream WWTP	6663519	1655019
10	Stockholm	Edeboviken 4 Hallstavik	Coastal	Downstream WWTP	6662983	1655116
11	Kalmar	Emån downstr Målilla	Inland	Downstream WWTP	6360027	1501130
12	Jönköping	Emån downstr Nyboholm returpappersbruk Kvillsfors	Inland	Downstream paper industry, WWTP	6364570	1483396
13	Jönköping	Emån downstr Vetlanda	Inland	Downstream WWTP	6366655	1459076
14	Kalmar	Emåns utlopp	Inland	Diffuse impact	6333870	1541762
15	Uppsala	Enköpingsån	Inland	Urban area, WWTP, agriculture	6611060	1570880
16	Skåne	Eslövsbäcken downstr Ellinge ARV	Inland	Downstream WWTP	6190035	1342748
17	Skåne	Eslövsbäcken upstr Ellinge ARV	Inland	Upstream WWTP	6190022	1343379
18	Västra Götaland	Flian Resville O 9	Inland	Diffuse impact	6478308	1345391
19	Uppsala	Fyrisån downstr Kungsängsverket ARV Uppsala	Inland	WWTP, urban area, agriculture	6637474	1603630
20	Uppsala	Fyrisån upstr Kungsängsverket ARV Upp-sala	Inland	Upstream WWTP	6637732	1603496
21	Värmland	Färnsjön	Inland	WWTP	6621667	1406597
22	Jönköping	Gnosjöån downstr ARV	Inland	Downstream WWTP	6358062	1375411
23	Gotland	Gothemsån downstr Åminne	Inland	Downstream WWTP	6391378	1676248
24	Västra Götaland	Göta Älv 1 Risholmen Göteborg	Coastal	Urban area	6402574**	1261499**
25	Västra Götaland	Göta Älv 2 Hjärtholmen Göteborg	Coastal	Urban area	6403223	1260791
26	Västra Götaland	Göta Älv river mouth Göteborg	Coastal	Urban area	6402464*	1265072*
27	Västra Götaland	Göta älv Trollhättan O11	Inland	Downstream WWTP	6466636**	1292222**
28	Stockholm	Hagaviken Stockholm	Inland	Diffuse, urban area	6572583	1617920
29	Värmland	Hammarö Vänern Karlstad	Inland	Diffuse impact	6584975	1372978
30	Kalmar	Hamnbassängen Oskarshamn	Coastal	Urban area	6348630	1540913
31	Skåne	Humlebäcken downstr Nyvångsverket ARV	Inland	Downstream WWTP	6227095	1319704
32	Skåne	Humlebäcken upstr Nyvångsverket ARV	Inland	Upstream WWTP	6230139	1319792
33	Värmland	Hyndalsån Tolerudsbäcken	Inland	Downstream WWTP	6599696	1357448
34	Jönköping	Hären	Inland	Urban area, down-	6355104*	1374224*

No.	Administrative region	Sampling station	Inland/ coastal	Anthropogenic influence	Coordinates (RT 90)	
					X	Y
				stream WWTP		
35	Skåne	Höje å downstr Källby ARV	Inland	Downstream WWTP	6177880	1332863
36	Skåne	Höje å upstr Källby ARV	Inland	Upstream WWTP	6176607	1334077
37	Västernorrland	Indalsälven Bogrundet plantskola Timrå	Inland	Downstream plant nursery	6934146	1583272
38	Gävleborg	Inre fjärden Sörgrundet-Fliskär	Coastal	Downstream WWTP	6730725	1576971
39	Värmland	Klarälven downstr ARV	Inland	Downstream WWTP	6587160	1371590
40	Värmland	Klarälven upstr ARV	Inland	Upstream WWTP	6587196	1371370
41	Skåne	Krankesjön	Inland	Agricultural area	6177024*	1353824*
42	Värmland	Kyrkviken Glafsfjorden	Inland	Background	6617446	1317856
43	Jönköping	Lagan downstr Värnamo	Inland	Downstream WWTP	6338875	1393863
44	Västerbotten	Lapp-Arvträsket	Inland	Background	7168340*	1644811*
45	Jönköping	Lillån downstr Bankeryd ARV	Inland	Downstream WWTP	6417254	1400667
46	Jönköping	Lillån upstr Bankeryd ARV	Inland	Upstream WWTP	6416523	1400042
47	Kalmar	Ljungbyån downstr Trekanten	Inland	Downstream WWTP	6284723	1519701
48	Dalarna	Ljusacksen	Inland	Background	6753716	1479768
49	Gävleborg	Ljusnan downstr Ljusdals ARV	Inland	Downstream WWTP	6855175	1517178
50	Gävleborg	Ljusnan upstr Ljusdals ARV	Inland	Upstream WWTP	6858245	1512965
51	Kalmar	Lyckebyån downstr Emmaboda	Inland	Downstream WWTP	6275806	1485780
52	Södermanland	Mellanfjärden	Coastal	Background	6513520*	1573104*
53	Värmland	Molkomssjön	Inland	WWTP	6609189	1381733
54	Östergötland	Motala Ströms mynning Norrköping	Inland	Urban area, WWTP, paper industry	6496842	1522293
55	Jönköping	Munksjöns utlopp	Inland	Urban area, down-stream WWTP	6407755**	1402640**
56	Jönköping	Nissan downströms Gislaved	Inland	Downstream WWTP	6352167	1363138
57	Västerbotten	Norsjön	Inland	Background	7206777*	1672076*
58	Skåne	Perstorpsbäcken downstr Perstorp ARV	Inland	Downstream WWTP	6226401	1348378
59	Skåne	Perstorpsbäcken upstr Perstorp ARV	Inland	Upstream WWTP	6226383	1348415
60	Blekinge	Ronnebyån downstr ARV	Inland	Downstream WWTP	6228291	1468529
61	Kronoberg	Ronnebyån Flåboda	Inland	Downstream plant nursery	6271237	1461637
62	Blekinge	Ronnebyån upstr ARV	Inland	Upstream WWTP	6229983	1467976
63	Dalarna	Runn Falun	Inland	Downstream WWTP	6718718	1492141
64	Västmanland	Sala Sörby	Inland	Urban/agricultural area, donwstream WWTP	6643802	1545930
65	Gävleborg	Sandarnefjärd Granskär ARV	Coastal	Downstream WWTP	6800157	1568947
66	Jönköping	Sjunnendammen	Inland	Diffuse impact	6367984*	1461628*
67	Halland	Stensån (N2 Dömestorp)	Inland	Downstream WWTP, paper industry, agri-cultural area	6259181	1326288
68	Gävleborg	Storsjön downstr Sandvikens ARV	Inland	Downstream WWTP	6720069	1553597
69	Jämtland	Storsjön downstr Östersunds ARV	Inland	Downstream WWTP	7009798**	1440743**
70	Jämtland	Storsjön upstr Östersunds ARV	Inland	Upstream WWTP	7019200	1418400
71	Uppsala	Strömarån (Skärplinge)	Inland	WWTP, agriculture, diffuse impact	6708851	1606932
72	Västmanland	Strömsholm	Inland	Diffuse impact	6600795	1526331
73	Östergötland	Stångån downstr Nykvarn ARV	Inland	Downstream WWTP	6478881	1489329

No.	Administrative region	Sampling station	Inland/ coastal	Anthropogenic influence	Coordinates (RT 90)	
					X	Y
74	Kalmar	Stångån downstr Vimmerby	Inland	Downstream WWTP	6395586	1501597
75	Östergötland	Stångån upstr Nykvarn ARV	Inland	Upstream WWTP	6477444	1489909
76	Örebro	Svartån downstr Skebäcks ARV	Inland	Downstream WWTP	6573087	1468814
77	Jönköping	Svartån downstr Tranås ARV	Inland	Downstream WWTP	6436185	1453055
78	Örebro	Svartån upstr Skebäcks ARV	Inland	Upstream WWTP	6572972	1468645
79	Västra Götaland	Säve ån Gamlestaden O 13	Inland	Urban area	6406635**	1273851**
80	Jönköping	Torsjöån downstr Eksjö ARV	Inland	Downstream WWTP	6349467	1451532
81	Uppsala	Tämnarån (Karholmsbruk)	Inland	Diffuse impact	6712642	1600726
82	Uppsala	Tämnarån (Tierps reningsverk)	Inland	Downstream WWTP, urban and diffuse	6691786	1594457
83	Skåne	Vege å downstr Ekebro ARV	Inland	Downstream WWTP, agricultural area	6223223	1319238
84	Skåne	Vege å upstr Ekebro ARV	Inland	Upstream WWTP, agricultural area	6223207	1319237
85	Blekinge	Vesan	Inland	Background	6221130	1429098
86	Jönköping	Vidöstern	Inland	Urban area, down-stream WWTP	6322032*	1389424*
87	Gotland	Visby ARV	Coastal	Adjacent to WWTP	6391627	1647312
88	Västra Götaland	Viskan Viskafors O20	Inland		6394345	1324275
89	Värmland	Vålösundet Kristinehamn	Inland	Downstream WWTP	6574871	1399878
90	Västmanland	Västerås "Skitviken"	Inland	Heavily polluted	6609593	1542942
91	Jönköping	Vättern Abborre	Inland	Diffuse impact	6443160*	1413510*
92	Blekinge	Åbyån	Inland	Background	6226331	1499046
93	Värmland	Åsfjorden Grums	Inland	Diffuse impact	6582207**	1348890**
94	Skåne	Öresund Malmö hamn	Coastal	Urban area	6169603	1323959
95	Västerbotten	Österfjärden Umeå	Coastal	Diffuse, downstream WWTP	7077634*	1723446*

* Approximated coordinates for fish samples

**Coordinates for water samples. Approximately the same coordinates for fish samples from the same sampling station

1 Passive sampling

Passive sampling offers several advantages over conventional sampling. The sampler is in place for a longer period of time (often days or weeks), accumulating the analytes. The result is an average of the concentration during this time, which eliminates the risk of non-detection of, for example, occasional peaks in emitted pollutants. It is also the case that to a large degree only the truly dissolved and thus the bioavailable fraction, i.e. the part that can be taken up by organisms, is sampled in a passive sampler.

The dissolved water concentrations are calculated based on the amount of analyte in the sampler, temperature and chemical specific coefficients. However, the EQS values established in the directive (2013/39/EU) are expressed as total concentrations in the whole water sample which has to be calculated based on the dissolved concentrations. The methodology for these calculations is explained below. *Note that the reported concentrations are consequently the calculated total concentrations*.

Two types of passive samplers were used in the present study, SPMD and POCIS.

1.1 Passive sampling using SPMD

Semi Permeable Membrane Devices (SPMD) is a passive sampling method for non-polar organic compounds such as PAH, PCB, and dioxins. The sampling method is based on a membrane that contains a lipid which easily dissolves hydrophobic substances (i.e. substances that dissolve in an organic phase like fat but only to a very small degree in water).

The length of the sampling period is variable, but is often about one month. During this time organic pollutants in dissolved or gas phase diffuse through the membrane and accumulate in the lipid. This uptake mimics the accumulation of organic pollutants in, for example, fish. The organic compounds are then extracted from the membrane for subsequent chemical analysis.

From the analytical result, concentrations in the sampled medium can be calculated. Concentrations of lipid-soluble substances in water are often so low that direct chemical analysis is difficult, but the passive sampler provides substantial preconcentration and thus enables more reliable analyses. Due to the large capacity of the lipid, a relatively long time (often >1 month) will elapse before the sampler is saturated, i e before a state of equilibrium has been attained between sampler and water.

The lipid filled membrane is mounted in a so-called spider carrier (Figure 1). The sampler consists of a stainless steel canister (Figure 2) that holds from one to five spider carriers with membranes.

Figure 1. Spider carrier with mounted lipid filled membrane for SPMD sampling.

1.2 Passive sampling using POCIS

Polar Organic Chemical Integrative Sampler (POCIS) is a passive sampling device for polar organic compounds in water. Many hydrophilic (i.e. easily dissolved in water) pesticides belong to this category.

The sampler consists of a solid sorbent (powder), enclosed between two membrane layers that are mounted in a pair of stainless steel washers (Figure 2). From one to three samplers can be placed in a steel canister (Figure 2). Notice that the same steel canister is used for SPMD and POCIS. Polar compounds diffuse through the membranes and are accumulated by the sorbent. Following extraction, the analysis is carried out by standard methods, and the concentrations in the sampled water can be calculated.

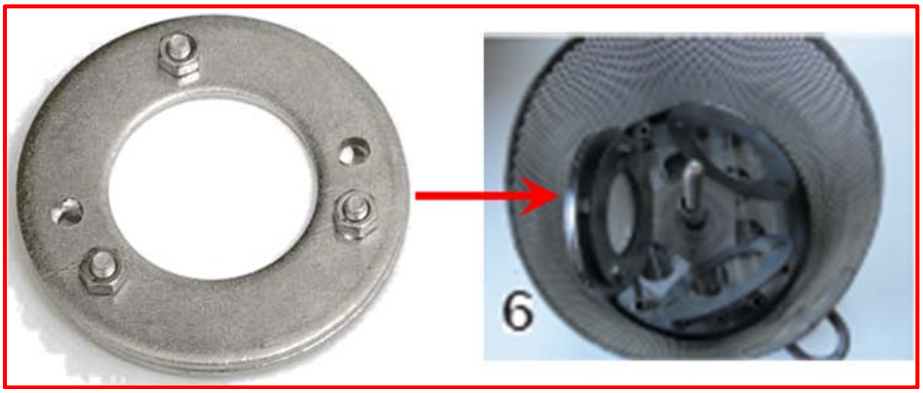

Figure 2. POCIS sampler on the left placed in a steel canister on the right.

1.3 Field deployment of passive sampler

The SPMD and POCIS samplers were placed in a perforated metal canister (Figure 2). If the water was deep, the metal canister was kept at the appropriate level below surface using a buoy. A typical setup is shown in Figure 3.

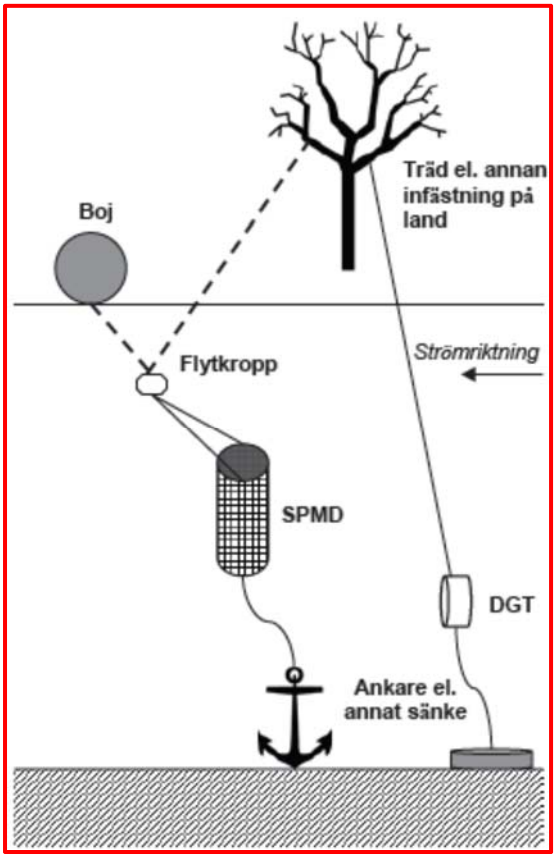

Figure 3. Typical deployment setup of passive samplers (in Swedish).

The samplers were deployed for about 3 weeks.

All sampling personnel received detailed instruction that governed the deployment and removal of the passive samplers. This included:

- The deployment and removal was to be executed as fast as possible since the uptake of analytes starts immediately after the transport containers have been opened.
- Disposable gloves were to be used during deployment and removal to minimise contamination.
- If trees or other objects did not shadow the sampling point, the samplers were to be deployed a minimum of 50 cm below the water surface to minimize photo-oxidation of accumulated analytes.
- If soft sediments were present at the site, the samplers were to be deployed a minimum of 50 cm above the sediment surface to minimize the influence of contaminants in the sediment.

1.4 Calculations of concentrations

1.4.1 Dissolved phase

1.4.1.1 SPMD

The calculations of water concentrations based on the analyte concentration in the passive sampler are dependent on whether the uptake is linear or whether equilibrium conditions control the uptake (Figure 4). If the uptake is linear the following equation applies:

$$C_W=(C_{SPMD} \bullet M_{SPMD})/(R_S \bullet t)$$

where C_W is the analyte concentration in water (g / l), C_{SPMD} is the analyte concentration in the SPMD membrane (g / l), M_{SPMD} is the mass of the SPMD membrane, R_s is the uptake rate (l / d) and t is the sampling time in the field. R_s has been determined in the laboratory for the priority substances sampled.

If the uptake is governed by equilibrium conditions, the following equation applies:

$$C_W=C_{SPMD\text{-}E} / K_{SPMD}$$

where $C_{SPMD\text{-}E}$ is the measured equilibrium concentration in the membrane and K_{SPMD} is the analyte equilibrium rate constant between water and the SPMD membrane.

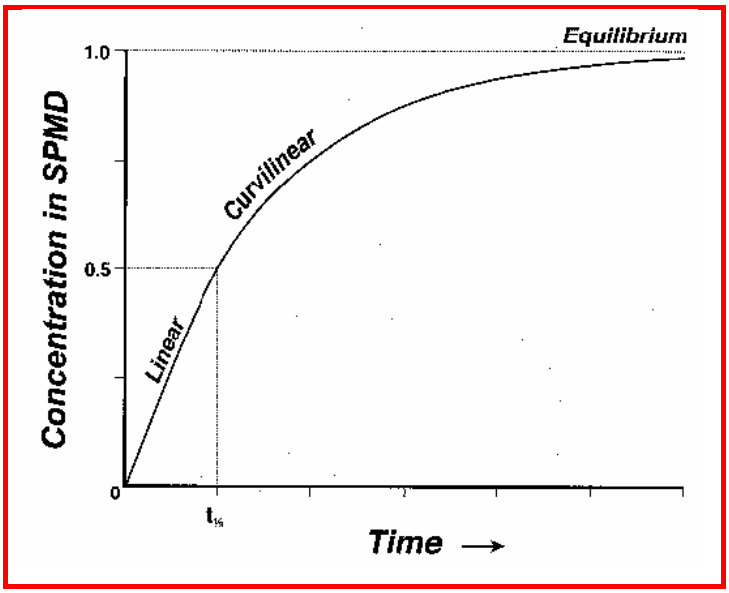

Figure 4. The evolvement of analyte concentration in the SPMD membrane over time.

1.4.1.2 POCIS

The water concentration of substances taken up in the POCIS sampler is calculated by:

$$C_w = C_{POCIS} / (R_s \bullet t)$$

Where C_w is the estimated water concentration, C_{POCIS} is the total mass of the analyte in the POCIS sample extract, R_s is the sampling rate in 1/d, and t is the deployment time in days. R_s has been determined in the laboratory for the priority substances sampled.

1.4.2 Calculations of total concentration

Concentrations in passive samplers represents only the truly dissolved portion of the measured substances. In general, the majority of hydrophobic organic contaminants will be associated with the particulate phase portion of the water sample followed by a portion associated with the colloidal and dissolved organic carbon (DOC) phases, with the smallest fraction being truly dissolved in water[1].

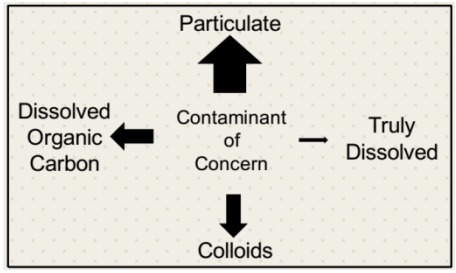

Figure 4. The image shows the partitioning of a hydrophobic COC between the principal environmental phases, with the thickness of the arrows indicating the relative degree to which a contaminant associates with a given phase.

Total substance concentrations (dissolved + particulate) were estimated from the data for dissolved concentrations using the equation Cw-tot= Cw(1 + TOC·Koc/Mw) where Cw is the dissolved concentration, Koc is the organic carbon-water equilibrium partition coefficient, TOC is the total organic carbon concentration and Mw is the mass of water per liter[2]. TOC were only measured in 2013, for 2012 an approximation were made.

Values of Koc for cypermethrin, diclofenac, terbutryn and dichlorvos were estimated by using public access databases, used values are shown in Table 1. Cypermethrin is the only truly hydrophobic substance analysed with passive samplers, and thus the only substance for which the calculation resulted in a significant difference between dissolved and total concentrations.

Table 1. Estimated Koc values for the substances analysed with passive samplers.

Substance	Koc
cypermethrin	500000
diclofenac	245
terbutryn	1000
dichlorvos	150

[1] US EPA 2012. Guidelines for using passive samplers to monitor organic contaminants at superfund sediment sites.
[2] (Meadows, J.C., K.R. Echols, J.N. Huckins, F.A. Borsuk, R.F. Carline, and D.E. Tillitt. 1998. Estimation of Uptake Rates for PCB Congeners Accumulated by Semipermeable Membrane Devices and Brown Trout (Salmo trutta). Environ. Sci. Tech. 32:1847-1852.)

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according to section 16 of Act No. 22/1997 Coll., on technical requirements for products, as amended

CERTIFICATE OF ACCREDITATION

No. 435 / 2013

Zdravotní ústav se sídlem v Ostravě
Partyzánské nám. 7, 702 00 Ostrava

To Testing Laboratory No. **1393**
Centrum hygienických laboratoří

Scope of accreditation:

Chemical, microbiological, radiological and biological analyses of water, waste, solid samples, food, materials, air and biological material, including independent sampling, determination of asbestos fibres, ecotoxicity tests, determination of sterilization efficiency and measurement of physical factors to the extent as specified in the appendix to this Certificate which is attached.

This Certificate of Accreditation is a proof of Accreditation issued on the basis of assessment of fulfillment of the accreditation criteria in accordance with

ČSN EN ISO/IEC 17025:2005

In its activities performed within the scope and for the period of validity of this Certificate, the Body is entitled to refer to this Certificate, provided that the accreditation is not suspended and the Body meets the specified accreditation requirements in accordance with the relevant regulations applicable to the activity of an accredited Conformity Assessment Body.

The Certificate of Accreditation is valid until: **26 July 2018**

The Certificate of Accreditation becomes effective on the date of its delivery to the Conformity Assessment Body.

Prague: 26 July 2013

Český institut pro akreditaci, o.p.s.
-1-

JiříRůžička
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Czech Accreditation Institute
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Zdravotní ústav se sídlem v Ostravě
Centrum hygienických laboratoří
Partyzánské nám. č. 7, 702 00 Ostrava 1

Testing laboratory working sites:

1	**Frýdek-Místek**	budova VÚHŽ a.s., 739 51, Dobrá 240
2	**Ostrava**	Partyzánské nám. č. 7, 702 00 Ostrava 1
3	**Karviná**	Těreškovové 2206, 734 01 Karviná – Mizerov
4	**Vyškov**	Masarykovo nám. 16, 682 01 Vyškov
5	**Olomouc**	Wolkerova 6, 779 11 Olomouc
6	**Jihlava**	Vrchlického 57, 587 25 Jihlava
7	**Brno**	Gorkého 6, 602 00 Brno

Contact and sampling points:

K1	**Nový Jičín**	Štefánikova 1977/9, 741 03 Nový Jičín
K2	**Bruntál**	Zahradní 5, 792 01 Bruntál
K3	**Zlín**	Havlíčkovo nábřeží 600, 760 01 Zlín
K4	**Vsetín**	4. května 287, 755 01 Vsetín
K5	**Šumperk**	Jeremenkova 7, 787 01 Šumperk
K6	**Ústí nad Orlicí**	Jana a Jos. Kovářů 1412, 562 06 Ústí nad Orlicí
K7	**Havlíčkův Brod**	Štáflova 2003, 580 01 Havlíčkův Brod
K8	**Pelhřimov**	Slovanského bratrství 710, 393 01 Pelhřimov
K9	**Třebíč**	Bráfova 31, 674 01 Třebíč
K10	**Žďár nad Sázavou**	Tyršova 3, 591 01 Žďár nad Sázavou
K11	**Břeclav**	Sovadinova 12, 690 02 Břeclav

Letter E at the ordinal number identifies the tests performed by the Laboratory in accordance with the requirements for periodic emission measurement according to ČSN P CEN/TS 15675:2009.

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Tests:

The laboratory has a flexible scope of accreditation permitted as detailed in the Annex.

Updated list of activities provided within the flexible scope of accreditation is available at the laboratory (from the Quality Manager).

The laboratory is qualified to provide expert opinions and to interpret the test results.

Basic chemistry

Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
1(2,5,6,7)	Determination of absorbance	SOP OV 001 (ČSN 75 7360)	Drinking, underground, surface, bathing water, extracts(2,7)
2(2,5,6,7)	Determination of ammonium (NH_4^+) by spectrophotometry and ammonia nitrogen ($N\text{-}NH_4^+$) by calculation from measured values	SOP OV 002 (ČSN ISO 7150-1)	Water, bottled water(2,5,6), extracts(2,6,7)
3(5)	Determination of ammonium (NH_4^+) by titration and ammonia nitrogen ($N\text{-}NH_4^+$) by calculation from measured values	SOP OV 002.03 (ČSN ISO 5664)	Drinking, underground, surface, bathing, waste and process water
4(2,5,6,7)	Determination of anions by ion chromatography (conductivity detection) (*)	SOP OV 003 (**)	Drinking, hot, bathing, surface, underground, purified and bottled water(2,5,6) (Waste and process water, extracts) (2,6,7)
5(2,6,7)	Determination of anions by ion chromatography (conductivity detection) (*)	SOP OV 003.01 (**)	Working and outdoor air, emission
6(2)	Determination of colour - visually	SOP OV 004 (ČSN EN ISO 7887)	Drinking, hot, bottled, bathing, surface, underground and purified water, extracts
7(5,6,7)	Determination of colour by spectrophotometry	SOP OV 004.01 (ČSN EN ISO 7887)	Drinking, hot, bottled, surface, bathing, underground and purified water, extracts
8(2,5,6)	Determination of biochemical oxygen demand after n days (BODn) – with oxygen electrode	SOP OV 005 (ČSN EN 1899-1, ČSN EN 1899-2)	Surface, underground, waste and process water
9(7)	Determination of biochemical oxygen demand after n days (BODn) – by titration	SOP OV 005.01 (ČSN EN 1899-1, ČSN EN 1899-2)	Surface, waste, process water
10(2)	Determination of Kjeldahl nitrogen Titration method after mineralization with selenium and determination of total, inorganic and organic nitrogen by calculation from measured values	SOP OV 006.01 (ČSN EN 25663)	Water, extracts
11(2)	Determination of total nitrogen by spectrophotometry (modified Kjeldahl method)	SOP OV 006.06 (ČSN ISO 11261)	Waste, solid samples
12(2)	Determination of total nitrogen by spectrophotometry with MERCK set	SOP OV 006.02 (Merck's manual)	Water, extracts
13(7)	Determination of total nitrogen after oxidation mineralization by spectrophotometry	SOP OV 006.03 (ČSN EN ISO 14905-1)	Water, extracts

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
14[(6)]	Determination of total nitrogen by electrochemical method, inorganic and organic nitrogen by calculation from measured values	SOP OV 006.05 (ČSN EN 12260)	Waste, process and surface water
15[(2,5,6,7)]	Determination of total phosphorus and phosphate by spectrophotometry and phosphorus pentaoxide (P_2O_5) by calculation from measured values	SOP OV 007 (ČSN EN ISO 6878)	Water, purified water , bottled water[(2,5,6)], extracts[(2,6,7)]
16[(2)]	Determination of total phosphorus by spectrophotometry with MERCK set	SOP OV 007.01 (MERCK manual)	Water, bottled water[(2,5,6)], extracts
17 * (1,2,3,5,6,7) (K2-5,K7-11)	Determination of total and free chlorine by spectrophotometry by HACH set and bound chlorine by calculation from measured values	SOP OV 008.01 (HACH manual)	Water, bottled water, extracts[(2)]
18[(7)]	Determination of nitrate (NO_3^-) by UV spectrophotometry and nitrate nitrogen (N-NO_3^-) by calculation from measured values	SOP OV 009.01 [(**)]	Water, purified water
19[(5,6,7)]	Determination of nitrite (NO_2^-) by spectrophotometry and nitrite nitrogen (N-NO_2^-) by calculation from measured values	SOP OV 010 (ČSN EN 26777)	Water, extracts[(6,7)], bottled water[(5,6)]
20[(2,5,6,7)]	Determination of electrical conductivity	SOP OV 011 (ČSN EN 27888)	Water, purified water, extracts[(2,6,7)], bottled water[(2,5,6)]
21[(2,6,7)]	Determination of phenols (phenol index) by spectrophotometry	SOP OV 046 (ČSN ISO 6439)	Water, extracts, bottled water[(2,6)]
22[(2)]	Determination of phenols (phenol index) by spectrophotometry	SOP OV 046.01 (ČSN ISO 6439)	Waste, solid samples
23[(2)]	Determination of fluoride by potentiometry (ISE)	SOP OV 012 (ČSN ISO 10359-1)	Water, bottled water, extracts, working air
24[(2,5,6)]	Determination of carbon dioxide forms (CO_2 free, bound, total, aggressive, hydrogen carbonates (HCO_3^-), carbonates (CO_3^{2-})) by titration and calculation from measured values	SOP OV 013 (ČSN 75 7373)	Water, bottled water, extracts[(2)]
25[(2,5,6,7)]	Determination of humic substances by spectrophotometry	SOP OV 014 (ČSN 757536)	Drinking, surface, underground, bottled water[(2)]
26[(2,5,6,7)]	Determination of chemical oxygen demand with dichromate (COD_{Cr}) by titration	SOP OV 015 (ČSN ISO 6060)	Water, bottled water[(2,5,6)], extracts[(2,6)]
27[(2)]	Determination of chemical oxygen demand with dichromate (COD_{Cr}) by spectrophotometry	SOP OV 015.01 (ČSN ISO 15705)	Water, bottled water, extracts
28[(2,5,6,7)]	Determination of chemical oxygen demand using permanganate (COD_{Mn}) by titration	SOP OV 016 (ČSN EN ISO 8467)	Drinking, underground, surface, bathing, hot water Bottled water[(2,5,6)], extracts[(2,7)]
29[(7)]	Determination of chlorides by titration	SOP OV 017 (ČSN ISO 9297)	Water, bottled water, extracts
30*[(2)]	Determination of chlorodioxide (chlorine dioxide) by spectrophotometry	SOP OV 018 [(**)]	Water: drinking, bathing, hot, purified
31*[(5,6,7)] (K5,K7-11)	Determination of chlorine dioxide by spectrophotometry with (Hach set)	SOP OV 018.01 (Hach's manual)	Drinking, underground, hot, bathing water, (waste, process, purified water)[(6)]

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Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
32(2,5,6,7)	Determination of chlorophyll-a by spectrophotometry	SOP OV 019 (ČSN ISO 10260)	Surface water
33(2,5,6)	Determination of chrome (VI) by spectrophotometry	SOP OV 049 (ČSN ISO 11083, ČSN EN ISO 18412)	Drinking, underground, surface, waste, process water Water, bottled water(2), extracts(2,6)
34(6)	Determination of chrome (VI) by spectrophotometry	SOP OV 049.02 (NIOSH Manual of Analytical Methods (NMAM), 8/1594)	Working and outdoor air, emission
35(2)	Determination of iodide by titration	SOP OV 020.02 (ČSN 58 0111, part 16)	Water: drinking, bottled, surface, underground, bathing
36(2,6,7)	Determination of total, free and easily liberatable cyanide by spectrophotometry(*)	SOP OV 022.01 (ČSN ISO 6703-2, ČSN 75 7415)	Water, bottled water(2,6), extracts(2,6,7)
37(2)	Determination of total, free and easily liberatable cyanide by spectrophotometry	SOP OV 022.04 (ČSN ISO 6703-2)	Waste, solid samples
38(2,5,6)	Determination of acid neutralizing capacity (ANC) by titration	SOP OV 024 (ČSN EN ISO 9963-1)	Water, bottled water, extracts(2)
39(2)	Determination of acid neutralizing capacity (ANC) by potentiometry	SOP OV 024.01 (ČSN EN ISO 9963-1)	Water, bottled water, extracts
40(2,5,6,7)	Determination of suspended (NL) and total solids by gravimetric method and loss by annealing of suspended solids by calculation from measured values	SOP OV 025.01 (ČSN EN 872, ČSN 75 7350)	Water, bottled water(2,6), extracts(2,6,7)
41(2,5,6,7)	Determination of dissolved solids (RL, RAS) by gravimetric method and total mineralization by calculation from measured values	SOP OV 026.01 (ČSN 75 7346, ČSN 75 7347, ČSN 75 7358, ČSN EN 15216)	Water, bottled water(2,5,6), extracts(2,6,7)
42*(1,2,3,5,6,7) (K2-5,K7-11)	Preliminary sensory analysis (*)	SOP OV 062 (TNV 75 7340)	Drinking, hot, bottled, surface, underground, bathing, purified water, extracts(2,7)
43* (1,2,3,5,6,7) (K2-5, K7-11)	Determination of redox potential	SOP OV 028 (ČSN 75 7367)	Drinking, bathing, underground and surface water
44* (1,3,5,6,7) (K3-5, K7-11)	Determination of ozone by spectrophotometry with HACH/MERCK set	SOP OV 032.02 (HACH/MERCK manual)	Bathing, drinking water
45* (1,2,3,5,6,7) (K2-5, K7-11)	Determination of pH by potentiometry	SOP OV 033 (ČSN ISO 10523)	Water, purified water, extracts(2,6,7) Bottled water(1,2,3,5,6)
46(2,6)	Determination of pH by potentiometry	SOP OV 033.01 (ČSN EN 12176, ČSN ISO 10390)	Solid samples, waste
47(2,7)	Determination of the threshold odour number (TON) and threshold flavour number (TFN)	SOP OV 034 (ČSN EN 1622)	(Drinking, hot, bottled, surface, underground water)(2), extracts
48* (1,2,5,6) (K3-5, K7-10)	Determination of dissolved oxygen – membrane probe method	SOP OV 036 (ČSN EN ISO 5814)	Drinking, underground, surface, bathing, waste and process water
49(2,3,5,6,7)	Determination of dry matter by gravimetry and water content (moisture content) by calculation from measured values	SOP OV 040.01 (ČSN EN 14346, part A)	Waste, solid samples
50(7)	Determination of sulphate by titration	SOP OV 037.01 (ČSN 75 7477)	Water, extracts
51(7)	Determination of the sum of calcium and magnesium by titration	SOP OV 039 (ČSN ISO 6059)	Water

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Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
52(2,5,6,7)	Determination of anionic surfactants by spectrophotometry	SOP OV 041 (ČSN EN 903)	Water, bottled water(2,5,6), extracts(2)
53* (1,2,3,4,5,6,7) (K2-5, K7-11)	Determination of temperature	SOP OV 042 (ČSN 75 7342)	Water, purified water
54* (1,2,5,6) (K7-10)	Determination of temperature	SOP OV 042.01 (ČSN EN 13485)	Foodstuffs
55(2,5,6,7)	Determination of turbidity by nephelometry	SOP OV 044.01 (ČSN EN ISO 7027)	Drinking, hot, bottled, surface, underground, bathing, purified water(2), extracts(2,7)
56(2,5,6)	Determination of basic neutralizing capacity (BNC) by titration	SOP OV 045 (ČSN 75 7372)	Water, bottled water, extracts(2)
57(2,5,6)	Determination of loss on ignition (combustible matter) by gravimetry and dry residue by calculation from measured values	SOP OV 040.02 (ČSN EN 12879, ČSN 46 5735)	Waste, solid samples
58(2,7)	Determination of iron by spectrophotometry	SOP OV 051 (ČSN ISO 6332)	Water, bottled water(2), extracts
59(2,6)	Determination of ammonium (NH_4^+) by automatic photometer Aquakem and ammonia nitrogen ($N\text{-}NH_4^+$) by calculation from measured values	SOP OV 064 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
60(6)	Determination of ammonium (NH_4^+) by automatic photometer Aquakem and ammonia nitrogen ($N\text{-}NH_4^+$) by calculation from measured values	SOP OV 064.07 (Aquakem manual)	Waste and process water, extracts
61(2)	Determination of alkalinity by automatic photometer Aquakem	SOP OV 064.01 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
62(2,6)	Determination of colour by automatic photometer Aquakem	SOP OV 064.02 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
63(6)	Determination of boron by automatic photometer Aquakem	SOP OV 064.08 (Aquakem manual)	Drinking, underground, bottled, surface, bathing, process, hot and purified water
64(2,6)	Determination of nitrate (NO_3^-) by automatic photometer Aquakem and nitrate nitrogen ($N\text{-}NO_3^-$) by calculation from measured values	SOP OV 064.03 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
65(6)	Determination of nitrate (NO_3^-) by automatic photometer Aquakem and nitrate nitrogen ($N\text{-}NO_3^-$) by calculation from measured values	SOP OV 064.09 (Aquakem manual)	Waste and process water, extracts
66(2,6)	Determination of nitrite (NO_2^-) by automatic photometer Aquakem and nitrite nitrogen ($N\text{-}NO_2^-$) by calculation from measured values	SOP OV 064.04 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
67(6)	Determination of nitrite (NO_2^-) by automatic photometer Aquakem and nitrite nitrogen ($N\text{-}NO_2^-$) by calculation from measured values	SOP OV 064.11 (Aquakem manual)	Waste and process water, extracts

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
68[(2)]	Determination of chloride by automatic photometer Aquakem	SOP OV 064.05 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
69 [(2)]	Determination of sulphate by automatic photometer Aquakem	SOP OV 064.06 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
70[(2)]	Determination of phosphate by automatic photometer Aquakem	SOP OV 064.10 (Aquakem manual)	Drinking, hot, bottled, bathing, surface, underground and purified water
71[(2)]	Qualitative determination of asbestos fibres by SEM-EDS technique	SOP OV 081 (VDI 3492, Annex D, VDI 3866, part 5)	Building materials
72[(2,6)]	Chemical tests for cleanness of water – qualitative [(*)]	SOP OV 055 (ČL, article A)	Purified water
73[(2,6)]	Determination of electrical conductivity	SOP OV 055.01 (ČL, article A)	Purified water
74[(2,6)]	Determination of evaporation residue by gravimetry	SOP OV 055.02 (ČL, article A)	Purified water
75[(2,6)]	Determination of gaseous pollutants by spectrophotometry[(*)]	SOP OV 058 [(**)]	Working air
76[(5)]	Determination of ions by capillary electrophoresis method[(*)]	SOP OV 073 (Application sheet Anion elektrolyte, Waters 1996)	Water, bottled water
77[(7)]	Determination of specified cations by ion chromatography[(*)]	SOP OV 066 (ČSN EN ISO 14911)	Water, purified water, extracts
78-199	Reserved		
200[(2)]	Determination of creatinine by spectrophotometry	SOP OV 503 (AHEM 4/1985)	Urine
201[(2)]	Determination of trichloro-acetic acid and trichloroethanol by spectrophotometry	SOP OV 509.01 (AHEM 4/1985)	Urine
202[(2)]	Determination of phenol by spectrophotometry	SOP OV 501 (AHEM 4/1985)	Urine
203[(2)]	Determination of hippuric acid by spectrophotometry	SOP OV 505.01 (AHEM 4/1985)	Urine
204[(2)]	Determination of 5 – aminolaevulic acid by spectrophotometry	SOP OV 507 (AHEM 4/1985)	Urine
205[(2)]	Determination of mandelic acid by polarography	SOP OV 506.01 (AHEM 4/1985)	Urine
206[(2)]	Determination of fluoride by ion selective electrode	SOP OV 502 (AHEM 4/1985)	Urine
207-249	Reserved		
250[(2,7)]	Determination of total migration by gravimetry	SOP OV 608 (Czech Ministry of Health Regulation No. 38/2001 Coll. and No. 84/2001 Coll., Commission Regulation (EU) No. 10/2011)	Materials
251[(2,7)]	Determination of primary aromatic amines by spectrophotometry	SOP OV 603 (ČSN 62 1156)	Materials, extracts
252[(2)]	Determination of material resistance to saliva and sweat	SOP OV 600 (MZ ČR Regulation No. 84/2001 Coll.)	Materials

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
253[(2,7)]	Detection of specified substances in rubber (*)	SOP OV 606 (ČSN 62 1156)	Aqueous extracts of rubber
254[(2,7)]	Determination of reducing substances by titration	SOP OV 606.01 (ČSN 62 1156)	Aqueous extracts of rubber
255[(2,7)]	Determination of evaporation residue by gravimetry	SOP OV 606.02 (ČSN 62 1156)	Aqueous extracts of rubber
256[(2,7)]	Determination of formaldehyde by spectrophotometry	SOP OV 609 (AHEM 32/1976, ČSN EN ISO 14184)	Materials, extracts (Surface, underground water)[(2)]
257-300	Reserved		

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Basic chemistry of food

Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
301[(2,7)]	Detection and identification of synthetic dyes by paper chromatography	SOP OV 102.01[(**)]	Foodstuffs
302[(2,5,7)]	Sensory analysis of food, PBU[(*)]	SOP OV 124 [(**)]	Food, extracts[(2,7)]
303[(2)]	Determination of sugar by titration	SOP OV 123 [(**)]	Foodstuffs
304[(2)]	Determination of acid value by titration	SOP OV 135 (ČSN ISO 660)	Fats, oils
305[(2)]	Determination of nitrogen by titration and protein by calculation from measured values	SOP OV 104 [(**)]	Foodstuffs
306[(2,5)]	Determination of ethanol by pycnometry	SOP OV 108 [(**)]	Foodstuffs
307[(2)]	Determination of sodium chloride by titration	SOP OV 110 [(**)]	Foodstuffs
308[(2)]	Determination of iodide and iodate by titration	SOP OV 112 [(**)]	Foodstuffs
309[(2)]	Determination of cyanide by titration	SOP OV 113 [(**)]	Salt
310[(2)]	Determination of acidity by titration	SOP OV 114 [(**)]	Foodstuffs
311[(2,6)]	Determination of sulphur dioxide by titration	SOP OV 125 (ČSN 56 0160-11, ČSN ISO 5523)	Foodstuffs
312[(2)]	Determination of peroxide value by titration	SOP OV 119 (ČSN EN ISO 3960)	Fats, oils
313[(2,6)]	Determination of pH by potentiometry	SOP OV 120 [(**)]	Foodstuffs
314[(2)]	Determination of ash insoluble in acid (sand)	SOP OV 121 [(**)]	Foodstuffs
315[(2,6)]	Determination of ash content by gravimetry	SOP OV 122 [(**)]	Foodstuffs
316[(2)]	Determination of ash content by conductometry	SOP OV 122.01 (ČSN 56 0161-4)	Foodstuffs
317[(2)]	Determination of foreign matter and impurities in seeds[(*)]	SOP OV 138 (ČSN 58 8719)	Oil seeds
318[(2)]	Determination of refractometric dry matter	SOP OV 126 [(**)]	Foodstuffs
319[(2,6)]	Determination of dry matter (water content) by gravimetric method and determination of energy value and saccharides by calculation[(*)]	SOP OV 118 [(**)]	Foodstuffs
320[(2)]	Determination of dry matter (moisture) by distillation	SOP OV 134.01 (ČSN ISO 939)	Foodstuffs
321[(2)]	Determination of volatile acids by titration	SOP OV 129 (Commission Regulation (EEC) No. 2676/90, art. 14)	Wine
322[(2)]	Determination of fat by gravimetry	SOP OV 130 [(**)]	Foodstuffs
323[(2)]	Determination of fibre by gravimetry	SOP OV 132 [(**)]	Foodstuffs
324-399	Reserved		

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Determination of metals

Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
400[6]	Determination of metals by flame AAS[*]	SOP OV 200 (ČSN 75 7400, ČSN ISO 7980, ČSN ISO 8288, ČSN EN 1233)	Water, purified water, extracts
401[6]	Determination of metals by flame AAS[*]	SOP OV 200.14 (ČSN 75 7400, ČSN ISO 7980, ČSN ISO 8288, ČSN EN 1233)	Waste, solid samples, materials
402[6]	Determination of metals by flame AAS[*]	SOP OV 200.12 (ČSN 75 7400, ČSN ISO 7980, ČSN ISO 8288, ČSN EN 1233)	Air, emission
403[6]	Determination of metals by flame AAS[*]	SOP OV 200.15 (ČSN 75 7400, ČSN ISO 7980, ČSN ISO 8288, ČSN EN 1233)	Food, feedstuffs
404[6]	Determination of metals by electrothermal AAS[*]	SOP OV 200.01 (TNV 75 7408, ČSN EN ISO 15586)	Water, bottled water, purified water, extracts
405[6]	Determination of metals by electrothermal AAS[*]	SOP OV 200.16 (TNV 75 7408, ČSN EN ISO 15586)	Waste, solid samples, materials
406[6]	Determination of metals by electrothermal AAS[*]	SOP OV 200.10 (TNV 75 7408, ČSN EN ISO 15586)	Air, emission
407[6]	Determination of metals by electrothermal AAS[*]	SOP OV 200.17 (TNV 75 7408, ČSN EN ISO 15586)	Food, feedstuffs
408[2,5]	Determination of elements by ICP-MS method [*]	SOP OV 201 (ČSN EN ISO 17294-1, ČSN EN ISO 17294-2)	Water, purified water, bottled water, extracts[2], dialyzates from DGT samplers[2]
409[2]	Determination of elements by ICP-MS method [*]	SOP OV 201.05 (ČSN EN ISO 17294-1, ČSN EN ISO 17294-2)	Waste, solid samples, materials
410[2]	Determination of elements by ICP-MS method [*]	SOP OV 201.04 (ČSN EN ISO 17294-1, ČSN EN ISO 17294-2)	Air, emission
411[2]	Determination of elements by ICP-MS method [*]	SOP OV 201.03 (ČSN EN ISO 17294-1, ČSN EN ISO 17294-2)	Biological material (blood, blood serum, urine, tissue, hair)
412[2]	Determination of elements by ICP-MS method [*]	SOP OV 201.10 (ČSN EN ISO 17294-1, ČSN EN ISO 17294-2)	Food, feedstuffs
413 [2]	Determination of elements by ICP-OES method[*]	SOP OV 201.01 (ČSN EN ISO 11885)	Water, bottled water, purified water, extracts, dialyzates from DGT samplers
414 [2]	Determination of elements by ICP-OES method[*]	SOP OV 201.06 (ČSN EN ISO 11885)	Waste, solid samples, materials
415 [2]	Determination of elements by ICP-OES method[*]	SOP OV 201.07 (ČSN EN ISO 11885)	Air, emission

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
416 [(2)]	Determination of elements by ICP-OES method[(*)]	SOP OV 201.08 (ČSN EN ISO 11885)	Biological material (blood, blood serum, urine, tissue, hair)
417 [(2)]	Determination of elements by ICP-OES method[(*)]	SOP OV 201.11 (ČSN EN ISO 11885)	Food, feedstuffs
418 [(2)]	Determination of elements by X-ray spectrometry method[(*)]	SOP OV 202 (SPECTRO manual)	Waste, solid samples, air, materials
419[(2,5,6)]	Determination of Hg by AMA analyser	SOP OV 200.03 (ČSN 75 7440)	Water, bottled water, purified water (Extracts, waste, solid samples, air, food, materials) [(2,6)] (Mineral oils, dialyzates from DGT samplers, emissions, feedstuffs, biological material (blood, blood serum, urine, tissue, hair)[(2)]
420-499	Reserved		

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Organic chemistry

Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
500[3]	Determination of α-modification of silicon dioxide by infrared spectrometry	SOP OV 300 (NIOSH 7602, AHEM 8/76, AHEM 2/88)	Working air
501[3]	Determination of additives by liquid chromatography (DAD) (*)	SOP OV 301 (ČSN EN 12856)	Food, cosmetic products, bottled water
502[3]	Determination of acrylamide by gas chromatography (ECD, MSD)	SOP OV 303 (EPA 8032A)	Water, bottled water, extracts
503[3]	Determination of acrylamide by gas chromatography (MSD)	SOP OV 303.01 (EPA 8032A)	Foodstuffs
504[3]	Determination of aldehydes and ketones by liquid chromatography (DAD) (*)	SOP OV 304.01 (EPA TO-11A)	Air, emission
505[2,5]	Determination of AOX (adsorbable organically bound halogens), EOX (extractable organically bound halogens), TX (total halogen compounds) and halogenides (sum of chlorides, bromides and iodides) by coulometry (*)	SOP OV 305.01 (ČSN EN ISO 9562)	Water[2,5], extracts[2]
506[2]	Determination of AOX (adsorbable organically bound halogens), EOX (extractable organically bound halogens), TX (total halogen compounds) and halogenides (sum of chlorides, bromides and iodides) by coulometry	SOP OV 305.04 (DIN 38414-17)	Solid samples, waste
507[2,5,6,7]	Determination of total organic carbon (TOC) and dissolved organic carbon (DOC) by infrared spectrometry method	SOP OV 307 (ČSN EN 1484)	Water, bottled water[2,5,6], purified water, extracts[2,6,7]
508[2]	Determination of total organic carbon (TOC) by infrared spectrometry method	SOP OV 307.02 (ČSN EN 13137)	Solid samples, waste
509[5]	Determination of diisocyanates by liquid chromatography (FLUD) (*)	SOP OV 316 (OSHA Method No.42 and No.47)	Working air
510[5]	Determination of phthalates by gas chromatography (MS) and the sum of phthalates by calculation from measured values(*)	SOP OV 313 (ČSN EN ISO 18856)	Materials, extracts
511[5]	Determination of phthalates by gas chromatography (MS) and the sum of phthalates by calculation from measured values(*)	SOP OV 313.04 (ČSN EN ISO 18856)	Spirits
512[6]	Determination of herbicides by gas chromatography (NPD) and the sum of herbicides by calculation from measured values(*)	SOP OV 314 (ČSN EN ISO 11369, ČSN EN 12918)	Bottled, drinking, underground, surface and waste water
513[3]	Determination of histamine by liquid chromatography (DAD)	SOP OV 381 (Journal of Chromatography A, 1032, 2004, 79-85)	Fish and fish products
514[3]	Determination of chelates by gas chromatography (MS) (*)	SOP OV 327.05 (ČSN EN ISO 16588)	Water, bottled water, extracts
515[1]	Determination of chloroalkanes by gas chromatography (MS) and the sum of chloroalkanes by calculation from measured values(*)	SOP OV 327.06 (**)	Water, bottled water, extracts, dialyzates from SPMD

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
516[(1)]	Determination of chlorobenzenes by gas chromatography (MS) and the sum of chlorobenzenes by calculation from measured values[(*)]	SOP OV 327.02 [(**)]	Air
517[(1)]	Determination of chlorophenols by gas chromatography (MS) and the sum of chlorophenols by calculation from measured values[(*)]	SOP OV 327.04 (ČSN EN 12673)	Water, bottled water, extracts, dialyzates from SPMD
518[(1)]	Determination of chlorophenols by gas chromatography (MS) and the sum of chlorophenols by calculation from measured values[(*)]	SOP OV 327.07 (ČSN EN 12673)	Solid samples, waste
519[(1)]	Determination of chlorophenols by gas chromatography (MS) and the sum of chlorophenols by calculation from measured values[(*)]	SOP OV 327.08 (ČSN EN 12673)	Air
520[(1)]	Determination of chlorophenols by gas chromatography (MS) and the sum of chlorophenols by calculation from measured values[(*)]	SOP OV 327.10 (ČSN EN 12673)	Foodstuffs
521[(5)]	Determination of fatty acids by gas chromatography (MS) and the sum of saturated, monounsaturated, polyunsaturated and transunsaturated fatty acids by the calculation from the measured values [(*)]	SOP OV 336 (ČSN ISO 5508, ČSN ISO 12966-2)	Foodstuffs
522[(3)]	Determination of metabolites of organic compounds by liquid chromatography (DAD,FLUD)[(*)]	SOP OV 323 [(**)]	Urine
523[(3,5,6)]	Determination of methanol and volatile organic compounds by gas chromatography (FID, MS) [(*)]	SOP OV 324 (ČSN 660805)	Spirits
524[(3,5,6,7)]	Determination of NEL (non-polar extractives) and EL (extractives) by infrared spectrometry	SOP OV 309.01 (ČSN 75 7505, ČSN 75 7506)	Water[(3,5,6,7)], bottled water[(3,5)], extracts[(3,6,7)]
525[(3)]	Determination of NEL (non-polar extractives) and EL (extractives) by infrared spectrometry	SOP OV 309.04 (ČSN 75 7505, ČSN 75 7506)	Solid samples, waste
526[(3)]	Determination of NEL (non-polar extractives) and EL (extractives) by infrared spectrometry	SOP OV 309.07 (ČSN 75 7505, ČSN 75 7506)	Air, pressure gases
527[(6,7)]	Determination of NEL (non-polar extractives) by infrared spectrometry	SOP OV 309.06 (TNV 758052)	Waste, solid samples
528[(6)]	Determination of fats and oils by gravimetry	SOP OV 360 (ČSN 75 7509)	Surface, waste, bathing and process water, extracts
529[(1,5,6)]	Determination of organochlorinated pesticides (OCP) and chlorobenzenes by gas chromatography (ECD, MS) and the sum of OCP and chlorobenzenes by calculation from measured values[(*)]	SOP OV 327 (ČSN EN ISO 6468)	Water, bottled water, extracts[(1)], dialyzates from SPMD[(1)]

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
530[(1,6)]	Determination of organochlorinated pesticides (OCP) and chlorobenzenes by gas chromatography (ECD, MS) and the sum of OCP and chlorobenzenes by calculation from measured values[(*)]	SOP OV 327.01 [(**)]	Solid samples, waste
531[(1)]	Determination of organochlorinated pesticides (OCP) and chlorobenzenes by gas chromatography (MS) and the sum of OCP and chlorobenzenes by calculation from measured values[(*)]	SOP OV 327.03 [(**)]	Biological material (tissue, blood, blood plasma and serum, breast milk)
532[(1)]	Determination of organochlorinated pesticides (OCP) and chlorobenzenes by gas chromatography (MS) and the sum of OCP and chlorobenzenes by calculation from measured values[(*)]	SOP OV 327.11 [(**)]	Foodstuffs
533[(1,3,5,6)]	Determination of polyaromatic hydrocarbons (PAH) by liquid chromatography (FLUD, DAD) and the sum of PAH by calculation from measured values[(*)]	SOP OV 331 (ČSN EN ISO 17993)	Water, bottled water, extracts[(1,3)], dialyzates from SPMD[(1)]
534[(1,3,6)]	Determination of polyaromatic hydrocarbons (PAH) by liquid chromatography (FLUD, DAD) and the sum of PAH by calculation from measured values[(*)]	SOP OV 331.05 (ČSN EN ISO 17993)	Solid samples, waste, mineral oils[(1,3)]
[E]535[(1,3,6)]	Determination of polyaromatic hydrocarbons (PAH) by liquid chromatography (FLUD, DAD) and the sum of PAH by calculation from measured values[(*)]	SOP OV 331.02 (EPA TO 13, STN ISO 11338-2)	Emission, air
536[(1,3)]	Determination of polyaromatic hydrocarbons (PAH) by liquid chromatography (FLUD, DAD) and the sum of PAH by calculation from measured values[(*)]	SOP OV 331.06 (ČSN EN ISO 15753, ČSN 56 0623)	Food, edible fats and oils
537[(1,5)]	Determination of polyaromatic hydrocarbons (PAH) by gas chromatography (MS) and the sum of PAH by calculation from measured values[(*)]	SOP OV 331.01 (ČSN 75 7554)	(Drinking, bottled, underground, surface and waste water) [(5)] (Drinking, underground and surface water, dialyzates from SPMD)[(1)]
538[(1)]	Determination of polychlorinated dibenzo – p-dioxines and furanes (PCDD/F), specified congeners of polychlorinated biphenyls (PCB), polychlorinated naphthalenes (PCN) and specified congeners of polybrominated diphenylethers (PBDE) by gas chromatography (MS/MS, HRMS) and the sum of PCDD/F, PCB, PCN and PBDE by calculation from measured values[(*)]	SOP OV 332 (EPA 1613)	Water, bottled water, extracts, dialyzates from SPMD

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
539[(1)]	Determination of polychlorinated dibenzo – p-dioxines and furanes (PCDD/F), specified congeners of polychlorinated biphenyls (PCB), polychlorinated naphthalenes (PCN) and specified congeners of polybrominated diphenylethers (PBDE) by gas chromatography (MS/MS, HRMS) and the sum of PCDD/F, PCB, PCN and PBDE by calculation from measured values[(*)]	SOP OV 332.01 (EPA 1613)	Solid samples, waste
E540[(1)]	Determination of polychlorinated dibenzo – p-dioxines and furanes (PCDD/F), specified congeners of polychlorinated biphenyls (PCB) and specified congeners of polybrominated diphenylethers (PBDE) by gas chromatography (MS/MS, HRMS) and the sum of PCDD/F, PCB and PBDE by calculation from measured values[(*)]	SOP OV 332.02 (ČSN EN 1948-2, ČSN EN 1948-3, EPA TO-9A)	Air, emission
541[(1)]	Determination of polychlorinated dibenzo – p-dioxines and furanes (PCDD/F), specified congeners of polychlorinated biphenyls (PCB) and specified congeners of polybrominated diphenylethers (PBDE) by gas chromatography (MS/MS, HRMS) and the sum of PCDD/F, PCB and PBDE by calculation from measured values[(*)]	SOP OV 332.03 (EPA 1613)	Biological material (tissue, blood, blood plasma and serum, breast milk)
542[(1)]	Determination of polychlorinated dibenzo – p-dioxines and furanes (PCDD/F), specified congeners of polychlorinated biphenyls (PCB) and specified congeners of polybrominated diphenylethers (PBDE) by gas chromatography (MS/MS, HRMS) and the sum of PCDD/F, PCB and PBDE by calculation from measured values[(*)]	SOP OV 332.04 (EPA 1613)	Food, feedstuffs
543[(1,5,6)]	Determination of polychlorinated biphenyls (PCB) by gas chromatography (ECD, MS) and the sum of PCB by calculation from measured values[(*)]	SOP OV 333 (ČSN EN ISO 6468)	Water, bottled water, extracts[(1)]
544[(1,5,6)]	Determination of polychlorinated biphenyls (PCB) by gas chromatography (ECD) and the sum of PCB by calculation from measured values[(*)]	SOP OV 333.06 (ČSN EN 15308, ČSN EN 12766-1)	Solid samples, waste, mineral oils, materials
545[(3)]	Determination of saccharide by liquid chromatography (RID) [(*)]	SOP OV 335 (ČSN EN 15086)	Foodstuffs
546[(3)]	Determination of synthetic food dyes by liquid chromatography(DAD) [(*)]	SOP OV 343.02 [(**)]	Foodstuffs
547[(3,5,6)]	Determination of volatile organic compounds (VOC) by gas chromatography (MS, FID, ECD) and the sum of VOC by calculation from measured values[(*)]	SOP OV 344 (ČSN EN ISO 15680, ČSN EN ISO 10301)	Water[(3,5,6)], bottled water[(3,5)], extracts[(3)]

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Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
548[(1)]	Determination of volatile organic compounds (VOC) by gas chromatography (ECD, FID) and the sum of VOC by calculation from measured values[(*)]	SOP OV 344.13 [(**)]	Water, eluates from passive samplers
549[(3,6)]	Determination of volatile organic compounds (VOC) by gas chromatography (MS) and the sum of VOC by calculation from measured values[(*)]	SOP OV 344.01 (ČSN EN ISO 15680)	Solid samples, waste
550[(3,6)]	Determination of volatile organic compounds (VOC) by gas chromatography (MS) and the sum of VOC by calculation from measured values[(*)]	SOP OV 344.02 (EPA TO 14)	Air
551[(3,5,6)]	Determination of volatile organic compounds (VOC) and other organic compounds by gas chromatography on a sorbent (FID, MS, ECD) and the sum of VOC by calculation from measured values[(*)]	SOP OV 344.12 (ČSN EN 13649)	Air, emission[(3)]
552[(1,5,6)]	Determination of hydrocarbons C_{10} to C_{40} by gas chromatography (FID).	SOP OV 338 (ČSN EN ISO 9377-2)	Water, bottled water
553[(1,5,6)]	Determination of hydrocarbons C_{10} to C_{40} by gas chromatography (FID).	SOP OV 338.01 (ČSN EN 14039)	Solid samples, waste
554[(5)]	Determination of urethane (ethyl carbamate) by gas chromatography (MSD)	SOP OV 339.01 (J.Assoc.of.Anal. Chem.)	Foodstuffs
555[(3)]	Determination of vitamins by liquid chromatography (DAD, FLUD) [(*)]	SOP OV 340 [(**)]	Foodstuffs
556[(1)]	Determination of specified polar compounds by liquid chromatography (MS/MS) [(*)]	SOP OV 341 [(**)]	Water: drinking, bottled, surface, underground, eluates from POCIS
557[(1)]	Determination of specified polar compounds by liquid chromatography (MS/MS) [(*)]	SOP OV 341.03 [(**)]	Biological material (blood plasma, tissue)
558[(5)]	Determination of specified polar pesticides by liquid chromatography (MS/MS) and the sum of pesticides by calculation from measured values[(*)]	SOP OV 341.02 [(**)]	Water: drinking, bottled, underground and surface
559[(1)]	Determination of specified pesticides by gas chromatography (MS) [(*)]	SOP OV 327.15 [(**)]	Water
560[(1)]	GC/MS identification and determination of organic compounds	SOP OV 346.03 (NIST LIBRARIES)	Chemical substances and agents
561[(3)]	Identification of materials and chemical substances by infrared spectrometry	SOP OV 357 (NICOLET Appl. sheet)	Materials
562[(1)]	Determination of alkylphenols and phthalates by gas chromatography (MS) and the sum of alkylphenols and phthalates by calculation from measured values[(*)]	SOP OV 327.12 [(**)]	Water, bottled water, extracts, dialyzates from SPMD
563[(1)]	Determination of alkylphenols by gas chromatography (MS) and the sum of alkylphenols by calculation from measured values[(*)]	SOP OV 327.13 (ČSN EN ISO 18857-1, ČSN EN ISO 18857-2, ČSN P CEN/TS 16189)	Solid samples, waste
564[(1)]	Determination of phthalates by gas chromatography (MS) and the sum of phthalates by calculation from measured values[(*)]	SOP OV 327.14 [(**)]	Biological material (tissue, blood, blood plasma and serum, breast milk)
565-599	Reserved		

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Air

Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
600* [3]	Determination of odour concentration	SOP OV 401 (ČSN EN 13725)	Indoor and outdoor air
601 [2,5,6,7]	Determination of dust and solid pollutants by gravimetry	SOP OV 403 (ČSN EN 481, ČSN EN 12341, ČSN EN 14907 ČSN EN 689, Government Regulation No. 361/2007 Coll.)	Indoor, outdoor and working air
602 [2,7]	Determination of mass of dustfall by gravimetry	SOP OV 404 (**)	Outdoor air
603 [2]	Determination of numerical concentration of mineral fibres by optical microscopy with phase contrast (*)	SOP OV 405 (Government Regulation No. 361/2007 Coll., Regulation 6/2003 Coll., NIOSH Meth. No. 7400)	Indoor, outdoor and working air
604 [2]	Determination of numerical concentration of mineral fibres by SEM method with EDS analyzer(*)	SOP OV 405.1 (Guideline VDI 3492)	Indoor, outdoor and working air
605* [2,3,5,6,7] (K1,3-6)	Preliminary determination of gases and vapours by detection tubes(*)	SOP OV 424 (ČSN EN 1231)	Indoor, outdoor and working air, pressure gases[2]
606* [2,5,6,7] (K5,10)	Measurement of the concentration of dust by automatic analyzers – optical method	SOP OV 436 (**)	Indoor, outdoor and working air
607* [2,5,6,7] (K10)	Measurement of the concentration of dust by automatic analyzers – gravimetric (frequency) method	SOP OV 436.01(**)	Indoor and outdoor air
608* [2,5,6,7] (K10)	Measurement of the concentration of dust by automatic analyzers – dispersion method	SOP OV 436.02 (**)	Indoor and outdoor air
609* [2,3,5,6,7] (K1,3-6)	Measurement of concentration of gaseous pollutants – electrochemical method(*)	SOP OV 438 (**)	Indoor, outdoor and working air, pressure gases[2]
610* [2,3,5,6,7] (K3,6)	Determination of sulphur dioxide (SO_2) and hydrogen sulphide (H_2S) by UV fluorescence	SOP OV 438.03 (ČSN EN 14212)	Indoor and outdoor air
611* [2,3,5,6,7] (K3,6)	Determination of ozone (O_3) by UV absorption	SOP OV 438.04 (ČSN EN 14625)	Indoor, outdoor and working air
612* [2,5,6,7] (K3,6)	Determination of nitrogen oxides by chemiluminescence	SOP OV 438.05 (ČSN EN 14211)	Indoor and outdoor air
613* [2]	Determination of hydrocarbons (methane, non-methane hydrocarbons and the sum of hydrocarbons) by flame ionization detection	SOP OV 438.06 (**)	Indoor and outdoor air
614* [2,3,5,6,7] (K1,3-6, K8)	Determination of carbon monoxide (CO) and carbon dioxide (CO_2) by IR absorption	SOP OV 438.07 (**)	Indoor, outdoor and working air, pressure gases[2]
615* [2,3]	Determination of methane and carbon dioxide (CH_4,CO_2) by analyzer with IR detection	SOP OV 438.01 (**)	Indoor, outdoor and working air, soil air
616* [2,3]	Measurement of dynamics of methane flux towards the surface (surface flux) by analyzer with optical detection	SOP OV 438.02 (**)	Soil air
617-699	Reserved		

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Physical factors

Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
700* (2,3,5,6,7) (K1,3-8)	Measurement and calculation of noise Measurement Calculation	 SOP OV 456, part 1 (**) SOP OV 456, part 2 (**)	Working and non-working environment
701* (6)	Measurement of noise emitted by railbound vehicles	SOP OV 457 (ČSN EN ISO 3095, ČSN EN ISO 3381)	Railway vehicles
702* (K6)	Measurement of noise of wind turbine generator systems	SOP OV 460 (ČSN EN 61400-11)	Wind turbine generator systems
703* (K6)	Measurement of sound power levels	SOP OV 462 (**)	Noise source
704* (K6)	Measurement of emission sound pressure levels at work stations	SOP OV 463 (**)	Machines and equipment
705* (3, K5-7)	Measurement of reverberation time	SOP OV 464 (ČSN EN ISO 3382-2)	Indoor areas
706* (2,3) (K5, K6)	Measurement of airborne sound insulation	SOP OV 468 (**)	Building structures
707* (3, K6)	Measurement of impact sound insulation	SOP OV 468.02 (**)	Building structures
708* (K6)	Determination of sound insulation	SOP OV 468.03 (ČSN EN ISO 11546-2, ČSN EN ISO 11957)	Enclosures, cabins
709* (K6)	Measurement of the influence of road surfaces on traffic noise	SOP OV 472 (ČSN ISO 11819-1)	Roads
710* (K6)	Measurement of insertion loss	SOP OV 473.01 (ČSN ISO 10847, ČSN EN ISO 11820, ČSN EN ISO 11821)	Noise barriers and baffles
711* (2,3,5,6,7) (K1,3,5-7)	Measurement of vibration	SOP OV 471(**)	Working and non-working environment
712* (2,3,5,6,7) (K1,3-8,10)	Measurement of artificial lighting	SOP OV 469 (**)	Working and non-working environment
713* (2,3,5,6,7) (K1,3-8,10)	Measurement of daylight	SOP OV 470 (**)	Working and non-working environment
714* (2,3,6,7) (K1,3-5,10)	Measurement of microclimatic conditions (*)	SOP OV 474 (**)	Working and non-working environment
715* (3)	Measurement of air-conditioning conditions	SOP OV 475 (ČSN 124070, ČSN 123061)	Working and non-working environment
716* (2,7, K3)	Measurement of electromagnetic field	SOP OV 452 (**)	Working and non-working environment
717* (7)	Ultraviolet radiation parameters measuring	SOP OV 455 (ČSN EN 61228, ČSN EN 14255-1, ČSN EN 12198-2, Government Regulation No. 1/2008, Annex 2)	Working and non-working environment
718-799	Reserved		

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Ecotoxicology

Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
800(1)	Determination of the acute lethal toxicity of substances to a freshwater fish Poecilia reticulata	SOP OV 800 (ČSN EN ISO 7346-2)	Water, extracts
801(1)	Determination of the inhibition of the mobility of Daphnia magna Straus – Acute toxicity test	SOP OV 801 (ČSN EN ISO 6341)	Water, extracts, dialyzates from SPMD
802(1)	Determination of the acute toxicity of substances to green algae Desmodesmus subspicatus	SOP OV 802 (ČSN EN ISO 8692)	Water, extracts, dialyzates from SPMD
803(1)	Determination of the acute toxicity of substances to the seeds of Sinapis alba	SOP OV 803 (Guideline, ME Bulletin, Volume XVII, Part 4/2007)	Water, extracts
804(1)	Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri	SOP OV 805 (ČSN EN ISO 11348-2)	Solid samples, waste, dialyzates from SPMD
805-849	Reserved		

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Radiology

Ordinal number [1)]	Test procedure/method name	Test procedure/method identification	Tested object
850[(6)]	Determination of total volume activity alpha in water by measurement of the mixture of evaporation residue and ZnS(Ag) scintillator and total indicative dose by calculation from measured values	SOP OV 806 (ČSN 75 7611)	Drinking, underground, surface, waste, process and hot water
851[(6)]	Determination of total volume activity beta in water by measurement of annealing residue of evaporation residue by window proportional counter and total volume activity beta – 40K by calculation from measured values	SOP OV 807 (ČSN 75 7612)	Drinking, underground, surface, waste, process and hot water
852[(6)]	Determination of 222Rn volume activity in water by measurement of gamma radiation using a scintillation counter	SOP OV 808 (ČSN 75 7624)	Drinking, underground, surface, waste, process and hot water
853-899	Reserved		

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Microbiology

Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
900(2,5,6,7)	Detection and enumeration of Escherichia coli and coliform bacteria – Membrane filtration method	SOP OV 900 (ČSN EN ISO 9308-1)	Water, bottled water
901(2,5,6,7)	Detection and enumeration of thermotolerant coliform bacteria – Membrane filtration method	SOP OV 903 (ČSN 75 7835)	Water, bottled water
902(2,5,6,7)	Detection and enumeration of intestinal enterococci – Membrane filtration method	SOP OV 906 (ČSN EN ISO 7899-2)	Water, bottled water
903(2,4,5,6,7)	Enumeration of culturable microorganisms – Colony count by inoculation in or on a nutrient agar culture medium at: a) 36 °C, b) 22 °C	SOP OV 908 (ČSN EN ISO 6222)	Water, bottled water
904(2,5,6,7)	Detection and enumeration of Pseudomonas aeruginosa – Membrane filtration method	SOP OV 909 (ČSN EN ISO 16266)	Water, bottled water, purified water(2)
905(2,5,6,7)	Detection and enumeration of Staphylococcus aureus – Membrane filtration method	SOP OV 911 (ČSN EN ISO 6888-1)	Water, bottled water
906(2,5,6,7)	Detection and enumeration of Legionella spp. by culture	SOP OV 913 (ČSN ISO 11731, ČSN ISO 11731-2)	Water, bottled water
907(4)	Detection of Legionella by culture	SOP OV 913.01 (ČSN ISO 11731)	Water, bottled water
908(2,5,6)	Enumeration of sulfite-reducing clostridia – Membrane filtration method	SOP OV 914 (ČSN EN 26461-2)	Water, bottled water
909(2,5,6,7)	Determination of microscopic image	SOP OV 916 (ČSN 75 7712, ČSN 75 7713, ČSN 75 7717)	Drinking water (Bottled, surface, bathing, underground water)(2,5,6)
910(2,5,6,7)	Detection of Salmonella spp. by culture	SOP OV 921 (ČSN ISO 19250)	Water, bottled water
911(2,5,6)	Enumeration of Clostridium perfringens – Membrane filtration method	SOP OV 914.01 (Regulation No. 252/2004 Coll., Annex No.6)	Water
912(2,5,6,7)	Microbiological tests of non-sterile products - by culture	SOP OV 930 (ČL, article A, part 2.6.12, 2.6.13)	Purified water, non-sterile products(2,6,7)
913(2)	Detection of bacterial endotoxins by LAL test	SOP OV 931 (ČL, part 2.6.14)	Purified water
914(6)	Determination of amoebas	SOP OV 951 (AHEM 22/78, HPA SOP W17 CDSC)	Water, purified water, swabs
915-929	Reserved		
930(2,5,6,7)	Enumeration of coliforms by culture	SOP OV 901 (ČSN ISO 4832)	Foodstuffs
931(2,5,6,7)	Enumeration of Escherichia coli by culture	SOP OV 902 (ČSN ISO 16649-1, ČSN ISO 16649-2, ČSN P ISO/TS 16649-3)	Foodstuffs
932(5,6)	Detection and enumeration of Pseudomonas aeruginosa by culture	SOP OV 910 (ČSN EN ISO 16266)	Foodstuffs
933(2,5,6,7)	Enumeration of coagulase-positive staphylococci by culture	SOP OV 912 (ČSN EN ISO 6888-1)	Foodstuffs

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Ordinal number [1]	Test procedure/method name	Test procedure/method identification	Tested object
934(2,5,6.7)	Enumeration of Clostridium perfringens by culture method	SOP OV 915 (ČSN EN ISO 7937)	Foodstuffs
935(2,5,6.7)	Enumeration of total microorganisms by culture	SOP OV 917 (ČSN EN ISO 4833)	Foodstuffs
936(2,5,6.7)	Enumeration of yeasts and moulds by culture	SOP OV 918 (ČSN ISO 21527-1, ČSN ISO 21527-2)	Foodstuffs
937(2,6)	Enumeration of potentially toxinogenic moulds by culture	SOP OV 918.01 (AHEM 1/2003)	Foodstuffs
938(2,5,6.7)	Detection and enumeration of Enterobacteriaceae by culture	SOP OV 919 (ČSN ISO 21528-1, ČSN ISO 21528-2)	Foodstuffs
939(2,5,6.7)	Detection of Salmonella by culture method	SOP OV 920 (ČSN EN ISO 6579)	Foodstuffs
940(2,5,6.7)	Detection and enumeration of Listeria monocytogenes by culture	SOP OV 923 (ČSN EN ISO 11290-1, ČSN EN ISO 11290-2)	Foodstuffs
941(2,6,7)	Detection and enumeration of Campylobacter spp. by culture	SOP OV 924 (ČSN EN ISO 10272-1, ČSN P ISO/TS 10272-2)	Foodstuffs
942(2,5,6.7)	Enumeration of Bacillus cereus by culture	SOP OV 925 (ČSN EN ISO 7932)	Foodstuffs
943(5)	Enumeration of mucific bacteria Leuconostoc by culture	SOP OV 940 (ČSN 560095)	Foodstuffs
944-959			
960(2,5,6,7)	Detection and enumeration of thermotolerant coliform bacteria by culture	SOP OV 904 (AHEM 1/2008)	Solid samples, waste
961(2,5,6,7)	Detection and enumeration of enterococci by culture	SOP OV 907 (AHEM 1/2008)	Solid samples, waste
962(2,5,6,7)	Detection of Salmonella by culture	SOP OV 922 (AHEM 1/2008)	Solid samples, waste
963(4)	Detection of Legionella by culture	SOP OV 913.06 (ČSN ISO 11731)	Solid samples
964(1,6)	Enumeration of geohelmint eggs (acc. to Červa)	SOP OV 1001 (AHEM 1/1986)	Solid samples
965-979	Reserved		
980(2,5,6)	Determination of microbial contamination by culture	SOP OV 927 (ČSN 56 0100)	Areas, surfaces of objects, packaging material, PBU
981(2,5,6,7)	Determination of microbial contamination by culture	SOP OV 928 (AHEM 1/2002, ČSN EN ISO 14698)	Air, pressure gases(2)
982(5,6)	Determination of microbial contamination by culture	SOP OV 929.01 (AHEM 7/1992)	Sterile and unsterile products, areas
983(4)	Detection of Legionella by culture	SOP OV 913.05 (ČSN ISO 11731)	Smears
984(2,5,6,7)	Sterility test by culture	SOP OV 929 (ČL, part 2.6.1)	Sterile products
985(6)	Determination of bactericidal effect of disinfecting agents – qualitative suspension method	SOP OV 948 (AHEM 1/1985, AHEM 7/1992)	Disinfecting agents
986(2,5,6)	Detection and enumeration of aerobic mesophilic bacteria by culture method	SOP OV 983 (ČSN EN ISO 21149)	PBU

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987(2,6)	Detection of Pseudomonas aeruginosa by culture method	SOP OV 984 (ČSN EN ISO 22717)	PBU
988(2,6)	Detection of Staphylococcus aureus by culture method	SOP OV 985 (ČSN EN ISO 22718)	PBU
989(2,6)	Detection of Candida albicans by culture method	SOP OV 986 (ČSN ISO 18415, art. 9.8.)	PBU
990(2,5,6,7)	Examination of biological indicators by culture	SOP OV 933 (AHEM 2/1994)	Biological indicators
991 (2,5,6,7)	Verification of efficiency of sterilizers by chemical tests	SOP OV 933.01 (ČSN EN ISO 11140-1, ČSN EN ISO 11140-3, ČSN EN ISO 11140-4)	Sterilizers
992 (2,5,6,7)	Verification of efficiency of cleaning and disinfecting agents by chemical tests	SOP OV 933.02 (ČSN EN ISO 15883-1, ČSN EN ISO 15883-2, ČSN EN ISO 15883-4)	Cleaning and disinfecting agents
993(4)	Detection of Legionella by culture	SOP OV 913.02 (**)	Respiratory secretions, pulmonary tissue, clinical isolate
994-999	Reserved		

Superscript at the at the test ordinal number identifies the number of the Working Site (1-7) or Contact and Sampling Point (K1-K11) carrying out the test (Working Sites and Contact and Sampling Points are identified on the first page of this document).

[1)] Asterisk at the ordinal number identifies the tests performed outside/also outside the laboratory premises.

* Asterisk at the Test procedure/method name identifies the tests for which the range of determination for the individual working places is specified at the end of this Appendix.

** Asterisks at the Test procedure/method identification identify the tests where implementing regulations are specified at the end of this Appendix.

The working place index at the test object identifies the working place analysing the test object. Test objects without index are analysed by all Working Places indicated at the ordinal number of the test.

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Explanations of used terms

Water	Drinking, hot, surface, underground, bathing, waste and process water
Purified water	Aqua purificata, diluting water for haemodialysis, water for sterilizers
Extracts	Aqueous extracts of wastes and solid samples, extracts of materials (according to Regulation No. 409/2005 Coll. as amended, according to Regulation No. 38/2001 Coll. as amended, according to Regulation No. 84/2001 Coll. as amended)
Waste	Solid and liquid waste, biodegradable waste
Solid samples	Soils, sands, sediments, sludge
Air	Outdoor air, indoor air, working air
Materials	Consumer goods (PBU), materials for contact with water and for water treatment, materials for contact with skin, medical devices (according to Regulation No. 409/2005 Coll. as amended, according to Regulation No. 38/2001 Coll. as amended, according to Regulation No. 84/2001 Coll. as amended, according to Regulation No. 448/2009 Coll. as amended, Commission Regulation (EU) No. 10/2011, AHEM 3/2000)
PBU	Toys, materials for contact with foodstuffs, cosmetic products, products for children up to three years
Non-sterile products	Gauze and dressings, medical preparations, medical material
Sterile products	Sterile water, medical devices
Emissions	Waste gas containing pollutants released in a controlled manner or leaking into atmosphere from pollution sources (the object of the test is an emission sample on a filter, sorbed in an absorption solution and/or in a solid sorbent, according to the nature of the substance)
Passive samplers	Systems working on the basis of passive diffusion of determined substances in a suitable medium (absorbent, absorbent)
Soil air	Gas containing pollutants accumulated in soil pores
Pressure gas	Natural or synthetic mixture of gases distributed by a pipeline system or in pressure cylinders
Building materials	E.g. insulation materials, boards, roofing, plaster, chipboard, piping, building boards, fabrics

List of used abbreviations:

SOP	Standard operating procedure	HP	Hygienic regulations
VZ	Sampling	GR	Government Regulation
OV	Ostrava	MoH	Ministry of Health
ČL	Czech Pharmacopoeia as amended	DAD	Diode Array Detector
AHEM	Acta Hygienica, Epidemiologica et Microbiologica	ECD	Electron Capture Detector
HEM	Hygiene and Epidemiology	MS	Mass spectrometry
TNV	Branch Technical Standard of Water Management	FLUD	Fluorescence Detector
DGT	Diffusion Gradient Technique	RID	Refractometric Detector
SPMD	Semipermeable Membrane Device	MS/MS	Tandem Mass Detector
POCIS	Polar Organic Chemical Integrative Sampler	HRMS	High Resolution Mass Spectrometry
NRL	National Reference Laboratory	FASFC	Federal Agency for the Safety of the Food Chain

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Annex:

Flexibility type: according to MPA 30-04-...	**Ordinal numbers of tests**
Type 1	All testing procedures
Type 2	4, 5, 42, 72, 75-77, 250-253, 400-418, 501, 504, 509-512, 514, 521-523, 533-537, 543-551, 555, 558, 559, 605, 609, 613
Type 3	59-70, 317, 515-520, 529-532, 538-542, 556, 557, 560, 562-564

Type 1 – The laboratory can include updated standardised and/or technically equivalent test methods in the scope of accreditation provided the measuring principle is observed,
Type 2 – includes type 1. In addition, the laboratory can modify the existing test methods (both standardised and in-house procedures) and/or extend the range of tested parameters in given scope of accreditation provided the measuring principle is observed,
Type 3 – includes types 1 and 2. Furthermore, the laboratory can develop other test methods within the accredited tests.

No changes can be made by the laboratory in the tests not included in the annex (fixed scope of accreditation).

Český institut pro akreditaci, o.p.s.
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Sampling

Ordinal number	Sampling procedure name	Sampling procedure identification	Sampled object
1 (1,2,3,5,6,7) (K2-5,K7-11)	Drinking water sampling	SOP VZ OV 001 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3; ČSN ISO 5667-5, ČSN ISO 5667-14; ČSN EN ISO 19458, ČSN ISO 11731)	Drinking and hot water
2 (1,2,3,5,6,7) (K2-5,K7-11)	Bathing water sampling	SOP VZ OV 002 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN ISO 5667-4, ČSN ISO 5667-6, ČSN ISO 5667-14, ČSN EN ISO 19458, ČSN ISO 11731, ČSN 75 7717, MoH Regulation No. 238/2011 Coll.)	Bathing water
3 (1,5,6,7) (K3-5, K7-11)	Underground water sampling - manual or using a pump(1,5,6)	SOP VZ OV 003 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3; ČSN ISO 5667-11, ČSN ISO 5667-14)	Underground water
4 (1,2,5,6,7) (K3-5, K7-11)	Taking samples from water reservoirs, rivers and streams	SOP VZ OV 005 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3; ČSN ISO 5667-4, ČSN ISO 5667-6, ČSN ISO 5667-14; ČSN EN ISO 19458)	Surface water
5 (1,2,3,5,6,7) (K2-5,K7-11)	Waste water sampling – manual and by automatic sampler(1,2,3,5,6)	SOP VZ OV 006 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3; ČSN ISO 5667-10, ČSN ISO 5667-14, ČSN 75 7315)	Waste water
6 (1,2,3,6,7) (K2,3,4, K7-11)	Purified water sampling	SOP VZ OV 008 (MoH Regulation No. 84/2008 Coll.)	Purified water
7(1)	Sampling with semipermeable membrane devices (SPMD), passive samplers POCIS, DGT and ceramic dosimeters	SOP VZ OV 010	Drinking, surface, underground and waste water
8(4)	Water sampling for Legionella	SOP VZ OV 009 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN ISO 5667-14, ČSN ISO 11731, ČSN 060320)	Drinking, hot, surface, bathing, underground and process water
9(4,6)	Sampling of swabs for Legionella	SOP VZ OV 012 (EU Guidelines 2005, ČSN EN ISO 11731)	Smears
10(6, K7-10)	Sampling of process water	SOP VZ OV 011 (ČSN EN ISO 5667-1, ČSN EN ISO 5667-3, ČSN ISO 5667-7, ČSN ISO 5667-14, ČSN EN ISO 19458)	Process water
11-19	Reserved		
20 (2,3,5,6,7) (K3,5,6)	Taking samples of outdoor, indoor air and pressure gases on a solid sorbent (filter, filter and BUF, sorption tube)	SOP VZ OV 109 (Act No. 201/2012 Coll. on air protection, ČSN EN 12341, ČSN EN ISO 16000-7)	Outdoor, indoor air, pressure gases(2)
21 (2,3,7) (K3,6)	Taking samples of outdoor and indoor air in a liquid (sorption solution, sedimentation tank, denuder)	SOP VZ OV 109.01 (Act No. 201/2012 Coll. on air protection)	Outdoor air, indoor air
22 (2,3,5,6,7) (K36)	Taking samples of outdoor and indoor air in canisters and bags	SOP VZ OV 109.02 (Act No. 201/2012 Coll. on air protection)	Outdoor air, indoor air
23 (2,5,6,7) (K3,5,7-10)	Taking samples of outdoor and indoor air on a culture medium	SOP VZ OV 109.03 (MoH Regulation No. 6/2003)	Outdoor air, indoor air

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Ordinal number	Sampling procedure name	Sampling procedure identification	Sampled object
24 (2,3,5,6,7) (K1,3-6,K8,K10)	Taking samples of working air on a solid sorbent (filter, filter and BUF, filter and sorbent, sorption tube)	SOP VZ OV 110 (ČSN EN 482, ČSN EN 689, Government Regulation No.361/2007 Coll.)	Working air
25 (2,3,5,6,7) (K1,3-6,K8,K10)	Taking samples of working air in a liquid (frit absorbers with absorption solution)	SOP VZ OV 110.01 (ČSN EN 482, ČSN EN 689, Government Regulation No.361/2007 Coll.)	Working air
26 (2,3) (K1,K3,K4,K6)	Taking samples of working air in canisters and bags	SOP VZ OV 110.02 (ČSN EN 482, ČSN EN 689, Government Regulation No. 361/2007 Coll.)	Working air
27 (2,3)	Sampling of pressure gases for culture soils	SOP VZ OV 217 (**)	Pressure gases
28-49	Reserved		
50 (1,2,5,6,7) (K3-5,7-11)	Sampling of wastes and solid samples	SOP VZ OV 201 (**)	Waste, solid samples
51 (1,2,5,6,7) (K3-5,7-11)	Sampling of sand from sandboxes and outdoor playgrounds	SOP VZ OV 204 (**)	Sand
52-69	Reserved		
70 (1,2,5,6) (K5,7-10)	Sampling of food for microbiological sampling	SOP VZ OV 200 (ČSN 56 0130-2)	Foodstuffs
71 (1,2,3, 5,6) (K3-5,7-10)	Sampling of areas and object surfaces for the determination of microbial contamination	SOP VZ OV 206 (ČSN ISO 18593)	Areas and surfaces, skin
72 (2,3,5,6,7) (K2-5,7-11)	Sampling by biological and non-biological systems to determine the sterilization efficiency of sterilizers	SOP VZ OV 213 (AHEM 2/1994)	Sterilizers
73 (5,6) (K5,7-10)	Taking of samples and smears for the determination of microbial contamination	SOP VZ OV 214 (AHEM 7/1992)	Areas and surfaces, sterile and unsterile products
74-99	Reserved		

Superscript at the at the sampling ordinal number identifies the number of the Working Site (1-7) or Contact and Sampling Point (K1-K11) carrying out the sampling (Working Sites and Contact and Sampling Points are identified on the first page of this document).

The working place index at the sampled object identifies the working place taking the sample. Sampling objects without index are sampled by all Working Places and Contact and Sampling Points indicated at the ordinal number.

** Asterisks at the Sampling procedure/method identification identify the tests where implementing regulations are specified at the end of this
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Range of determined parameters:

Ord. no.	Test procedure/method name – Range of parameters
$4^{(2,5,6,7)}$	**Working place 2**: Fluorides, chlorides, nitrites, nitrates, phosphates, sulphates, bromates, chlorites, chlorates and nitrite nitrogen, nitrate nitrogen, phosphorus pentoxide (P_2O_5) by calculation of measured values. **Working place 5**: Fluorides, chlorides, nitrites, nitrates, phosphates, sulphates, bromates, chlorites and nitrite nitrogen, nitrate nitrogen, phosphorus pentoxide (P_2O_5) by calculation of measured values. **Working place 6:** Fluorides, chlorides, nitrites, nitrates, phosphates, sulphates and nitrite nitrogen, nitrate nitrogen, phosphorus pentoxide (P_2O_5) by calculation of measured values. **Working place 7:** Fluorides, chlorides, bromides, nitrates, sulphates, bromates, chlorites, chlorates and nitrate nitrogen, phosphorus pentoxide (P_2O_5) by calculation of measured values.
$5^{(2,6,7)}$	**Working place 2 and 6:** Fluorides, chlorides, nitrates, phosphates, sulphates and HF (hydrogen fluoride), HCl (hydrogen chloride, hydrochloric acid), HNO_3 (nitric acid), H_3PO_4 (phosphoric acid), H_2SO_4 (sulphuric acid), SO_3 (sulphur trioxide) by calculation from measured values. **Working place 7:** Fluorides, chlorides, nitrates, sulphates and HF (hydrogen fluoride), HCl (hydrogen chloride, hydrochloric acid), HNO_3 (nitric acid), H_2SO_4 (sulphuric acid), SO_3 (sulphur trioxide) by calculation from measured values.
$36^{(2,6,7)}$	**Working place 2 and 6:** Total, free and easily liberatable cyanides **Working place 7:** Total cyanides
$42^{*(1,2,3,5,6,7)}$ (K2-5, K7-11)	Appearance (turbidity, suspended solids, sediment, floating substances, foam, surface film layer, water-bloom, waste contamination, natural contamination), colour, transparency, odour, taste
$72^{(2,6)}$	**Working place 2:** Chloride, sulphate, nitrate, oxidable substances, heavy metals, ammonium, calcium and magnesium, acid-reacting substances, basic-reacting substances. **Working place 6:** Chloride, sulphate
$75^{(2,6)}$	**Working place 2**: Ammonia (NH_3), formaldehyde (HCHO), nitrogen oxide (NO_x), sulfane (H_2S), ozone (O_3), sulphur dioxide (SO_2), phenol (C_6H_5OH) **Working place 6**: Ammonia (NH_3), formaldehyde (HCHO), nitrogen oxides (NO_x), sulphur dioxide (SO_2),
$76^{(5)}$	Chlorides, sulphates, nitrates, fluorides and nitrate nitrogen, inorganic nitrogen by calculation from measured values.
$77^{(7)}$	Na^+, NH_4^+, K^+, Mg^{2+}, Ca^{2+}
$253^{(2,7)}$	Opalescence, ammonium, sulphide, hyposulphite, primary and aromatic amine, Ba
$302^{(2,5,7)}$	Determination of appearance and consistency, olfactoric determination, and gustatoric determination
$317^{(2)}$	Mineral impurities, coarse impurities, impurities, foreign matter, total foreign matter and impurities, seeds infected by pests, heavily damaged seeds, seeds of henbane, immature rust coloured seeds, dark or black seeds that didn't take on their colour, blue seeds, white seeds or mix coloured seeds, content of impurities in the original sample, content of harmful impurities. Harmful impurities: **Henbane**(Hyoscyamus niger), **Scentless mayweed** (Tripleurospermum inodorum), **Loose Silky-bent**(Apera spica – venti), **Corkspur grass** (Echinichloa crus – galli), **Sheperd's purse** (Capsella bursa – pastoris), **Common Hemp-nettle** (Galeopsis tetrahit), **Red-root amaranth** (Amaranthus retroflexus), **White goosefoot** (Chenopodium album), **Common wild oat** (Avena fatua), **Field Pennz-cress** (Thlaspi arvense), **Potato weed** (Galinsoga parviflora), **Creeping thistle** (Cirsium arvense), **Couch grass** (Elytrigia repens), **Wilow weed** (Persicaria lapathifolia), **Green field-speedwell** (Veronica agrestis), **Wild radish,** (Raphanus raphanistrum), **Goosegrass** (Galium sarine), **Curly Dock** (Rumex crispus), **Broad-leaved Dock** (Rumex obtusifolius), **Earth smoke** (Fumaria officinalis).
$319^{(2,6)}$	**Working place 2:** dry matter (water content), energy value **Working place 6:** dry matter (water content)
$400^{(6)}$	Ag, Ca, Cd, Co, Cr_{total}, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Zn and hardness (Ca+Mg) by calculation from measured values
$401\text{-}403^{(6)}$	Ag, Ca, Cd, Co, Cr_{total}, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Zn
$404\text{-}407^{(6)}$	Al, Sb, As, Ba, Be, Cd, Co, Cr_{total}, Mo, Ni, Pb, Se, Sn, V
$408^{(2,5)}$	**Working place 2:** Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr_{total}, Cu, Fe, I, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Rb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, W, Zn and silicate, SiO_2, P_2O_5 and hardness (Ca+Mg, $CaCO_3$) by calculation from measured values. **Working place 5:** Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr_{total}, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, W, Zn and silicate, SiO_2 and hardness (Ca+Mg) by calculation from measured values

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Ord. no.	Test procedure/method name – Range of parameters
409(2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl ,V, Zn
410(2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, Sr, Ti, Tl ,V, W, Zn and CaO, MgO, KOH, NaOH by calculation from measured values
411(2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, I, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn
412(2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, I, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl ,V, Zn and $P_2 0_5$ by calculation from measured values
413 (2)	Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, V, W, Zn and K_2O, P_2O_5 , SiO_2, silicate and hardness (Ca+Mg, $CaCO_3$) by calculation from measured values
414 (2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, Sr, Ti, Tl, V, Zn and K_2O, P_2O_5, CaO, MgO by calculation from measured values
415 (2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn and CaO, MgO, KOH, NaOH by calculation from measured values
416 (2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn
417 (2)	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cu, Cr_{total}, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn and P_2O_5 by calculation from measured values
418 (2)	Ag, Al, As, Ba, Bi, Br, Ca, Cd, Ce, Co, Cr_{total}, Cs, Cu, Fe, Ga, Ge, Hg, I, K, La, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, S, Sb, Se, Si, Sn, Sr, Rb, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn and Na_2O, MgO, Al_2O_3, SiO_2, P_2O_5, SO_3, K_2O, CaO, TiO_2, MnO, Fe_2O_3 by calculation from measured values.
501(3)	Acesulfam, saccharine, aspartame, caffeine, sorbic acid, benzoic acid, p- hydroxybenzoic acid, 2-phenoxyethanol, 1-fenoxy-2-propanol, methyl-, ethyl- propyl-, butyl- and benzylester of hydroxybenzoic acid
504(3)	Formaldehyde, acetaldehyde, acetone,acroleine, propionaldehyde, crotonaldehyde, butyraldehyde, benzaldehyde,valeraldehyde, m-tolualdehyde, hexaldehyde, methylethyl ketone, methacroleine
505(2,5)	**Working place 2:** AOX, EOX, TX, halogenides **Working place 5:** AOX
509(5)	Toluene- 2,6-diisocyanate, toluene-2,4-diisocyanate, 1,6-hexamethylendiisocyanate, 4,4´-methylenbisphenyldiisocyanate
510-511 (5)	dimethylphthalate, diethyphthalate, di-n-butylphthalate, benzylbutylphthalate, bis(2-etylhexyl)phthalate, di-n-octylphthalate, di-n-nonylphthalate, di-isodecylphthalate, di-isononylphthalate, n-octyl-n-decylphthalate, di-n-decylphthalate
512(6)	Ametryn, atrazin, prometryn, propazin, simazin, terbuthylazin, terbutryn, desethylatrazin
514(3)	EDTA, NTA, PDTA
515(1)	C10-C13
516(1)	Tetrachlorobenzenes, pentachlorobenzene, hexachlorobenzene
517(1)	Mono-, di-, tri-, tetrachlorophenols, pentachlorophenol, 1-naphthol (α-naphthol), 4-chloro-2-methylphenol
518-520(1)	Tetrachlorophenols, pentachlorophenol
521(5)	Butyric acid (c4:0), capronic acid (c6:0), caprylic acid (c8:0), caprynic acid (c10:0), undecanoic acid (c11:0), lauric acid (c12:0), tridecanoic acid (c13:0), myristic acid (c14:0) , myristoleic acid (c14:1), pentadecanoic acid (c15:0), cis-10-pentadecenoic acid (c15:1) , palmitic acid (c16:0), palmitoleic acid (c16:1), heptadecanoic acid (c17:0), cis-10-heptadecenoic acid (c17:1) , stearic acid (c18:0), elaidic acid (c18:1n9t), oleic acid (c18:1n9c), linolelaidic acid (c18:2n6t), linolic acid (c18:2n6c), arachic acid (c20:0), gamma-linolenic acid (c18:3n6), cis-11-eicosanoic acid (c20:1) gondoic, alpha-linolenic acid (c18:3n3), heneicosanoic acid (c21:0), cis-11,14-eicosadienoic acid (c20:2), behenic acid (c22:0), cis-8,11,14-eicosatrienoic acid (c20:3n6), erucic acid (C22:1n9), cis-11,14,17-eicosatrienoic acid (c20:3n3), arachidonic acid (c20:4n6), tricosanoic acid (c23:0), cis-13,16-docosadienoic acid (c22:2), lignoceric acid (c24:0), cis-5,8,11,14,17-eicosapentaenoic acid (c20:5n3), nervonic acid (c24:1), cis-4,7,10,13,16,19-docosahexaenoic acid (c22:6n3).
522(3)	Metylhippuric acids (o, m and p), pyromucic acid, PAH metabolites (1-hydroxypyrene)

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523(3,5,6)	**Working place 3:** methanol, 2-propanol (isopropanol) **Working place 5:** Methanol, acetaldehyde, 1-propanol, ethyl acetate, 2-methyl-1-propanol, 1-butanol, 2-methyl-1-butanol, 3-methyl-1-butanol, furfural, 2-propanol (isopropanol) **Working place 6:** Acetaldehyde, ethylacetate, methanol, n-propanol, i-butanol, i-amyl-alcohol, acetic acid, furalaldehyd, 2-propanol (isopropanol)
529(1,5,6)	**Working place 1:** **Organochlorinated pesticides (OCP):** alphaHCH, betaHCH, gammaHCH (lindane), delta HCH, HCB (hexachlorobenzene), Aldrin, Dieldrin, Endrin, Endrinaldehyde, Endrinketone, Heptachlor, trans-Chlordan, cis-Chlordan, Nonachlor, Metoxychlor, opDDT, ppDDT, opDDD, ppDDD, opDDE, ppDDE, Endosulfane I (alpha) and II (beta), Endosulfansulfate, trans-Heptachloroepoxide, cis-Heptachloroepoxide, Isodrin, Chlorpyrifos, Trifluralin, Tetradifon, Clopyralid, Picloram, Iprodione, Octachlorostyrene, Dichlobenil **Chlorobenzenes** – Tetrachlorobenzenes, pentachlorobenzenes, hexachlorobenzenes **Working place 5:** **Organochlorinated pesticides (OCP):** alphaHCH, betaHCH, gammaHCH (lindane), deltaHCH, HCB (hexachlorobenzene), Aldrin, Dieldrin, Endrin, Endrinaldehyde, Heptachlor, ppDDD, ppDDE, ppDDT, Endosulfane I (alpha) and II (beta), Endosulfansulfate, Heptachloroepoxide, Isodrin, Methoxychlor, Mirex, Oxychlordan, Trifluralin. **Working place 6:** **Organochlorinated pesticides (OCP):** gammaHCH (lindane), HCB (hexachlorobenzene), Aldrin, Dieldrin, Endrin, Heptachlor, Methoxychlor, Heptachloroepoxide, Endosulfan I (alpha) and II (beta), ppDDE, ppDDD, opDDT, ppDDT
530(1,6)	**Working place 1:** **Organochlorinated pesticides (OCP):** alpha HCH, beta HCH, gamma HCH (lindane), delta HCH, HCB, Aldrin, Dieldrin, Endrin, Endrinaldehyde, Endrinketone, Heptachlor, trans-Chlordane, cis-Chlordane, Nonachlor, Methoxychlor, opDDT, ppDDT, opDDD, ppDDD, opDDE, ppDDE, Endosulfane I and II, Endosulfansulfate, trans-Heptachloroepoxide, Isodrin, cis-Heptachloroepoxide, Chlorpyrifos, Trifluralin, Tetradifon **Chlorobenzenes** – Tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene **Working place 6:** **Organochlorinated pesticides (OCP):** gammaHCH (lindane), HCB (hexachlorobenzene), Aldrin, Dieldrin, Endrin, Heptachlor, Methoxychlor, Heptachloroepoxide, Endosulfan I (alpha) and II (beta), ppDDE, ppDDD, opDDT, ppDDT
531-532 (1)	**Organochlorinated pesticides (OCP):** alphaHCH, betaHCH, gammaHCH (lindane), delta HCH, HCB, Aldrin, Dieldrin, Endrin, Endrinaldehyde, Endrinketone, Heptachlor, trans-Chlordan, cis-Chlordan, Nonachlor, Methoxychlor, opDDT, ppDDT, opDDD, ppDDD, opDDE, ppDDE, Endosulfane I and II, Endosulfanesulfate, trans-Heptachloroepoxide, Isodrin, cis-Heptachloroepoxide, Chlorpyrifos, Trifluralin, Tetradifon, HCBD (hexachlorobutadien) **Chlorobenzenes** – Tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene
533(1,3,5,6)	**Working place 1**: 2,3-benzofluorene [Benzo(b)fluorene], 1,2-benzofluorene [Benzo(a)fluorene], Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Benzo(ghi)perylene, Benzo(j)fluoranthene, Benzo(k)fluoranthene, Coronen, Dibenzo(a,e)pyrene, Dibenzo(ah)anthracene, Dibenzo(ah)pyrene, Dibenzo(ai)pyrene, Dibenzo(a,l)pyrene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene, Triphenylene **Working place 3 and 6**: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene **Working place 5:** Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene, Indeno(1,2,3-cd)pyrene
534(1,3,6)	**Working place 1**: 2,3-benzofluorene [Benzo(b)fluorene], 1,2-benzofluorene [Benzo(a)fluorene], Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Benzo(ghi)perylene, Benzo(j)fluoranthene, Benzo(k)fluoranthene, Coronen, Dibenzo(a,e)pyrene, Dibenzo(ah)anthracene, Dibenzo(ah)pyrene, Dibenzo(ai)pyrene, Dibenzo(a,l)pyrene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene, Triphenylene **Working place 3 and 6**: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene

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E535(1,3,6)	E**Working place 1**: 2,3-benzofluorene [Benzo(b)fluorene], 1,2-benzofluorene [Benzo(a)fluorene], Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Benzo(ghi)perylene, Benzo(j)fluoranthene, Benzo(k)fluoranthene, Coronen, Dibenzo(a,e)pyrene, Dibenzo(ah)anthracene, Dibenzo(ah)pyrene, Dibenzo(ai)pyrene, Dibenzo(a,l)pyrene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene, Triphenylene **Working place 3**: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene **Working place 6**: Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene, Indeno(1,2,3-cd)pyrene.
536(1,3)	**Working place 1**: 2,3-benzofluorene [Benzo(b)fluorene], 1,2-benzofluorene [Benzo(a)fluorene], Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Benzo(ghi)perylene, Benzo(j)fluoranthene, Benzo(k)fluoranthene, Coronen, Dibenzo(a,e)pyrene, Dibenzo(ah)anthracene, Dibenzo(ah)pyrene, Dibenzo(ai)pyrene, Dibenzo(a,l)pyrene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene, Triphenylene **Working place 3**: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Phenanthrene, Fluoranthene, Fluorene, Chrysene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene
537(1,5)	**Working place 1**: Naphthalene, acenaphthene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene. **Working place 5:** Naphthalene, Acenaphthylene, Fluorene, Phenanthrene, Anthracene, Karbazol, Fluoranthene, Pyrene, Chrysene, Benzo(a)anthracene, Benzo(k)fluoranthene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene
538(1) 539(1)	**dibenzo-p-dioxines and –furanes (PCDD/F)** 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8,9-OCDD, sum of TCDD, sum of PeCCD, sum of HxCDD, sum of HpCDD 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,4,6,7,8,9-OCDF, sum of TCDF, sum of PCDF, sum of HxCDF, sum of HpCDF **polychlorinated biphenyls (PCB)** trichlorinated, tetrachlorinated, pentachlorinated, hexachlorinated, heptachlorinated, octachlorinated, nonachlorinated a decachlorinated PCB congeners **polybrominated diphenylethers (PBDE)** PBDE15, PBDE17, PBDE28, PBDE47, PBDE49, PBDE66, PBDE71, PBDE77, PBDE99, PBDE100, PBDE138, PBDE153, PBDE154, PBDE156, PBDE183, PBDE206, PBDE207, PBDE209 **Chlorinated naphthalenes (PCN)** di- up to okta- chlorinated naphthalenes
E540(1) 541(1) 542(1)	**dibenzo-p-dioxines and –furanes (PCDD/F)** 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8,9-OCDD, sum of TCDD, sum of PeCCD, sum of HxCDD, sum of HpCDD 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,4,6,7,8,9-OCDF, sum of TCDF, sum of PCDF, sum of HxCDF, sum of HpCDF **polychlorinated biphenyls (PCB)** trichlorinated, tetrachlorinated, pentachlorinated, hexachlorinated, heptachlorinated, octachlorinated, nonachlorinated a decachlorinated PCB congeners **polybrominated diphenylethers (PBDE)** PBDE15, PBDE17, PBDE28, PBDE47, PBDE49, PBDE66, PBDE71, PBDE77, PBDE99, PBDE100, PBDE138, PBDE153, PBDE154, PBDE156, PBDE183, PBDE206, PBDE207, PBDE209
543(1,5,6)	PCB 28, 52, 101, 118, 138, 153, 180 or evaluation with Delor 103 and 106 or Aroclor 1242 or 1260
544(1,5,6)	PCB 28, 52, 101, 118, 138, 153, 180 or evaluation with Delor 103 and 106 or Aroclor 1242 or 1260
545(3)	Sorbitol, mannitol, inulin, fructose, glucose, saccharose
546(3)	E 102-tartrazine, E 104- quinoline yellow, E 110 – yellow SY,E 122- azorubine, E 123- amarant,E 124- ponceau 4R,E 127- eryhthrosine, E 131- patent blue, E132-indigotine, E 133- brillant blue FCF,E 151- black BN, E 129- allure red AC

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547(3,5,6)	**Working place 3**: 1,1-Dichloroethylene (1,1-DCE) , Dichloromethane (DCM), trans-1,2-Dichloroethylene (1,2-DCE trans), 1,1-Dichloroethane (1,1-DCA), 2,2-Dichloropropane (2,2-DCPA), cis-1,2-Dichloroethylene (1,2-DCE cis), trichloromethane (chloroform), bromochloromethane, 1,1,1-Trichloroethane (1,1,1-TCA), 1,1-Dichloropropene (1,1-DCPE), tetrachloromethane, 1,2-Dichloroethane (1,2-DCA), benzene, trichloroethylene (TCE), 1,2-Dichloropropane (1,2-DCPA), dichlorobromomethane, dibromomethane, cis-1,3-Dichloropropene (1,3-DCPE cis), trans-1,3-Dichloropropene (1,3-DCPE trans), toluene, 1,1,2-Trichloroethane (1,1,2-TCA), 1,3-Dichloropropane (1,3-DCPA), Tetrachloroethylene (PCE), dibromochloromethane, 1,2-dibromoethane, 1,1,1,2-Tetrachloroethane (1,1,1,2-TCA), chlorobenzene, ethylbenzene, m,p-xylene, o-xylene, styrene, isopropylbenzene, bromoform, 1,1,2,2-Tetrachlorooethane, 1,2,3-Trichloropropane (1,2,3-TCPA), propylbenzene, 1,3,5-trimethylbenzene (1,3,5-TMB), bromobenzene, 2-chlorotoluene, 4-chlorotoluene, terc-Butylbenzene, 1,2,4-Trimethylbenzene (1,2,4-TMB), 1,2,3-Trimethylbenzene (1,2,3-TMB), sek-Butylbenzene, p-Isopropyltoluene (p-cymen), 1,3-Dichlorobenzene (m-Dichlorobenzene), 1,4-Dichlorobenzene (p-Dichlorobenzene), 1,2-Dichlorobenzene (o–Dichlorobenzene), butylbenzene, 1,2-dibromo-3-chloropropane, 1,2,4-Trichloro benzene (1,2,4-TCB), Hexachlorobutadiene, naphthalene, 1,2,3 -Trichlorobenzene (1,2,3-TCB), vinylchlorid (chloroethylene), epichlorohydrin, aniline, nitrobenzene, hexachloroethane and the identification of volatile and semi-volatile organic compounds **Working place 5:** 1,1-Dichloroethylene (1,1-DCE) , Dichloromethane (DCM), trans-1,2-Dichloroethylene (1,2-DCE trans), 1,1-Dichloroethane (1,1-DCA), 2,2-Dichloropropane (2,2-DCPA), cis-1,2-Dichloroethylene (1,2-DCE cis), trichloromethane (chloroform), bromochloromethane, 1,1,1-Trichloroethane (1,1,1-TCA), 1,1-Dichloropropene (1,1-DCPE), tetrachloromethane, 1,2-Dichloroethane (1,2-DCA), benzene, trichloroethylene (TCE), 1,2-Dichloropropane (1,2-DCPA), dichlorobromomethane, dibromomethane, cis-1,3-Dichloropropene (1,3-DCPE cis), trans-1,3-Dichloropropene (1,3-DCPE trans), toluene, 1,1,2-Trichloroethane (1,1,2-TCA), 1,3-Dichloropropane (1,3-DCPA), Tetrachloroethylene (PCE), dibromochloromethane, 1,2-dibromoethane, 1,1,1,2-Tetrachloroethane (1,1,1,2-TCA), chlorobenzene, ethylbenzene, m,p-xylene, o-xylene, styrene, isopropylbenzene, bromoform, 1,1,2,2-Tetrachlorooethane, 1,2,3-Trichloropropane (1,2,3-TCPA), propylbenzene, 1,3,5-trimethylbenzene (1,3,5-TMB), bromobenzene, 2-chlorotoluene, 4-chlorotoluene, terc-Butylbenzene, 1,2,4-Trimethylbenzene (1,2,4-TMB), 1,2,3-Trimethylbenzene (1,2,3-TMB), sek-Butylbenzene, p-Isopropyltoluene (p-cymen), 1,3-Dichlorobenzene (m-Dichlorobenzene), 1,4-Dichlorobenzene (p-Dichlorobenzene), 1,2-Dichlorobenzene (o–Dichlorobenzene), butylbenzene, 1,2-dibromo-3-chloropropane, 1,2,4-Trichloro benzene (1,2,4-TCB), Hexachlorobutadiene, naphthalene, 1,2,3 -Trichlorobenzene (1,2,3-TCB), vinylchlorid (chloroethylene) **Working place 6:** Dichloromethane (DCM), trans 1,2-Dichloroethylene (1,2-DCE trans), cis 1,2-Dichloroethylene (1,2-DCE cis), trichloromethane (chloroform), tetrachloromethane, benzene, 1,2-Dichloroethane (1,2-DCA), trichloroethylene (TCE), bromodichloromethane, toluene, Tetrachloroethylene (PCE), dibromochloromethane, chlorobenzene, etylbenzene, m-xylene, styrene, bromoform
548(1)	1,1-Dichloroethylene (1,1-DCE), Dichloromethane (DCM), trans-1,2-Dichloroethylene (1,2-DCE trans), cis-1,2-Dichloroethylene (1,2-DCE cis), chloroform, tetrachloromethane, 1,1-Dichloroethane (1,2-DCA), trichloroethylene (TCE), tetrachloroethylene (PCE), benzene, toluene, m,p, o-xylene
549(3,6)	**Working place 3:** 1,1-Dichloroethylene (1,1-DCE) , Dichloromethane (DCM), trans-1,2-Dichloroethylene (1,2-DCE trans), 1,2-Dichloroethane (1,1-DCA), 2,2-Dichloropropane (2,2-DCPA), cis 1,2-Dichloroethylene (1,2-DCE cis), trichloromethane (chloroform), bromochloromethane, 1,1,1-Trichloroethane (1,1,1-TCA), 1,1-Dichloropropene (1,1-DCPE), tetrachloromethane, 1,2-Dichloroethane (1,2-DCA), benzene, trichloroethylene (TCE), 1,2-Dichloropropane (1,2-DCPA), dichlorobromomethane, dibromomethane, cis-1,3-Dichloropropene (1,3-DCPE cis), toluene, trans-1,3-Dichloropropene (1,3-DCPE trans), 1,1,2-Trichloroethane (1,1,2-TCA), 1,3-Dichloropropane (1,3-DCPA), 2-brom-1-chloropropane Tetrachloroethylene (PCE), dibromochloromethane, 1,2-dibromomethane, 1,1,1,2-Tetrachloroethane (1,1,1,2-TCA), chlorobenzene, ethylbenzene, m,p-xylene, o-xylene, styrene, isopropylbenzene, bromoform, 1,1,1,2-Tetrachlorooethane, 2,2-TCA 1,2,3-Trichloropropane (1,2,3-TCPA), propylbenzene, 1,3,5-trimethylbenzene (1,3,5-TMB), bromobenzene, 2-chlorotoluene, 4-chlorotoluene, terc-Butylbenzene, 1,2,4-Trimethylbenzene (1,2,4-TMB), 1,2,3-Trimethylbenzene (1,2,3-TMB), sek-Butylbenzene, p-Isopropyltoluene (p-cymen), 1,3-Dichlorobenzene (m-Dichlorobenzene), 1,4-Dichlorobenzene (p-Dichlorobenzene), butylbenzene, 1,2-Dichlorobenzene (o–Dichlorobenzene), 1,2-dibromo-3-chloropropane, 1,2,4-Trichloro benzene (1,2,4-TCB), Hexachlorobutadiene, naphthalene, 1,2,3 -Trichlorobenzene (1,2,3-TCB), vinylchlorid (chloroethylene), epichlorohydrin **Working place 6:** benzene, ethylbenzene, toluene, trichloroethylene(TCE), tetrachloroethylene (PCE), xylene (all isomers)
550(3,6)	**Working place 3:** Freon 12 (F12), chloromethane, freon 113 (F113), chloroethylene (vinylchlorid), methylbromide, ethylbromide, freon 114 (F114),1,1-dichloroethylene (1,1-DCE), dichloromethane (DCM), freon 11 (F11), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethylene (1,2-DCE cis), trichloromethane (chloroform),1,2-dichloroethane (1,2-DCA), 1,1,1-trichloroethane (1,1,1-TCA), benzene, tetrachloromethane, 1,2-dichloropropane (1,2-DCPA), trichloroethylene (TCE), cis-1,3-dichloropropene (1,3-DCPE cis), trans-1,3-dichloropropene (1,3-DCPE trans), 1,1,2-trichloroethane (1,1,2-TCA), toluene, 1,2-dibromoethane, tetrachloroethylene (PCE), chlorobenzene, ethylbenzene, m,p-xylene, o-xylene, styrene, 1,1,2,2,-tetrachloroethane (1,1,2,2-TCA), 1,3,5-trimethylbenzene (1,3,5-TMB), 1,2,4-trimethylbenzene (1,2,4-TMB), m-dichlorobenzene (m-DCB), p-dichlorobenzene (p-DCB), o-dichlorobenzene (o-DCB), 1,2,4-trichlorobenzene (1,2,4-TCB), hexachlorobutadien, diacetyl and the identification of volatile and semi-volatile organic compounds **Working place 6:** benzene, trichloroethylene (TCE), toluene, tetrachloroethylene (PCE), ethylbenzene, m,p-xylene, styrene, acetophenone.

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551(3,5,6)	**Working place 3:** 1,1,1-trichloroethane, 1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methoxy-2-propanol, 2-methoxymethylethylacetate (1-mehoxy-2-propyl-acetate), 2-butanol, 2-butoxyethanol, 2-butoxyethyl-acetate, 2-ethoxyethanol, 2-ethoxyethyl-acetate, 2-methoxyethanol, 2-methoxyethyl-acetate, 4-hydroxy-4-methyl-2-pentanone, acetone, aniline, benzene, benzines, butyl-acrylate, cyclohexanone, dichloromethane, ethanol, ethyl-acetate, ethyl-acrylate, ethylbenzene, ethylenoxide, phenol, furfurylalcohol, 2-methyl-1-propanol (isobutanol), isobutyl-acetate, isopropanol, isopropylbenzene, cresols, acetic acid, methanol, methyl-acetate, methyl(ethyl)ketone (2-butanone), methyl-methacrylate, methylpentane, N,N-diethylaniline, n-butanol (1-butanol), n-butyl-acetate, N-ethylaniline, nitrobenzene, n-propanol, propyl-acetate, propylbenzene, styrene, tetrachloroethane, tetrachloromethane, toluene, trichloroethylene, trichloromethane (chloroform), xylenes (m,p-xylene, o-xylene), cyclohexane, cyclohexanol, epichlorohydrin, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, amyl-acetate, isoamyl-acetate, chloroethylene (vinylchlorid), 1,1,1,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, 1,2-dichlorobenzene, trans-1,2- dichloroethylene, cis-1,2- dichloroethylene, 1,3-dichlorobenzene, cis-1,3-dichloropropene, 1,4-dichlorobenzene, chlorobenzene, solvent naphtha, benzylalcohol, 1-butoxy-2-propanol, 2-(2-butoxyethoxy)ethanol, 1,2-ethandiol, 4-methyl-2-pentanone (isobutyl(methyl)ketone) , methyl- methoxyacetate, indene, pentane **Working place 5:** benzene, ethylbenzene, cumene (isopropylbenzene), propylbenzene, styrene, toluene, xylenes (o, m,p,), 1,2,3-trimethylbenzene, pseudocumene (1,2,4-trimethylbenzene), mesitylene (1,3,5-trimethylbenzene), p-cymene, benzine, hexane, tetrachloroethylene, trichloroethene, halotane (narcotane), isoflurane, sevorane, ethyl-acetate, n-butyl-acetate, 2-methoxymethylethylacetate (1-methoxy-2-propyl-acetate), ethylenglycolmonoethyletheracetate (2-ethoxyethyl-acetate), ethanol, n-propanol, isopropanol, isobutanol, n-butanol, 2-butanone, n-hexanol, cyclohexanone, 1-methoxy-2-propanol, ethylenglycolmonobutylether (2-butoxyethanol), ethylenglycolmonoethylether (2-ethoxyethanol), ethylenglycolmonomethylether (2-methoxyethanol), acetone, 4-methyl-2-pentanone (isobutylmethylketone) **Working place 6:** n-hexane, i-heptane, acetone, ethyl acetate, 2-butanone, i-butyl acetate, toluene, n-butyl acetate, i-butanol, ethylbenzene, xylenes (3 isomers: o-, m-, p-), n-butanol, i-propylbenzene, n-propylbenzene, methoxypropylacetate, 1,3,5-trimetylbenzene, styrene, cyclohexanone, diacetonalcohol, 2-butoxyethanol, butoxyethylacetate, ethanol, cyclohexane, benzene, pentane, hexane, heptane, octane,1,2,4-Trimethylbenzene, nonane, vinyltoluene (methylstyrene), decane, undecane, dodecane, tridecane, tetradecane, pentadecane, hexadecane, benzines (defined as the sum of C5 to C16 according to the proportion of individual fractions)
555(3)	Vitamin C, vitamins B1, B2, B3, B5 and B6, vitamins A, E
556(1)	**Pesticides:** 2,4,5-T (2,4,5-trichlorophenoxyacetic acid), 2,4-DP(Dichlorprop), 2,4-D (2,4-dichlorophenoxyacetic acid), 2,6-dichlorobenzamide, 2-amino-N-(isopropyl)benzamide (Antranilic acid isopropylamide), 2-chloro-2,6-diethylacetanilide, 3,4-dichloranilin (DCA), 3,4-dichlorophenyl urea (DCPU), 3-hydroxycarbofuran, 3-chlor-4-methylanilin, Acetochlor, Acetochlor ESA, Acetochlor OA, Alachlor, Alachlor OA, Alachlor ESA, Aminopyralid, Atraton, Atrazine, Atrazine-desethyl, Atrazine-desethyl-desisopropyl (diaminoatrazine), Atrazine-desisopropyl, Atrazine-hydroxy, Azoxystrobin, Bentazone, Bentazone methyl, Bromacil, Bromoxynil, Carbendazim, Carbofuran, Clomazone, Clopyralid, Cyanazin, Cyproconazole, Desmetryn, Diazinon, Dicamba, Dichlobenil, Dichlormid, Dimethachlor, Dimethoat, Dimethomorph, Diuron, Diuron desmethyl (1-(3,4-dichlorophenyl)-3-methylurea, DCPMU), Epoxiconazole, Ethofumesate, Fenarimol, Fenhexamid, Fipronil, Florasulam, Fluazifop-P, Fluazifop-p-butyl, Flusilazole, Foramsulfuron, Hexazinon, Chloranthraniliprol, Chlorbromuron, Chloridazon, Chloridazon desphenyl, Chlorotoluron, Chlorsulfuron, Chlorotoluron desmethyl (1-(3-chloro-4-isopropylphenyl)-3-methylurea), Imazamethabenz methyl, Imazamox, Imazethapyr, Imidacloprid, Iprodione, Isoproturon, Isoproturon monodesmethyl (1-(4-isopropylphenyl)-3-methylurea), Isoproturon desmethyl (1-(4-isopropylphenyl)urea), Kresoxim-methyl, Lenacil, Linuron, MCPA, MCPB, MCPP (Mecoprop), Metalaxyl, Metamitron, Metazachlor, Metazachlor ESA, Metazachlor OA, Metconazole, Methabenzthiazuron, Methamidophos, Methidathion, Methoxyfenozide, Metobromuron, Metolachlor, Metolachlor ESA, Metolachlor OA, Metoxuron, Metribuzin, Metribuzin-desamino, Metribuzin-desamino diketo, Metribuzin-diketo, Metsulfuron methyl, Monolinuron, Napropamide, Nicosulfuron, Phorate, Phosalone, Phosphamidon, Picloram, Pirimicarb, p-isopropylanilin (4-isopropylanilin), Prometryn, Propachlor, Propachlor ESA, Propachlor OA, Propiconazole, Propoxycarbazone sodium, Propyzamide (Pronamide), Pyrimethanil, Pyridate, Rimsulfuron, Simazin, Simazin-2-hydroxy, Sulfosulfuron, Tebuconazole, Terbuthylazine, Terbuthylazine-desethyl, Terbuthylazin-desethyl-2-hydroxy, Terbuthylazine-hydroxy, Terbutryn, Thiamethoxam, Thifensulfuron-methyl, Thiophanate-methyl, Triadimefon, Triadimenol, Tri-allate, Triasulfuron, Tribenuron-methyl, Triforine, Triticonazole, sum of pesticides by calculation from measured values **Pharmaceuticals:** Sulfometoxazol, Sulfamethazin, Trimetoprim, Diaverdin, Diclofenac, Carbamazepin, Sulfapyridine, Sulfamethoxypyridazine, Sulfachloropyridazine, sum of pharmaceuticals by calculation from measured values **PFOC** – PFOA (perfluoro-n-octanoic acid), PFNA (perfluoro-n-nonanoic acid), PFOS (sodium perfluoro-1-octanesulfonate), PFHxS (Perfluoro-hexansulfonate), FOSA (Fluoroalkyl Sulfonamid), N-MeFOSA (N-methylperfluoro-1-octanesulfonamide), sum of PFOC by calculation from measured values
557(1)	PFOA (perfluoro-n-octanoic acid), PFNA (perfluoro-n-nonanoic acid), PFOS (sodium perfluoro-1-octanesulfonate), PFHxS (Perfluoro-hexansulfonate), FOSA (Fluoroalkyl Sulfonamid), N-MeFOSA (N-methylperfluoro-1-octanesulfonamide), sum of PFOC by calculation from measured values

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558(5)	Chlorotoluron, isoproturon, metobromuron, linuron, phenmedipham, desmedipham, metamitron, atrazin, desetylatrazin, sebutylazin, terbutylazin,cyanazin, metazachlor, metolachlor, acetochlor, dimetachlor, dicamba, tebuconazol, flusilazol, prochloraz, propiconazole, carbendazim, ethofumesate, MCPA, 2,4-D (2,4-dichlorophenoxyacetic acid), thiram, captan, fenpropimorph, trifluralin, chloridazon (pyrazon), chlorpyrifos, 2-hydroxyatrazin (atrazin-hydroxy), alachlor, atrazin-desisopropyl, azoxystrobin, bentazon, carboxin, clomazone, cyproconazole, dichlormid, dichlorprop (2,4-DP), dimethenanid, epoxiconazol, fenpropidin, fluroxypyr, fluzifop-butyl, haloxyfop-metyl, kresoxim-metyl, lenacil, MCPB, MCPP, mefenpyr-dietyl, metconazole, metoxuron, pendimetalin, quinmerac, quinoxyfen, simazine, spiroxamin, thiophanat-metyl
559(1)	Dimethipin, SWEP (methyl-(3,4-dichlorophenyl)carbamate)
562(1)	**Alkylphenols** – 4-t-octylphenol (identical with technical 4-octylphenol) , 4-n-octylphenol, 4-n-nonylphenol, 4-nonylphenol (technical mixture), nonylphenol (identical with 4-nonylphenol), 4-nonylphenolmonoethoxylate, 4-nonylphenoldiethoxylate **Phthalates** - di-n-butylphthalate, butylbenzylphthalate, bis(2-etylhexyl)phthalate (BEHP), di-n-oktylphthalate, diisononylphthalate, diisodecylphthalate, n-octyl-n-decylphthalate, di-decylphthalate
563(1)	4-t-octylphenol (identical with technical 4-octylphenol) , 4-n-octylphenol, 4-n-nonylphenol, 4-nonylphenol (technical mixture), nonylphenol (identical with 4-nonylphenol), 4-nonylphenolmonoethoxylate, 4-nonylphenoldiethoxylate
564(1)	bis(2-ethylhexyl)phthalate (BEHP), di-n-butylphthalate, di-n-octylphthalate
603(2)	Mineral fibres are natural or man-made fibres meeting the requirements for respirable fibres (length > 5 µm, diameter < 3µm, length/diameter ratio at least 3 : 1).
604(2)	Mineral fibres are natural or man-made fibres meeting the requirements for respirable fibres (length > 5 µm, diameter < 3µm, length/diameter ratio at least 3 : 1).
605* (2,3,5,6,7) (K1,3-6)	Acetone (C_3H_6O), ammonia (NH_3), chlorine (Cl_2), xylene, nitrogen dioxide (NO_2), hydrogen sulfide (H_2S), mercaptans, hydrogen phosphide (phosphine PH_3), benzene, sulphur dioxide (SO_2), formaldehyde (HCHO), hydrogen cyanide (HCN), carbon dioxide (CO_2), styrene, ozone (O3), mercury vapours, carbon oxide (CO), toluene, carbon disulphide (CS_2), vinylchloride, hydrogen chloride (HCl), nitric acid (HNO_3), oxygen (O_2), phenol, sulphuric acid (H_2SO_4), nitric acid (HNO_3), acetic acid (CH_3COOH), nitrogen gases (NO_x), hydrogen sulfide (H_2S), ethylene oxide, acetaldehyde, methylmethacrylate, benzines,dichloromethane, trichloroethylene, tetrachloroethylene, isopropropylalcohol, ethylalcohol. GASTEC and Drager detection tubes.
609* (2,3,5,6,7) (K1,3-6)	Sulphur dioxide (SO_2), sulfane (H_2S), hydrogen phosphide (phosphine PH_3), hydrogen cyanide (HCN), chlorine (Cl_2), carbon monoxide (CO), nitrogen monoxide (NO), nitrogen dioxide (NO_2) , flammability, oxygen (O_2), ammoniac (NH_3), TOL (benzene, toluene, ethylbenzene, xylenes and styrene)
714* (2,3,6,7) (K1,3-5,10)	resulting temperature of spherical thermometer, air temperature, relative air humidity, air flow velocity, operating temperature

List of implementing regulations:

Ord. no.	Test procedure/method identification
4, 5	ČSN EN ISO 15061, ČSN EN ISO 10304-1, ČSN EN ISO 10304-4 Manual NIOSH 1994, Method 7903 – Inorganic Acids Dionex Application Notes – Application Note 2 – Determination of Nitrate and Sulfate Collected on Air Filters U.S.EPA Method 300.1 – The Determination of Inorganic Anions in Drinking Water by IC
30	Ulrich Pinkernell, Bernd Nowack, Hervé Gallard, Urs von Gunten. Methods for the photometric determination of reactive bromide and chlorine species with ABTS. Wat. Res. Vol. 34, No. 18, pp. 4343-4350. 2000.
18	Water Management 12/1977 – Series B, 319-320
75	HP MoH, Volume No.52/81, Guideline No. 60, Annex No.5 Vladimír Križan, Rudolf Kemka, Eugen Hlucháň et al: Air Analysis, SNTL 1981 Marta Horáková, Peter Lischke, Alexander Grünwald: Chemical and Physical Methods for Water Analysis, SNTL Prague 1986 Stern,A.C.: Air Pollution,Vol.II Analysis,Monitoring and Surveying, Academic Press, New York, London 1968
301	ČSN 56 0146, ČSN 56 0140, J. Davídek at al: Laboratory Guide to Food Analysis, Chapter XIII
302	R. Neuman, P. Molnár, S. Arnold – Sensory Analysis of Food, Alfa, Bratislava 1990, ČSN ISO 5492 (56 0030) - Sensory analysis — Vocabulary, ČSN 77 0226 –Effect of packaging products on organoleptic properties of food, ČSN EN 1230- 1, 2 (50 0483) – Paper and board intended to come into contact with foodstuffs - Sensory analysis, ČSN ISO 13 302 Methods for assessing modifications to the flavour of foodstuffs due to packaging, AHEM 24/1986 , AHEM 13/1982 ČSN ISO 8589, ČSN ISO 3972, ČSN ISO 5496, Collection of Documents "Sensory Analysis of Food", ČSN 58 0120

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Ord. no.	Test procedure/method identification
303	ČSN 56 0116-7, ČSN 56 0130-5A, ČSN 56 0146-5, ČSN 56 0160-7D, ČSN 56 0186-11, ČSN 56 0240 -8, ČSN 56 0246-18 , ČSN 56 0512-15, ČSN 58 1361 art.15, Commission Regulation (EEC) No. 2676/90, determining Community methods for the analysis of wines. Article 5. – Reducing sugars.
305	ČSN 46 1011-18,ČSN ISO 1871, ČSN 56 0116-9, ČSN 56 0186-12, ČSN 56 0187-29, ČSN EN 12135, ČSN 56 0512-12 , ČSN EN ISO 3188, ČSN 57 0105-5, ČSN 57 0111-5, ČSN 57 0153, ČSN EN ISO 8968-1,ČSN ISO 937,ČSN 58 0703-7, J.Davídek et al.: Laboratory Guide to Food Analysis, Chapter III
306	ČSN 56 0186-5 , ČSN 56 0210-4 , Commission Regulation (EEC) No. 2676/90, determining Community methods for the analysis of wines. Article 3. – Alcohol content, Czech Ministry of Agriculture: Official Alcohol Metering Tables - Part 1, Prague 1995.
307	ČSN 56 0116-5, ČSN 56 0232 art.59, ČSN 56 0290-5, ČSN 57 0107-12, ČSN 57 0167, ČSN ISO 1841-1, ČSN 58 0111 art. 13, ČSN 58 0170-7, ČSN 58 0703-4, ČSN 58 1361 art.18, ČSN 58 8769, ČSN 58 8770
308	ČSN 58 0111 art. 16,AOAC Official Methods of Analysis (16 Edition, 1995), Chapter 11
309	M. Horáková, P. Lischke, A. Grünwald – Chemical and Physical Methods for Water Analysis, SNTL, 1989
310	ČSN 56 0116-10, ČSN 56 0130-7, ČSN 56 0176-11, ČSN 56 0240-5, ČSN 56 0246-13, ČSN ISO 750, ČSN EN 12147, ČSN 56 0512-9, ČSN 57 0105-8, ČSN 57 0107 art. 21, ČSN 57 0190 art.15, ČSN 58 0170-6, ČSN 58 0703-10, ČSN 581361-16, ČSN ISO 660, Commission Regulation (EEC) No. 2676/90, determining Community methods for the analysis of wines. Article 13.
313	ČSN ISO 11289, ČSN 56 0160-4, ČSN 56 0186 -7, ČSN 56 0210 art. 26, ČSN EN 1132, ČSN ISO 1842, ČSN 57 0111-12, ČSN 57 0166, ČSN 58 0111 art. 9, ČSN 58 0703-9.
314	ČSN 56 0116-4, ČSN 56 0130-4,ČSN 56 0232 art.49,50, ČSN 56 0246 –12, ČSN 56 0512-19, ČSN ISO 930, ČSN ISO 1577, ČSN 58 1361 art.14
315	ČSN 56 0115 art. 29, ČSN 56 0116-4, ČSN 56 0130-4, ČSN 56 0146-6, ČSN 56 0160-6, ČSN 56 0232 art. 49,50, ČSN 560240-9, ČSN 56 0246-11, ČSN EN 1135, ČSN 56 0512-8, ČSN 57 0107 art. 18, ČSN 57 0185 art.13, ČSN 58 0113 art.39, ČSN ISO 928, ČSN ISO 1575, ČSN ISO 7514, ČSN 58 0703-11, ČSN 58 1361 art.14, ČSN 58 8760, Commission Regulation (EEC) No. 2676/90, determining Community methods for the analysis of wines. Art. 9 – Ash.
318	ČSN 56 0116 art. 42, ČSN 56 0130-5B, ČSN 56 0160-17 B, ČSN 56 0161-2, ČSN 56 0210 art. 49, ČSN 56 0240-3, ČSN 56 0246–10, ČSN ISO 2173, ČSN EN 12143, ČSN 57 0190 art. 11, ČSN 56 0146 Table B.
319	ČSN ISO 712 , ČSN ISO 6540, ČSN EN ISO 665, ČSN 56 0115 art.28, ČSN 56 0116-3, ČSN 56 0130-3, ČSN 56 0140 art. 22, ČSN 56 0146-3, ČSN 56 0160-3, ČSN 56 0232 art.45-47, ČSN 56 0246-10, ČSN 56 0290-4, ČSN 56 0512-7, ČSN 56 0520-6, ČSN EN ISO 1666, ČSN 56 9431 art.20, ČSN 57 0104-3, ČSN 57 0105-3, ČSN 57 0105-13, ČSN ISO 6731, ČSN EN ISO 5534, ČSN EN ISO 3727-1, ČSN 57 6021, ČSN 58 0111 art.10, ČSN ISO 1573, ČSN ISO 7513, ČSN 58 0703-5, ČSN ISO 6673, ČSN ISO 11294, ČSN 58 8758, ČSN 58 1361 art.13.
322	ČSN ISO 7302, ČSN ISO 659, ČSN 56 0116-6, ČSN 56 0130-6, ČSN 56 0146-4, ČSN 56 0232 art.52, ČSN 56 0290-6, ČSN 56 0512-18, ČSN 57 0104-4, ČSN EN ISO 7328, ČSN 57 0107 art. 15, ČSN 57 0146 art. 20, ČSN ISO 1443, ČSN ISO 1211, ČSN EN ISO 1737, ČSN EN ISO 8381, ČSN ISO 7208, ČSN ISO 8262-1, ČSN ISO 8262-2, ČSN ISO 8262-3, ČSN EN ISO 2450, ČSN ISO 1736, ČSN EN ISO 1735, ČSN EN ISO 1854, ČSN EN ISO 17189, ČSN 57 2301, ČSN ISO 1444, ČSN 58 0110 art.43, ČSN 58 0120 art.23, ČSN 58 0120 art.24, ČSN 58 0170-5, ČSN 58 0703-6, ČSN 58 8786
323	Method AOAC 985.29 Total Dietary Fiber in Foods – Enzymatic-Gravimetric Method
515	Water quality – Determination of short-chain polychlorinated alkanes (SCCPs) in water – Method using gas chromatography-mass spectrometry (GC-MS) and negative-ion chemical ionization (NCI)
516	Polycyclic aromatic hydrocarbons, polychlorinated biphenyls and organochlorine pesticides in urban air of Konya, Turkey. Senar Ozcan, Mehmet Emin Aydin: Atmospheric Research 93, 2009, 715–722.
522	NIOSH 8301 Journal of Analytical Toxicology, Vol.27, Jan/Febr 2003: An Improved HPLC Analysis of the Metabolite Furoic Acid in the Urine of Workers Occupationally Exposed to Furfural
530	Microwave-assisted extraction followed by gas chromatography–mass spectrometry for the chromatography of endocrine disrupting chemicals in river sediments. R. Liu, J.L. Zhou, A. Wilding: Journal of Chromatography A, 1038 (2004) 19–26.
531,564	Analytical chromatography for the identification of estrogenic contaminants in bile. R. Gibson, C.R: Tyler, E.M. Hill, Journal of Chromatography A 1066 (2005), 33-40. ČSN EN ISO 18856
532	Analytical chromatography for the identification of estrogenic contaminants in bile. R. Gibson, C.R: Tyler, E.M. Hill, Journal of Chromatography A 1066 (2005), 33-40.
546	A.G. Huesgen, R. Schuster . Sensitive analysis of synthetic colors using HPLC and DAD at 190-950nm. HP Application Note 5964-3559E, 1995)
548	ČSN EN ISO 10 301 S. Bopp, M. Mclachlan, K..Schirmer: Passive Sampler for Combined Chemical and Toxicological Long-Term Monitoring of Groundwater: The pramic Toximeter. Environ. Sci. Technol. 2007, 41, 6868-6876.
555	ČSN EN 12822, ČSN EN 12823-1, ČSN EN 14130, ČSN EN 14122, ČSN EN 14152, ČSN 14663

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Ord. no.	Test procedure/method identification
556, 557	B.Kmellár et al./J.Chromatogr. A 1215 (2008) 37-50, I.Ferrer, E.M.Thurman/J.Chromatogr.A 1175 (2007) 24-37 G.-F.Pang et al./J.Chromatogr.A 1125 (2006) 1-30 Chunang Gu et al, Simaltaneus Analysis of 250 Pesticides Residues in Plants by LC/MS/MS using 500 Selected Reaction Monitoring (SRM) Transitions Thermo Scientific Materials
558	Cliquid Software four Routine Analysis Version 3.0 PN 1037538
559	EPA 632, EPA 525.2 Pesticide residue analysis in foodstuffs applying capillary gas chromatography with mass spectrometric detection. State-of-the-art use of modified DFG-multimethod S19 and automated data evaluation. Hans-Jürgen Stan, Journal of Chromatography A, 892 (2000) 347–377)
562	ČSN EN ISO 18856, ČSN EN ISO 18857-1, ČSN EN ISO 18857-2
602	HP MoH, Volume No. 52/81
606	Manual for the monitor Sharp by Thermo Fisher Scientific, manual for the monitors Grimm by Grimm, manual for the monitor DustTrak DRX by TSI, manual for the monitoring systems Microdust Pro, Microdust 880 IS and SW WinDust by Casella
607	Manual for the monitor Teom by Rupprecht Patashnick
608	Manual for the monitoring system FAG by Horiba
609	Manuals for the instruments Crowcon, QRAE Plus, Multi Rae PLUS
613	Manual for the analyzer APHA 350E, APHA 360 by Horiba
614	ČSN EN 14626, Severin, Testo 445, Ananas CD 98
615	CO_2 and CH_4 EX-TEC HS680 analyser application sheer, Ecoprobe 5, MP 35/A1 Metanscreening – Measurement of the concentration of mine gases in soil air
616	CH_4 Inspectra Laser analyzer application sheet
700	**Measurement:** ČSN EN ISO 9612, ČSN ISO 1999 and MZ-HH CR Guideline No. HEM-300-26.4.01-16344 of 26.04.2001, ČSN ISO 1996-1, ČSN ISO 1996-2 and MZ-HH CR Guideline No. HEM-300-11.12.01-34065 of 11.12.2001, MZ-HH CR Guideline No. 62545/2010-OVZ-32.3-1.11.2010 for the assessment of noise in protected outdoor areas of buildings, MZ-HH CR Guideline for the measurement and assessment of noise from air traffic OVZ-32.0-19.02.2007/6306 **Calculation:** ČSN ISO 9613-1, ČSN ISO 9613-2
703	ČSN EN ISO 3744, ČSN EN ISO 3746, ČSN EN ISO 3747, ČSN EN 1265+A1, ČSN EN ISO 1680, ČSN EN ISO 2151, ČSN ISO 6393, ČSN ISO 6395+Adm., ČSN ISO 7960, ČSN ISO 8297, ČSN EN ISO 9902-1 Change, ČSN EN ISO 9902-2 Change, ČSN EN ISO 9902-3 Change A1, ČSN EN ISO 9902-4 Change, ČSN EN ISO 9902-5 Change A1, ČSN EN ISO 9902-6 Change A1, ČSN EN ISO 9902-7 Change A1, ČSN ISO 11094, ČSN EN 12053 +A1, ČSN EN 12545 +A1, ČSN EN 12549+A1, ČSN EN 28960, ČSN EN 60704-1 Change 1, ČSN EN 60704-2, ČSN EN 60704-3ed.2, ČSN EN 61063
704	ČSN EN ISO 11201, ČSN EN ISO 11202, ČSN EN ISO 11203, ČSN EN ISO 11204, ČSN ISO 6394, ČSN ISO 6396, ČSN EN ISO 22868
706	ČSN EN ISO 140-4, ČSN EN ISO 140-5, ČSN EN ISO 717-1, ČSN EN ISO 3382-2, ČSN EN ISO 10052
707	ČSN EN ISO 140-7, ČSN EN ISO 717-2, ČSN EN ISO 3382-2
711	ČSN EN ISO 5349-1, ČSN EN ISO 5349-2, ČSN ISO 5348, ČSN ISO 2631-1, ČSN ISO 2631-2, ČSN ISO 4866, ČSN ISO 8569
712	ČSN 360011-1, ČSN 360011-3, ČSN EN 12464-1, ČSN EN 12464-2, ČSN 36 0020, ČSN EN 12193, ČSN EN 1838, ČSN EN 13201-3, ČSN EN 13201-4
713	ČSN 360011-2; ČSN 36 0020
714	ČSN EN ISO 7726, HH CR Guideline No.12 Guideline for the measurement of microclimatic parameters of working environment and indoor areas of buildings, MoH CR Bulletin 2009, Part 2)
716	Government Regulation No. 1/2008 Coll., Guideline for the harmonization of public health bodies and facilities in the field of inspection of the fulfilment of requirements imposed on physical and legal entities for the purpose of protection against non-ionising radiation, No. 29015/2009, ČSN EN 62233
993	Maiwald M., Helbig J.H., Luck P.Ch. Laboratory methods for the diagnosis of Legionella infections.Journal of Microbiological Methods 33 : 59 79, 1998.

Ord. no.	Sampling procedure identification
27	Manual for MAS-100 CG Ex by MBV, A.G.
50	ČSN EN 14899, TNI CEN/TR 15310-1, TNI CEN/TR 15310-2, TNI CEN/TR 15310-3, TNI CEN/TR 15310-4,TNI CEN/TR 15310-5, Ministry of Environment Guideline for waste sampling, 2008
51	Instruction of the Chief Public Health Officer of the Czech Republic for the assurance of unified inspection procedure for the inspection of sandboxes of outdoor playgrounds, No. 35023/2004-HEM of 01/12/2004.

Region	Location	Year	17β-estradiol	17β-estradiol eq (ER-CALUX)	17α-ethinyl-estradiol	Aclonifen	Bifenox	Cybutryne	Quinoxyfen	Diclofenac*	Terbutryn*	Dichlorvos*	Cypermethrin*	Pb	Cd	Cu	Cr	Hg	Ni	Zn
Blekinge	Ronnebyån nedstr ARV	2013		<0,04																
Blekinge	Ronnebyån uppstr ARV	2013		<0,059																
Blekinge	Vesan	2012				<10	<8	<2,5	<3	0,93	<0,08	<26	<0,26	180	310	2600	740		10000	24000
Blekinge	Vesan	2013	<0,6		<0,42	<10	<8	<2,5	<3	2,4	<0,033	<22	<0,55	240	33	1700	340	<100	1100	3500
Blekinge	Åbyån	2012					<8	<2,5	<3	15	0,28	<29	<0,19	310	54	2200	660		2000	10000
Blekinge	Åbyån	2013				<10				11	0,092	<21	<0,5							
Dalarna	Ljusacksen	2012	<0,1		<0,1	<10	<8	<2,5	<3	<0,61	<0,07	<22	<0,3	120	<10	210	97	<100	<200	1200
Dalarna	Ljusacksen	2013	<0,71		<0,5	<10	<8	<2,5	<3	2,2	<0,042	<18	<0,53	71	10	560	69	<100	<200	4300
Dalarna	Runn Falun	2012	<0,1		<0,1	<10	<8	<2,5	<3	14	0,08	1000	<0,16	670	170	16000	210	<100	580	150000
Dalarna	Runn Falun	2013	<0,73		<0,51	<10	<8	<2,5	<3	27	0,088	<20	<0,4	1800	220	18000	180	<100	570	200000
Gotland	Gothemsån nedstr reningsdammar	2012	<0,1		<0,1	<10	<8	<2,5	<3	1	<0,08	<21	<0,2	160	<10	1700	300	<100	1200	1100
Gotland	Gothemsån nedstr reningsdammar	2013	<0,78		<0,79	<10	<8	<2,5	<3	1,7	<0,028	<17	<0,084	380	<10	1700	300	<100	1300	1900
Gävleborg	Ljusnan nedstr Ljusdals ARV	2013	<0,8	<0,1	<0,82	<10	<8	<2,5	<3	<1,2	<0,039	260	<0,12							
Gävleborg	Ljusnan uppstr Ljusdals ARV	2013	<0,85	<0,042	<0,87	<10	<8	<2,5	<3	<1,1	<0,039	230	<0,33							
Gävleborg	Storsjön nedstr Sandvikens ARV	2013	<0,89	<0,14	<0,91	<10	<8	<2,5	<3	22	0,24	<42	<0,32							
Halland	Bölarpsån	2013	<0,68		<0,69	<10	<8	<2,5	<3	2,5	<0,03	<16	<0,22							
Halland	Stensån (Dömestorp)	2013	<0,75		<0,77	<10	<8	<2,5	<3											
Jämtland	Storsjön nedstr Östersunds ARV	2012	<0,1	<0,04	<0,1	<10	<8	<2,5	<3	0,72	<0,08	<19	<0,28	32	<10	540	88	<100	350	<1000
Jämtland	Storsjön nedstr Östersunds ARV	2013	<0,72		<0,74	<10	<8	<2,5	<3	2,3	<0,029	<21	<0,078	21	<10	530	90	<100	350	<1000
Jämtland	Storsjön uppstr Östersunds ARV	2012		<0,04																
Jönköping	Emån nedstr Nyboholms bruk Kvillsfors	2012	<0,1		<0,1	<10	<8	<2,5	<3	1,5	0,14	<37	<0,29	260	<10	1400	440	<100	1000	1400
Jönköping	Emån nedstr Nyboholms bruk Kvillsfors	2013	<0,7		<0,49	<10	<8	<2,5	<3	4,9	0,081	<21	<0,18	190	<10	1400	460	<100	980	1800
Jönköping	Emån nedstr Vetlanda	2013	<0,71		<0,49	<10	<8	<2,5	<3	4,8	0,15	<19	<0,17							
Jönköping	Gnosjöån nedstr ARV	2012	<0,1		<0,1					5,3	0,21	<30	<0,26	550	21	2000	1000	<100	9300	9300
Jönköping	Gnosjöån nedstr ARV	2013				<10	<8	<2,5	<3											
Jönköping	Lagan nedstr Värnamo	2013	<0,69		<0,48	<10	<8	<2,5	<3	6,5	0,048	<20	<0,2							
Jönköping	Lillån nedstr Bankeryd ARV	2012	<0,1		<0,1					35	0,44	<29	<0,25	210	<10	1600	400	<100	2400	3400
Jönköping	Lillån nedstr Bankeryd ARV	2013		<0,086		<10	<8	<2,5	<3											
Jönköping	Lillån uppstr Bankeryd ARV	2013		<0,069																
Jönköping	Munksjöns utlopp	2013	<0,57		<0,4	<10	<8	<2,5	<3	45	0,17	<16	<0,18							
Jönköping	Nissan nedströms Gislaved	2013	<0,66		<0,46	<10	<8	<2,5	<3											
Jönköping	Svartån nedstr Tranås ARV	2013	<0,67		<0,47	<10	<8	<2,5	<3	8,8	0,065	<18	<0,31							
Jönköping	Torsjöån nedstr Eksjö ARV	2012	<0,1		<0,1	<10				17	0,25	<33	<0,2	240	<10	920	360	<100	600	2900
Jönköping	Torsjöån nedstr Eksjö ARV	2013				<10	<8	<2,5	<3											
Kalmar	Bottorpsströmmen nedstr Ankarsrum	2013	<0,71		<0,72	<10	<8	<2,5	<3	<1,4	<0,033	<42	<0,17							
Kalmar	Emån nedstr Målilla	2013	<0,89		<0,91	<10	<8	<2,5	<3	2,7	0,15	<40	<0,13							
Kalmar	Emåns utlopp	2013	<0,7		<0,76	<10	<8	<2,5	<3	3,2	0,078	<44	<0,098							
Kalmar	Ljungbyån nedstr Trekanten	2013	<0,9		<0,92	<10	<8	<2,5	<3	26	0,33	<44	<0,39							
Kalmar	Lyckebyån nedströms Emmaboda	2013								<1,2	<0,2	<37	<14							
Kalmar	Stångån nedstr Vimmerby	2013	<0,65		<0,67	<10	<8	<2,5	<3	8,2	0,072	<42	<0,19							
Kronoberg	Bolmen	2013	<0,84		<0,86	<10	<8	<2,5	<3	<1,1	<0,03	18	<0,28							
Kronoberg	Ronnebyån Flåboda	2012				<10	<8	<2,5	<3	<0,93	<0,08	<30	<0,24	1200	32	2100	650		740	6000
Kronoberg	Ronnebyån Flåboda	2013	<0,7		<0,49	<10	<8	<2,5	<3	<1,9	<0,032	<26	<0,52	800	21	1700	550	<100	800	4100
Skåne	Bäljaneån nedstr Klippan ARV	2013		<0,046																
Skåne	Bäljaneån uppstr Klippan ARV	2013		<0,04																
Skåne	Eslövsbäcken nedstr Ellinge ARV	2012		<0,06																
Skåne	Eslövsbäcken nedstr Ellinge ARV	2013		1,1																
Skåne	Eslövsbäcken uppstr Ellinge ARV	2012		<0,05																
Skåne	Eslövsbäcken uppstr Ellinge ARV	2013		<0,06																
Skåne	Humlebäcken nedstr Nyvångsverket ARV	2012		0,21																
Skåne	Humlebäcken nedstr Nyvångsverket ARV	2013		0,4																
Skåne	Humlebäcken uppstr Nyvångsverket ARV	2012		<0,07																
Skåne	Humlebäcken uppstr Nyvångsverket ARV	2013		<0,039																
Skåne	Höje å nedstr Källby ARV	2012	<0,1	0,63	2,5	<10	<8	<2,5	<3	138	1,7	<20	<0,22	120	<10	1800	200	<100	1500	8800

Region	Location	Year	17β-estradiol	17β-estradiol eq (ER-CALUX)	17α-ethinyl-estradiol	Aclonifen	Bifenox	Cybutryne	Quinoxyfen	Diclofenac*	Terbutryn*	Dichlorvos*	Cypermethrin*	Pb	Cd	Cu	Cr	Hg	Ni	Zn
Skåne	Höje å nedstr Källby ARV	2013	<0,51	1,3	<0,35	<10	<8	<2,5	<3	151	0,61	<24	<0,33	540	15	3400	390	<100	2000	10000
Skåne	Höje å uppstr Källby ARV	2012		0,075																
Skåne	Höje å uppstr Källby ARV	2013		0,16																
Skåne	Perstorpsbäcken nedstr Perstorp ARV	2013		0,24																
Skåne	Perstorpsbäcken uppstr Perstorp ARV	2013		<0,04																
Skåne	Vege å nedstr Ekebro ARV	2012	<0,1	0,32	0,41	<10	<8	<2,5	<3	7,6	0,14	<31	<0,21	400	34	1800	480	<100	3100	6300
Skåne	Vege å nedstr Ekebro ARV	2013	<0,4	0,24	<0,28	<10	<8	<2,5	<3	60	0,28	<20	<0,13	280	16	1300	190	<100	890	2900
Skåne	Vege å uppstr Ekebro ARV	2012		<0,05																
Skåne	Vege å uppstr Ekebro ARV	2013		<0,038																
Stockholm	Hagaviken Stockholm	2012	<0,1		<0,1	<10	<8	<2,5	<3	<0,74	<0,09	<24	<0,11	110	<10	2200	200	<100	2200	1500
Stockholm	Hagaviken Stockholm	2013	<0,36		<0,25	<10	<8	5,9	<3	<1,1	<0,03	<16	<0,23	120	<10	2500	220	<100	2400	2100
Uppsala	Enköpingsån	2013	<0,77	0,19	<0,54	<10	<8	3,5	<3	59	0,27	<22	<0,63							
Uppsala	Fyrisån nedstr Kungsängsverket ARV	2012	<0,1		0,15	<10	<8	<2,5	<3	1,3	<0,09	<25	<0,22	300	13	2100	800	130	2000	3700
Uppsala	Fyrisån nedstr Kungsängsverket ARV	2013	<0,58	<0,13	<0,4	<10	<8	<2,5	<3	17	0,05	<24	<3	1200	32	3900	940	<100	7100	12000
Uppsala	Fyrisån uppstr Kungsängsverket ARV	2013		0,25																
Uppsala	Strömmarån (Skärplinge)	2013	<0,72		<0,5	<10	<8	<2,5	<3	2	<0,04	<27	<0,16							
Uppsala	Tämnarån (Karholmsbruk)	2013	<0,56		<0,39	<10	<8	<2,5	<3	<1,8	<0,04	<25	<0,44							
Uppsala	Tämnarån (Tierps reningsverk)	2013		2,6																
Värmland	Färnsjön	2012	<0,1		<0,1	<10	<8	<2,5	<3					420	<10	880	320	<100	410	4300
Värmland	Hammarö Vänern Karlstad	2012	<0,1		<0,1	<10	<8	<2,5	<3	0,87	<0,08	<43	<0,14	230	<10	380	170	<100	240	2400
Värmland	Hammarö Vänern Karlstad	2013	<0,57		<0,4	<10	<8	<2,5	<3	<2	<0,033	1300	<0,11	210	<10	500	180	<100	270	2500
Värmland	Hyndalsån Tolerudsbäcken	2012	<0,1		0,67	<10	<8	<2,5	<3	36	0,3	<33	<0,18	790	27	1800	700	<100	1500	9800
Värmland	Klarälven nedstr ARV	2013		<0,1																
Värmland	Klarälven uppstr ARV	2013		<0,06																
Värmland	Kyrkviken Glafsfjorden	2012	<0,1		<0,1	<10	<8	<2,5	<3					170	<10	1500	240	<100	710	2800
Värmland	Molkomsjön	2012	<0,1		<0,1	<10	<8	<2,5	<3					2100	11	1300	440	<100	650	5300
Värmland	Vålösundet	2012	<0,1		<0,1	<10	<8	<2,5	<3	4,1	<0,09	<39	<0,22	310	<10	1000	280	<100	600	3000
Värmland	Åsfjorden Grums	2012	<0,1		<0,1	<10	<8	<2,5	<3	<0,92	<0,08	<39	<0,25	97	<10	760	130	<100	440	3100
Västernorrland	Indalsälven Bogrundet plantskola	2012	<0,1		<0,1	<10	<8	<2,5	<3					150	<10	1400	130	<100	510	11000
Västernorrland	Indalsälven Bogrundet plantskola Timrå	2013	<0,42		<0,29	<10	<8	<2,5	<3	1,5	1,3	<14	<0,4	93	<10	880	240	<100	6200	1500
Västmanland	Arboga	2013	<2,2		<2,2	<10	<8	<2,5	<3											
Västmanland	Sala Sörby	2013	<1,4		<1,4	<10	<8	<2,5	<3											
Västmanland	Strömsholm	2013	<1,2		<1,2	<10	<8	<2,5	<3											
Västmanland	Västerås "Skitviken"	2013	<1,7	0,26	<1,7	<10	<8	6,7	<3											
Västra Götaland	Flian Resville O 9	2013								6,9	0,092	140	<0,15							
Västra Götaland	Göta älv Trollhättan O11	2013								<1,1	<0,062	<33	<0,76							
Västra Götaland	Säve ån Gamlestaden O 13	2012	<0,1		<0,1	<10	<8	<2,5	<3				<0,3	170	<10	1400	250	<100	770	3000
Västra Götaland	Säve ån Gamlestaden O 13	2013	<0,54		<0,37	<10	<8	<2,5	<3	2,7	0,51	<41	<0,13	350	<10	1600	390	<100	640	5700
Västra Götaland	Viskan Viskafors O20	2013								52	0,42	<18	<0,078							
Örebro	Svartån nedstr Skebäcks ARV	2012	<0,1		0,16	<10	<8	<2,5	<3	13	0,17	<38	<0,26	720	18	1800	580	<100	1000	5900
Örebro	Svartån nedstr Skebäcks ARV	2013	<0,85	<0,059	<0,59	<10	<8	<2,5	<3	26	0,13	<23	<0,1	1500	20	2100	550	<100	1000	5400
Örebro	Svartån uppstr Skebäcks ARV	2013		<0,042																
Östergötland	Motala Ströms mynning Norrköping	2012	<0,1		<0,1	<10	<8	<2,5	<3	<0,6	0,095	<21	<0,21	160	<10	1300	290	<100	870	1400
Östergötland	Motala Ströms mynning Norrköping	2013	<0,78		<0,8	<10	<8	<2,5	<3	4,9	0,05	<16	<0,12	160	<10	1400	220	<100	770	1700
Östergötland	Stångån nedstr Nykvarn ARV	2013		<0,12																
Östergötland	Stångån uppstr Nykvarn ARV	2013		<0,04																

***Results calculated from passive samplers using measured or approximated concentration of Total Organic Carbon (TOC) and Organic Carbon-Water Partitioning Coefficient (Koc)**

Region	Location	Year	17β-estradiol	17β-estradiol eq (ER-CALUX)	17α-ethinyl-estradiol	Aclonifen	Bifenox	Cybutryne	Quinoxyfen	Diclofenac*	Terbutryn*	Dichlorvos*	Cypermethrin*	Pb	Cd	Cu	Cr	Hg	Ni	Zn
Gotland	Visby ARV	2012	<0,1		1,2	<10	<8	<2,5	<3	493	2,4	<56	<0,174	69	11	10000	200	<100	1900	13000
Gävleborg	Inre fjärden Sörgrundet-Fliskär	2012	<0,1		<0,1	<10	<8	<2,5	<3	4	0,09	<31	<0,336	650	14	1800	550	<100	1100	7400
Gävleborg	Inre fjärden Sörgrundet-Fliskär	2013	<0,41		<0,28	<10	<8	<2,5	<3	6,2	0,052	<19	<0,294	1100	26	2000	600	<100	1100	11000
Gävleborg	Sandamefjärd Granskär ARV	2013	<0,82	<0,11	<0,84	<10	<8	<2,5	<3	1,2	<0,039	<32	<0,371							
Kalmar	Hamnbassängen Oskarshamn	2013	1,1		<0,62	<10	<8	<2,5	<3	2,8	<0,032	<28	<0,10385							
Skåne	Öresund Malmö hamn	2012	<0,1		<0,1	<10	<8	<2,5	<3	2,4	<0,09	<22	<0,114	140	<50	950	<250	<100	<1000	4600
Skåne	Öresund Malmö hamn	2013	<0,38		<0,27	<10	<8	<2,5	<3	<1,2	<0,035	<15	<0,15435	320	63	1700	330	<100	850	3200
Stockholm	Edeboviken 1 Hallstavik	2012	<0,1		0,12	<10	<8	<2,5	<3	<0,64	<0,08	<23	324	150	25	1500	300	<100	1500	5600
Stockholm	Edeboviken 1 Hallstavik	2013	<0,58		<0,41	<10	<8	<2,5	<3	<1	<0,035	<17	<0,57	180	26	1500	380	<100	1600	5400
Stockholm	Edeboviken 2 Hallstavik	2012												180	28	1800	340	<100	1700	6800
Stockholm	Edeboviken 3 Hallstavik	2012												240	18	2000	440	<100	2000	4100
Stockholm	Edeboviken 4 Hallstavik	2012												290	17	2500	570	<100	2600	3900
Västra Götaland	Göta Älv 1 Risholmen Göteborg	2012	<0,1		<0,1	<10	<8	<2,5	<3				<0,28	160	11	1200	230	<100	680	2600
Västra Götaland	Göta Älv 2 Hjärtholmen Göteborg	2013	<0,51	<0,094	0,36	<10	<8	<2,5	<3	4,9	0,12	<38	<0,096	890	17	2800	480	<100	990	5000

***Results calculated from passive samplers using measured or approximated concentration of Total Organic Carbon (TOC) and Organic Carbon-Water Partitioning Coefficient (Koc)**

Region	Location	Year	sum of HBCDs*	Dicofol*	Dry mass, whole fish (%)	Heptachlor + heptachlor epoxide**	PFOS**	Quinoxyfen**	sum of PCDD/Fs + PCBs**	As**	Ba**	Pb**	Cd**	Co**	Cu**	Cr**	Hg**	Ni**	V**	Zn**	Dry mass, muscle (%)
Jämtland	Storsjön	2012	0,48	<0,6	27	<0,079	4,6	<0,55	0,0012	<51,3	<209	<20,9	<10,07	<20,9	134,9	<51,3		<51,3	<51,3	5890	19
Jönköping	Hären	2013	0,38	<0,63	25	<0,214	2,3	<0,44	0,00034	<52	<220	<22	<10,4	<22	138	<52	124	<52	<52	5600	20
Jönköping	Munksjön	2013	2,47	<0,59	24	<0,085	6,8	<0,49	0,00046	<49,3	<204	<20,4	<9,86	<20,4	238	<49,3	272	<49,3	<49,3	6290	17
Jönköping	Sjunnendammen	2013	0,1	<0,7	27	<0,182	5,2	<0,66	0,00022	58,8	<197,4	<19,74	<9,87	<19,74	176,4	<50,4	294	<50,4	<50,4	3780	21
Jönköping	Vidöstern	2013	1,16	<0,68	26	<0,06	0,4	<0,44	0,00014	<50,4	306	<19,8	<9,9	<19,8	180	<50,4	396	<50,4	<50,4	4140	18
Jönköping	Vättern	2013	4,33	<0,83	31	<0,095	15	<0,72	0,00098	<52	<220	<22	<10,2	<22	260	<52	196	<52	<52	4400	20
Kronoberg	Bolmen	2013	0,44	<0,46	25	<0,066	1,8	<0,51	0,00048	<50,4	<216	<21,6	<10,08	<21,6	306	<50,4		<50,4	<50,4	4320	18
Skåne	Krankesjön***	2012	<0,001	<0,2	25	<0,16	<0,3	<0,33	0,00021	<50	<198	<19,8	<10	<19,8	192	<50		<50	<50	5200	20
Södermanland	Mellanfjärden	2013	0,39	<0,54	27	<0,064	2,1	<0,66	0,00077	252	<198	50,4	<9,9	<19,8	180	<50,4	131,4	<50,4	<50,4	6300	18
Värmland	Åsfjorden Grums	2012	0,05	<0,2	25	<0,227	1,3	<0,33	0,00018	66	<220	<22	<10,2	<22	300	<52		<52	<52	8600	20
Västerbotten	Lapp-Arvträsket	2013	0,09	<0,71	31	<0,776	0,8	<0,85	0,00037	90,3	<197,4	<19,74	<9,87	<19,74	130,2	<50,4		<50,4	<50,4	5460	21
Västerbotten	Norsjön	2013	0,21	<0,6	24	<0,104	0,7	<0,57	0,00017	68,4	<198	<19,8	<9,9	<19,8	306	<50,4		<50,4	<50,4	6120	18
Västerbotten	Österfjärden	2013	0,62	<0,73	26	<0,114	0,4	<0,7	0,00087	280	<220	<22	<10,2	<22	150	<52		<52	<52	5200	20
Västra Götaland	Göta Älv 1 Risholmen Göteborg	2013	0,23	<0,57	22	<0,067	0,6	<0,49	0,00068	2850	<209	<20,9	<10,07	<20,9	361	<51,3	60,8	<51,3	<51,3	3420	19
Västra Götaland	Göta Älv river mouth Göteborg	2012	0,025	<0,63	2	<0,1	1,5	<0,33	0,00039	2850	<209	<20,9	<9,88	<20,9	167,2	<49,4		<49,4	<49,4	9880	19
Västra Götaland	Göta älv Trollhättan O11	2013	1,18	<0,75	29	<0,071	10	<0,49	0,0015	<52,9	<204,7	<20,47	<10,35	<20,47	276	<59,8	135,7	<52,9	<52,9	5290	23
Västra Götaland	Säve ån Gamlestaden O 13	2013	3,84	<0,75	27	<0,083	5,3	<0,67	0,00069	147,2	<204,7	<20,47	<10,35	<20,47	179,4	<52,9	131,1	<52,9	<52,9	5750	23

***Analyzed in whole fish**

****Analyzed in fish muscle**

*****Sample from the National Swedish Monitoring Programme in Fresh Water Biota (Naturhistoriska riksmuseet).**

	Norsjön			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0223	0,0223	0,0223
12378PeCDD	1	0,201	0,201	0,201
123478HxCDD	0,1	< 0.033	BLOQ	0,0033
123678HxCDD	0,1	< 0.033	BLOQ	0,0033
123789HxCDD	0,1	< 0.035	BLOQ	0,0035
1234678HpCDD	0,01	< 0.069	BLOQ	0,00069
OCDD	0,0003	0,192	0,0000576	0,0000576
TCDD		0,216		
PeCDD		0,305		
HxCDD		0,117		
HpCDD		< 0.15		
2378TCDF	0,1	0,0866	0,00866	0,00866
12378PeCDF	0,03	0,0270	0,000810	0,000810
23478PeCDF	0,3	0,111	0,0333	0,0333
123478HxCDF	0,1	0,0229	0,00229	0,00229
123678HxCDF	0,1	< 0.020	BLOQ	0,0020
234678HxCDF	0,1	< 0.020	BLOQ	0,0020
123789HxCDF	0,1	< 0.031	BLOQ	0,0031
1234678HpCDF	0,01	< 0.032	BLOQ	0,00032
1234789HpCDF	0,01	< 0.042	BLOQ	0,00042
OCDF	0,0003	< 0.080	BLOQ	0,000024
TCDF		0,444		
PeCDF		0,542		
HxCDF		0,141		
HpCDF		< 0.11		
Sum of PCDDs		0,830	0,223	0,234
Sum of PCDFs		1,13	0,0451	0,0529
Sum of PCDD/Fs		2,0	0,27	0,29
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	0,604	0,0000604	0,0000604
PCB77	0,0003	6,37	0,00191	0,00191
PCB126	0,1	3,35	0,335	0,335
PCB169	0,03	0,474	0,0142	0,0142
PCB123	0,00003	11,5	0,000345	0,000345
PCB118	0,00003	617	0,0185	0,0185
PCB114	0,00003	11,1	0,000333	0,000333
PCB105	0,00003	138	0,00414	0,00414
PCB167	0,00003	111	0,00333	0,00333
PCB156	0,00003	200	0,00600	0,00600
PCB157	0,00003	24,6	0,000738	0,000738
PCB189	0,00003	29,8	0,000894	0,000894
Sum of PCBs		1150	0,385	0,385
Sum of PCDD/Fs+PCBs		1160	0,65	0,67

	Storsjön			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0193	0,0193	0,0193
12378PeCDD	1	2,81	2,81	2,81
123478HxCDD	0,1	< 0.034	BLOQ	0,0034
123678HxCDD	0,1	0,0987	0,00987	0,00987
123789HxCDD	0,1	< 0.038	BLOQ	0,0038
1234678HpCDD	0,01	0,100	0,00100	0,00100
OCDD	0,0003	2,02	0,000606	0,000606
TCDD		0,303		
PeCDD		4,15		
HxCDD		0,897		
HpCDD		0,233		
2378TCDF	0,1	0,304	0,0304	0,0304
12378PeCDF	0,03	0,0572	0,001716	0,001716
23478PeCDF	0,3	0,234	0,0702	0,0702
123478HxCDF	0,1	0,0510	0,00510	0,00510
123678HxCDF	0,1	0,0476	0,00476	0,00476
234678HxCDF	0,1	0,169	0,0169	0,0169
123789HxCDF	0,1	< 0.032	BLOQ	0,0032
1234678HpCDF	0,01	0,0423	0,000423	0,000423
1234789HpCDF	0,01	< 0.048	BLOQ	0,00048
OCDF	0,0003	< 0.093	BLOQ	0,0000279
TCDF		1,63		
PeCDF		2,50		
HxCDF		0,826		
HpCDF		0,283		
Sum of PCDDs		7,60	2,84	2,85
Sum of PCDFs		5,24	0,129	0,133
Sum of PCDD/Fs		13	3,0	3,0
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	3,54	0,000354	0,000354
PCB77	0,0003	34,9	0,0105	0,0105
PCB126	0,1	20,8	2,08	2,08
PCB169	0,03	4,50	0,135	0,135
PCB123	0,00003	81,3	0,00244	0,00244
PCB118	0,00003	5912	0,177	0,177
PCB114	0,00003	143	0,00429	0,00429
PCB105	0,00003	1762	0,0529	0,0529
PCB167	0,00003	891	0,0267	0,0267
PCB156	0,00003	1560	0,0468	0,0468
PCB157	0,00003	253	0,00759	0,00759
PCB189	0,00003	179	0,00537	0,00537
Sum of PCBs		10800	2,55	2,55
Sum of PCDD/Fs+PCBs		10900	5,5	5,5

	Österfjärden			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0879	0,0879	0,0879
12378PeCDD	1	1,78	1,78	1,78
123478HxCDD	0,1	< 0.14	BLOQ	0,014
123678HxCDD	0,1	< 0.15	BLOQ	0,015
123789HxCDD	0,1	< 0.16	BLOQ	0,016
1234678HpCDD	0,01	< 0.29	BLOQ	0,0029
OCDD	0,0003	< 0.74	BLOQ	0,000222
TCDD		0,353		
PeCDD		1,95		
HxCDD		0,935		
HpCDD		< 0.64		
2378TCDF	0,1	0,295	0,0295	0,0295
12378PeCDF	0,03	< 0.039	BLOQ	0,00117
23478PeCDF	0,3	0,695	0,2085	0,2085
123478HxCDF	0,1	< 0.091	BLOQ	0,0091
123678HxCDF	0,1	< 0.086	BLOQ	0,0086
234678HxCDF	0,1	< 0.089	BLOQ	0,0089
123789HxCDF	0,1	< 0.14	BLOQ	0,014
1234678HpCDF	0,01	0,184	0,00	0,00184
1234789HpCDF	0,01	< 0.20	BLOQ	0,0020
OCDF	0,0003	< 0.39	BLOQ	0,000117
TCDF		1,44		
PeCDF		2,16		
HxCDF		0,252		
HpCDF		< 0.50		
Sum of PCDDs		3,24	1,87	1,92
Sum of PCDFs		3,85	0,240	0,284
Sum of PCDD/Fs		7,1	2,1	2,2
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	2,42	0,000242	0,000242
PCB77	0,0003	21,9	0,00657	0,00657
PCB126	0,1	14,8	1,48	1,48
PCB169	0,03	2,74	0,0822	0,0822
PCB123	0,00003	64,5	0,00194	0,00194
PCB118	0,00003	3753	0,113	0,113
PCB114	0,00003	81,1	0,00243	0,00243
PCB105	0,00003	1019	0,0306	0,0306
PCB167	0,00003	468	0,0140	0,0140
PCB156	0,00003	848	0,0254	0,0254
PCB157	0,00003	143	0,00429	0,00429
PCB189	0,00003	103	0,00309	0,00309
Sum of PCBs		6520	1,76	1,76
Sum of PCDD/Fs+PCBs		6530	3,9	4,0

	Munksjön			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0423	0,0423	0,0423
12378PeCDD	1	0,0519	0,0519	0,0519
123478HxCDD	0,1	< 0.067	BLOQ	0,0067
123678HxCDD	0,1	0,114	0,0114	0,0114
123789HxCDD	0,1	< 0.073	BLOQ	0,0073
1234678HpCDD	0,01	0,224	0,00224	0,00224
OCDD	0,0003	3,14	0,000942	0,000942
TCDD		0,215		
PeCDD		0,787		
HxCDD		4,13		
HpCDD		0,469		
2378TCDF	0,1	0,145	0,0145	0,0145
12378PeCDF	0,03	< 0.018	BLOQ	0,00054
23478PeCDF	0,3	0,193	0,0579	0,0579
123478HxCDF	0,1	0,0870	0,00870	0,00870
123678HxCDF	0,1	0,0657	0,00657	0,00657
234678HxCDF	0,1	0,112	0,0112	0,0112
123789HxCDF	0,1	< 0.065	BLOQ	0,0065
1234678HpCDF	0,01	0,112	0,00112	0,00112
1234789HpCDF	0,01	< 0.087	BLOQ	0,00087
OCDF	0,0003	< 0.16	BLOQ	0,000048
TCDF		1,33		
PeCDF		1,77		
HxCDF		1,14		
HpCDF		0,344		
Sum of PCDDs		8,74	0,109	0,123
Sum of PCDFs		4,58	0,100	0,108
Sum of PCDD/Fs		13	0,21	0,23
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	4,41	0,000441	0,000441
PCB77	0,0003	28,2	0,00846	0,00846
PCB126	0,1	18,5	1,85	1,85
PCB169	0,03	1,17	0,0351	0,0351
PCB123	0,00003	91,8	0,00275	0,00275
PCB118	0,00003	5618	0,169	0,169
PCB114	0,00003	125	0,00375	0,00375
PCB105	0,00003	1310	0,0393	0,0393
PCB167	0,00003	924	0,0277	0,0277
PCB156	0,00003	1714	0,0514	0,0514
PCB157	0,00003	206	0,00618	0,00618
PCB189	0,00003	193	0,00579	0,00579
Sum of PCBs		10200	2,20	2,20
Sum of PCDD/Fs+PCBs		10200	2,4	2,4

	Vidöstern			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.014	BLOQ	0,014
12378PeCDD	1	0,164	0,164	0,164
123478HxCDD	0,1	< 0.053	BLOQ	0,0053
123678HxCDD	0,1	< 0.054	BLOQ	0,0054
123789HxCDD	0,1	< 0.057	BLOQ	0,0057
1234678HpCDD	0,01	< 0.11	BLOQ	0,0011
OCDD	0,0003	0,369	0,0001107	0,0001107
TCDD		0,109		
PeCDD		0,244		
HxCDD		0,188		
HpCDD		< 0.24		
2378TCDF	0,1	0,149	0,0149	0,0149
12378PeCDF	0,03	0,0269	0,000807	0,000807
23478PeCDF	0,3	0,114	0,0342	0,0342
123478HxCDF	0,1	0,0401	0,00401	0,00401
123678HxCDF	0,1	0,0544	0,00544	0,00544
234678HxCDF	0,1	< 0.033	BLOQ	0,0033
123789HxCDF	0,1	< 0.052	BLOQ	0,0052
1234678HpCDF	0,01	< 0.049	BLOQ	0,00049
1234789HpCDF	0,01	< 0.072	BLOQ	0,00072
OCDF	0,0003	< 0.15	BLOQ	0,000045
TCDF		0,612		
PeCDF		0,591		
HxCDF		0,162		
HpCDF		< 0.18		
Sum of PCDDs		0,910	0,164	0,196
Sum of PCDFs		1,37	0,0594	0,0691
Sum of PCDD/Fs		2,3	0,22	0,26
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	0,642	0,0000642	0,0000642
PCB77	0,0003	7,15	0,00215	0,00215
PCB126	0,1	4,02	0,402	0,402
PCB169	0,03	0,523	0,0157	0,0157
PCB123	0,00003	11,0	0,000330	0,000330
PCB118	0,00003	478	0,01434	0,01434
PCB114	0,00003	10,7	0,000321	0,000321
PCB105	0,00003	128	0,00384	0,00384
PCB167	0,00003	112	0,00336	0,00336
PCB156	0,00003	182	0,00546	0,00546
PCB157	0,00003	26,6	0,000798	0,000798
PCB189	0,00003	30,9	0,000927	0,000927
Sum of PCBs		992	0,449	0,449
Sum of PCDD/Fs+PCBs		994	0,67	0,71

	Hären			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.049	BLOQ	0,049
12378PeCDD	1	0,389	0,389	0,389
123478HxCDD	0,1	< 0.198	BLOQ	0,0198
123678HxCDD	0,1	< 0.201	BLOQ	0,0201
123789HxCDD	0,1	< 0.213	BLOQ	0,0213
1234678HpCDD	0,01	< 0.41	BLOQ	0,0041
OCDD	0,0003	1,30	0,000390	0,000390
TCDD		0,232		
PeCDD		0,859		
HxCDD		1,38		
HpCDD		< 0.93		
2378TCDF	0,1	0,277	0,0277	0,0277
12378PeCDF	0,03	< 0.047	BLOQ	0,00141
23478PeCDF	0,3	0,350	0,105	0,105
123478HxCDF	0,1	< 0.115	BLOQ	0,0115
123678HxCDF	0,1	< 0.112	BLOQ	0,0112
234678HxCDF	0,1	< 0.121	BLOQ	0,0121
123789HxCDF	0,1	< 0.194	BLOQ	0,0194
1234678HpCDF	0,01	0,264	0,00264	0,00264
1234789HpCDF	0,01	< 0.30	BLOQ	0,0030
OCDF	0,0003	< 0.56	BLOQ	0,000168
TCDF		0,808		
PeCDF		1,71		
HxCDF		1,14		
HpCDF		< 0.72		
Sum of PCDDs		3,77	0,389	0,504
Sum of PCDFs		3,66	0,135	0,194
Sum of PCDD/Fs		7,4	0,52	0,70
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	1,13	0,000113	0,000113
PCB77	0,0003	10,5	0,00315	0,00315
PCB126	0,1	8,52	0,852	0,852
PCB169	0,03	0,758	0,0227	0,0227
PCB123	0,00003	17,6	0,000528	0,000528
PCB118	0,00003	1118	0,0335	0,0335
PCB114	0,00003	24,2	0,000726	0,000726
PCB105	0,00003	274	0,00822	0,00822
PCB167	0,00003	272	0,00816	0,00816
PCB156	0,00003	465	0,0140	0,0140
PCB157	0,00003	57,2	0,00172	0,00172
PCB189	0,00003	67,0	0,00201	0,00201
Sum of PCBs		2320	0,947	0,947
Sum of PCDD/Fs+PCBs		2320	1,5	1,6

	Bolmen			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,107	0,107	0,107
12378PeCDD	1	0,660	0,660	0,660
123478HxCDD	0,1	< 0.065	BLOQ	0,0065
123678HxCDD	0,1	0,0698	0,00698	0,00698
123789HxCDD	0,1	< 0.071	BLOQ	0,0071
1234678HpCDD	0,01	0,272	0,00272	0,00272
OCDD	0,0003	0,585	0,0001755	0,0001755
TCDD		0,295		
PeCDD		0,938		
HxCDD		1,13		
HpCDD		0,588		
2378TCDF	0,1	0,418	0,0418	0,0418
12378PeCDF	0,03	0,133	0,00399	0,00399
23478PeCDF	0,3	0,912	0,2736	0,2736
123478HxCDF	0,1	0,149	0,0149	0,0149
123678HxCDF	0,1	0,175	0,0175	0,0175
234678HxCDF	0,1	0,0753	0,00753	0,00753
123789HxCDF	0,1	< 0.061	BLOQ	0,0061
1234678HpCDF	0,01	0,182	0,00182	0,00182
1234789HpCDF	0,01	< 0.103	BLOQ	0,00103
OCDF	0,0003	< 0.18	BLOQ	0,000054
TCDF		1,11		
PeCDF		2,54		
HxCDF		1,50		
HpCDF		0,353		
Sum of PCDDs		3,54	0,777	0,790
Sum of PCDFs		5,50	0,361	0,368
Sum of PCDD/Fs		9,0	1,1	1,2
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	1,55	0,000155	0,000155
PCB77	0,0003	9,7	0,00291	0,00291
PCB126	0,1	9,21	0,921	0,921
PCB169	0,03	1,425	0,0428	0,0428
PCB123	0,00003	19,1	0,000573	0,000573
PCB118	0,00003	1040	0,0312	0,0312
PCB114	0,00003	27,0	0,000810	0,000810
PCB105	0,00003	304	0,00912	0,00912
PCB167	0,00003	188	0,00564	0,00564
PCB156	0,00003	313	0,00939	0,00939
PCB157	0,00003	57,5	0,00173	0,00173
PCB189	0,00003	57,6	0,00173	0,00173
Sum of PCBs		2030	1,03	1,03
Sum of PCDD/Fs+PCBs		2040	2,2	2,2

	Mellanfjärden			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,102	0,102	0,102
12378PeCDD	1	0,658	0,658	0,658
123478HxCDD	0,1	< 0.041	BLOQ	0,0041
123678HxCDD	0,1	0,0624	0,00624	0,00624
123789HxCDD	0,1	< 0.045	BLOQ	0,0045
1234678HpCDD	0,01	< 0.088	BLOQ	0,00088
OCDD	0,0003	0,832	0,0002496	0,0002496
TCDD		0,423		
PeCDD		0,922		
HxCDD		4,50		
HpCDD		< 0.2		
2378TCDF	0,1	1,05	0,105	0,105
12378PeCDF	0,03	0,187	0,00561	0,00561
23478PeCDF	0,3	1,00	0,300	0,300
123478HxCDF	0,1	0,0503	0,00503	0,00503
123678HxCDF	0,1	0,149	0,0149	0,0149
234678HxCDF	0,1	0,238	0,0238	0,0238
123789HxCDF	0,1	< 0.037	BLOQ	0,0037
1234678HpCDF	0,01	0,0757	0,000757	0,000757
1234789HpCDF	0,01	< 0.060	BLOQ	0,00060
OCDF	0,0003	0,155	0,0000465	0,0000465
TCDF		3,03		
PeCDF		3,01		
HxCDF		1,23		
HpCDF		0,213		
Sum of PCDDs		6,68	0,766	0,776
Sum of PCDFs		7,64	0,455	0,459
Sum of PCDD/Fs		14	1,2	1,2
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	3,94	0,000394	0,000394
PCB77	0,0003	46,1	0,0138	0,0138
PCB126	0,1	21,4	2,14	2,14
PCB169	0,03	3,03	0,0909	0,0909
PCB123	0,00003	59,7	0,00179	0,00179
PCB118	0,00003	2831	0,0849	0,0849
PCB114	0,00003	66,7	0,00200	0,00200
PCB105	0,00003	767	0,0230	0,0230
PCB167	0,00003	406	0,0122	0,0122
PCB156	0,00003	569	0,0171	0,0171
PCB157	0,00003	124	0,00372	0,00372
PCB189	0,00003	97,1	0,00291	0,00291
Sum of PCBs		4500	2,39	2,39
Sum of PCDD/Fs+PCBs		5010	3,6	3,6

	Vättern			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.070	BLOQ	0,070
12378PeCDD	1	0,346	0,346	0,346
123478HxCDD	0,1	< 0.27	BLOQ	0,027
123678HxCDD	0,1	< 0.30	BLOQ	0,030
123789HxCDD	0,1	< 0.32	BLOQ	0,032
1234678HpCDD	0,01	< 0.63	BLOQ	0,0063
OCDD	0,0003	< 1.4	BLOQ	0,00042
TCDD		0,232		
PeCDD		0,757		
HxCDD		1,68		
HpCDD		< 1.4		
2378TCDF	0,1	1,53	0,153	0,153
12378PeCDF	0,03	0,128	0,00384	0,00384
23478PeCDF	0,3	1,13	0,339	0,339
123478HxCDF	0,1	< 0.16	BLOQ	0,016
123678HxCDF	0,1	< 0.15	BLOQ	0,015
234678HxCDF	0,1	< 0.17	BLOQ	0,017
123789HxCDF	0,1	< 0.26	BLOQ	0,026
1234678HpCDF	0,01	0,306	0,00306	0,00306
1234789HpCDF	0,01	< 0.42	BLOQ	0,0042
OCDF	0,0003	1,10	0,00033	0,00033
TCDF		3,86		
PeCDF		6,76		
HxCDF		0,982		
HpCDF		< 1.0		
Sum of PCDDs		2,67	0,346	0,512
Sum of PCDFs		12,7	0,499	0,577
Sum of PCDD/Fs		15	0,85	1,1
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	2,37	0,000237	0,000237
PCB77	0,0003	28,7	0,00861	0,00861
PCB126	0,1	32,1	3,21	3,21
PCB169	0,03	4,99	0,150	0,150
PCB123	0,00003	59,1	0,00177	0,00177
PCB118	0,00003	2631	0,0789	0,0789
PCB114	0,00003	72,7	0,00218	0,00218
PCB105	0,00003	849	0,0255	0,0255
PCB167	0,00003	391	0,0117	0,0117
PCB156	0,00003	662	0,0199	0,0199
PCB157	0,00003	135	0,00405	0,00405
PCB189	0,00003	91,5	0,00275	0,00275
Sum of PCBs		4960	3,52	3,52
Sum of PCDD/Fs+PCBs		4980	4,4	4,6

	Lapp-Arvträsket			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.30	BLOQ	0,30
12378PeCDD	1	< 0.45	BLOQ	0,45
123478HxCDD	0,1	< 1.0	BLOQ	0,10
123678HxCDD	0,1	< 1.0	BLOQ	0,10
123789HxCDD	0,1	< 1.1	BLOQ	0,11
1234678HpCDD	0,01	< 2.0	BLOQ	0,020
OCDD	0,0003	< 6.6	BLOQ	0,00198
TCDD		< 0.74		
PeCDD		< 1.1		
HxCDD		< 1.3		
HpCDD		< 4.6		
2378TCDF	0,1	< 0.17	BLOQ	0,017
12378PeCDF	0,03	< 0.24	BLOQ	0,0072
23478PeCDF	0,3	< 0.25	BLOQ	0,075
123478HxCDF	0,1	< 0.56	BLOQ	0,056
123678HxCDF	0,1	< 0.51	BLOQ	0,051
234678HxCDF	0,1	< 0.61	BLOQ	0,061
123789HxCDF	0,1	< 1.1	BLOQ	0,11
1234678HpCDF	0,01	1,06	0,0106	0,0106
1234789HpCDF	0,01	< 1.7	BLOQ	0,017
OCDF	0,0003	< 3.6	BLOQ	0,00108
TCDF		< 0.44		
PeCDF		< 0.62		
HxCDF		< 1.1		
HpCDF		< 4.0		
Sum of PCDDs		0	0	1,08
Sum of PCDFs		0	0,0106	0,406
Sum of PCDD/Fs		0	0,011	1,5
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	< 0.34	BLOQ	0,000034
PCB77	0,0003	4,26	0,00128	0,00128
PCB126	0,1	1,48	0,148	0,148
PCB169	0,03	< 0.89	BLOQ	0,0267
PCB123	0,00003	< 9.4	BLOQ	0,00028
PCB118	0,00003	171	0,00513	0,00513
PCB114	0,00003	< 9.5	BLOQ	0,00029
PCB105	0,00003	49,1	0,00147	0,00147
PCB167	0,00003	13,7	0,000411	0,000411
PCB156	0,00003	< 9.8	BLOQ	0,00029
PCB157	0,00003	< 10	BLOQ	0,00030
PCB189	0,00003	< 12	BLOQ	0,00036
Sum of PCBs		240	0,156	0,185
Sum of PCDD/Fs+PCBs		240	0,17	1,7

	Göta älv Trollhättan O11			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0058	0,0058	0,0058
12378PeCDD	1	1,49	1,49	1,49
123478HxCDD	0,1	< 0.018	BLOQ	0,0018
123678HxCDD	0,1	< 0.022	BLOQ	0,0022
123789HxCDD	0,1	0,0264	0,00264	0,00264
1234678HpCDD	0,01	< 0.025	BLOQ	0,00025
OCDD	0,0003	< 0.49	BLOQ	0,000147
TCDD		9,91		
PeCDD		26,2		
HxCDD		16,7		
HpCDD		< 0.057		
2378TCDF	0,1	1,83	0,183	0,183
12378PeCDF	0,03	2,25	0,0675	0,0675
23478PeCDF	0,3	8,73	2,619	2,619
123478HxCDF	0,1	< 0.027	BLOQ	0,0027
123678HxCDF	0,1	0,0373	0,00373	0,00373
234678HxCDF	0,1	0,253	0,0253	0,0253
123789HxCDF	0,1	< 0.018	BLOQ	0,0018
1234678HpCDF	0,01	0,0598	0,000598	0,000598
1234789HpCDF	0,01	< 0.039	BLOQ	0,00039
OCDF	0,0003	< 0.26	BLOQ	0,000078
TCDF		4,05		
PeCDF		953		
HxCDF		98,2		
HpCDF		0,254		
Sum of PCDDs		52,8	1,50	1,50
Sum of PCDFs		1056	2,90	2,90
Sum of PCDD/Fs		1108	4,4	4,4
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	3,54	0,000354	0,000354
PCB77	0,0003	41,9	0,0126	0,0126
PCB126	0,1	19,6	1,96	1,96
PCB169	0,03	< 0.022	BLOQ	0,00066
PCB123	0,00003	153	0,00459	0,00459
PCB118	0,00003	3707	0,111	0,111
PCB114	0,00003	88,7	0,00266	0,00266
PCB105	0,00003	1164	0,0349	0,0349
PCB167	0,00003	570	0,0171	0,0171
PCB156	0,00003	1022	0,0307	0,0307
PCB157	0,00003	191	0,00573	0,00573
PCB189	0,00003	130	0,00390	0,00390
Sum of PCBs		7090	2,18	2,18
Sum of PCDD/Fs+PCBs		8200	6,6	6,6

	Säveån Gamlestaden			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.040	BLOQ	0,040
12378PeCDD	1	0,268	0,268	0,268
123478HxCDD	0,1	< 0.12	BLOQ	0,012
123678HxCDD	0,1	< 0.13	BLOQ	0,013
123789HxCDD	0,1	< 0.14	BLOQ	0,014
1234678HpCDD	0,01	< 0.12	BLOQ	0,0012
OCDD	0,0003	< 1.5	BLOQ	0,00045
TCDD		17,6		
PeCDD		39,1		
HxCDD		40,8		
HpCDD		< 0.28		
2378TCDF	0,1	1,85	0,185	0,185
12378PeCDF	0,03	0,194	0,00582	0,00582
23478PeCDF	0,3	0,555	0,1665	0,1665
123478HxCDF	0,1	< 0.070	BLOQ	0,0070
123678HxCDF	0,1	< 0.065	BLOQ	0,0065
234678HxCDF	0,1	< 0.074	BLOQ	0,0074
123789HxCDF	0,1	< 0.10	BLOQ	0,010
1234678HpCDF	0,01	0,261	0,00261	0,00261
1234789HpCDF	0,01	< 0.18	BLOQ	0,0018
OCDF	0,0003	< 0.78	BLOQ	0,000234
TCDF		5,29		
PeCDF		6,16		
HxCDF		9,20		
HpCDF		0,621		
Sum of PCDDs		97,5	0,268	0,349
Sum of PCDFs		21,3	0,360	0,393
Sum of PCDD/Fs		119	0,63	0,74
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	6,30	0,000630	0,000630
PCB77	0,0003	75,2	0,0226	0,0226
PCB126	0,1	19,0	1,90	1,90
PCB169	0,03	1,81	0,0543	0,0543
PCB123	0,00003	168	0,00504	0,00504
PCB118	0,00003	5425	0,163	0,163
PCB114	0,00003	118	0,00354	0,00354
PCB105	0,00003	1710	0,0513	0,051
PCB167	0,00003	619	0,0186	0,019
PCB156	0,00003	1131	0,0339	0,034
PCB157	0,00003	207	0,00621	0,00621
PCB189	0,00003	121	0,00363	0,00363
Sum of PCBs		9600	2,26	2,26
Sum of PCDD/Fs+PCBs		9720	2,9	3,0

	Göta älv Risholmen			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	0,0416	0,0416	0,0416
12378PeCDD	1	0,434	0,434	0,434
123478HxCDD	0,1	< 0.019	BLOQ	0,0019
123678HxCDD	0,1	0,0604	0,00604	0,00604
123789HxCDD	0,1	< 0.026	BLOQ	0,0026
1234678HpCDD	0,01	< 0.021	BLOQ	0,00021
OCDD	0,0003	< 0.089	BLOQ	0,0000267
TCDD		10,1		
PeCDD		12,6		
HxCDD		22,5		
HpCDD		< 0.048		
2378TCDF	0,1	1,66	0,166	0,166
12378PeCDF	0,03	0,180	0,0054	0,0054
23478PeCDF	0,3	0,668	0,2004	0,2004
123478HxCDF	0,1	0,109	0,0109	0,0109
123678HxCDF	0,1	0,0599	0,00599	0,00599
234678HxCDF	0,1	0,0178	0,00178	0,00178
123789HxCDF	0,1	< 0.017	BLOQ	0,0017
1234678HpCDF	0,01	0,0851	0,000851	0,000851
1234789HpCDF	0,01	< 0.035	BLOQ	0,00035
OCDF	0,0003	< 0.047	BLOQ	0,0000141
TCDF		4,36		
PeCDF		4,25		
HxCDF		3,56		
HpCDF		0,185		
Sum of PCDDs		45,2	0,482	0,49
Sum of PCDFs		12,4	0,391	0,39
Sum of PCDD/Fs		58	0,87	0,88
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	2,03	0,000203	0,000203
PCB77	0,0003	23,5	0,00705	0,00705
PCB126	0,1	18,9	1,89	1,89
PCB169	0,03	2,09	0,0627	0,0627
PCB123	0,00003	149	0,00447	0,00447
PCB118	0,00003	4370	0,131	0,131
PCB114	0,00003	74,3	0,00223	0,00223
PCB105	0,00003	1439	0,0432	0,0432
PCB167	0,00003	481	0,0144	0,0144
PCB156	0,00003	845	0,0254	0,0254
PCB157	0,00003	193	0,00579	0,00579
PCB189	0,00003	88,7	0,00266	0,00266
Sum of PCBs		7690	2,19	2,19
Sum of PCDD/Fs+PCBs		7740	3,1	3,1

	Sjunnendammen			
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
			BLOQ=0	BLOQ=(LOQ)
2378TCDD	1	< 0.039	BLOQ	0,039
12378PeCDD	1	0,0835	0,0835	0,0835
123478HxCDD	0,1	< 0.16	BLOQ	0,016
123678HxCDD	0,1	< 0.17	BLOQ	0,017
123789HxCDD	0,1	< 0.18	BLOQ	0,018
1234678HpCDD	0,01	< 0.31	BLOQ	0,0031
OCDD	0,0003	< 0.90	BLOQ	0,00027
TCDD		26,2		
PeCDD		75,5		
HxCDD		86,2		
HpCDD		< 0.70		
2378TCDF	0,1	0,345	0,0345	0,0345
12378PeCDF	0,03	< 0.045	BLOQ	0,00135
23478PeCDF	0,3	< 0.055	BLOQ	0,0165
123478HxCDF	0,1	< 0.15	BLOQ	0,015
123678HxCDF	0,1	0,145	0,0145	0,0145
234678HxCDF	0,1	0,128	0,0128	0,0128
123789HxCDF	0,1	< 0.12	BLOQ	0,012
1234678HpCDF	0,01	< 0.16	BLOQ	0,0016
1234789HpCDF	0,01	< 0.24	BLOQ	0,0024
OCDF	0,0003	< 0.47	BLOQ	0,000141
TCDF		5,22		
PeCDF		4,01		
HxCDF		12,5		
HpCDF		< 0.59		
Sum of PCDDs		188	0,0835	0,177
Sum of PCDFs		21,7	0,0618	0,111
Sum of PCDD/Fs		210	0,15	0,29
	I-TEF	ng/kg d. m.	ng TEQ/kg d. m.	
PCB81	0,0001	0,527	0,0000527	0,0000527
PCB77	0,0003	11,9	0,00357	0,00357
PCB126	0,1	6,18	0,618	0,618
PCB169	0,03	0,588	0,0176	0,0176
PCB123	0,00003	67,4	0,00202	0,00202
PCB118	0,00003	1253	0,0376	0,0376
PCB114	0,00003	22,0	0,000660	0,000660
PCB105	0,00003	258	0,00774	0,00774
PCB167	0,00003	382	0,0115	0,0115
PCB156	0,00003	684	0,0205	0,0205
PCB157	0,00003	80,0	0,00240	0,00240
PCB189	0,00003	150	0,00450	0,00450
Sum of PCBs		2920	0,726	0,726
Sum of PCDD/Fs+PCBs		3130	0,87	1,0

	Åsefjorden			
	TEF	/g fresh weig	pg TEQ/g fresh weight	
			BLOD=0	BLOD=(LOD)
2378TCDD	1	< 0.017	BLOD	0,017
12378PeCDD	1	< 0.027	BLOD	0,027
123478HxCDD	0,1	< 0.020	BLOD	0,0020
123678HxCDD	0,1	< 0.021	BLOD	0,0021
123789HxCDD	0,1	< 0.023	BLOD	0,0023
1234678HpCDD	0,01	< 0.025	BLOD	0,00025
OCDD	0,0003	0,199	0,0000597	0,0000597
TCDD		0,170		
PeCDD		0,260		
HxCDD		0,253		
HpCDD		< 0.031		
2378TCDF	0,1	0,0943	0,00943	0,00943
12378PeCDF	0,03	0,0414	0,00124	0,00124
23478PeCDF	0,3	0,0566	0,0170	0,0170
123478HxCDF	0,1	< 0.022	BLOD	0,0022
123678HxCDF	0,1	< 0.022	BLOD	0,0022
234678HxCDF	0,1	< 0.021	BLOD	0,0021
123789HxCDF	0,1	< 0.018	BLOD	0,0018
1234678HpCDF	0,01	< 0.030	BLOD	0,00030
1234789HpCDF	0,01	< 0.023	BLOD	0,00023
OCDF	0,0003	< 0.029	BLOD	0,0000087
TCDF		0,370		
PeCDF		0,255		
HxCDF		0,359		
HpCDF		< 0.019		
PCB81	0,0003	0,220	0,0000660	0,0000660
PCB77	0,0001	3,09	0,000309	0,000309
PCB126	0,1	0,831	0,0831	0,0831
PCB169	0,03	0,0974	0,00292	0,00292
PCB123	0,00003	1,30	0,0000390	0,000039
PCB118	0,00003	116	0,00348	0,00348
PCB114	0,00003	0,869	0,0000261	0,0000261
PCB105	0,00003	38,7	0,00116	0,00116
PCB167	0,00003	15,4	0,000462	0,000462
PCB156	0,00003	28,0	0,000840	0,000840
PCB157	0,00003	5,30	0,000159	0,000159
PCB189	0,00003	2,53	0,0000759	0,000076
Sum of PCDDs		0,882	0,0000597	0,0507
Sum of PCDFs		0,984	0,0277	0,0365
Sum of PCBs		212	0,0926	0,0926
Sum of PCDDs/Fs		1,9	0,028	0,087
Sum of PCDDs/Fs + PCBs		214	0,12	0,18

	Krankesjön			
	TEF	/g fresh weig	pg TEQ/g fresh weight	
			BLOD=0	BLOD=(LOD)
2378TCDD	1	< 0.021	BLOD	0,021
12378PeCDD	1	< 0.024	BLOD	0,024
123478HxCDD	0,1	< 0.025	BLOD	0,0025
123678HxCDD	0,1	< 0.026	BLOD	0,0026
123789HxCDD	0,1	< 0.029	BLOD	0,0029
1234678HpCDD	0,01	< 0.054	BLOD	0,00054
OCDD	0,0003	< 0.062	BLOD	0,000019
TCDD		0,139		
PeCDD		0,202		
HxCDD		0,224		
HpCDD		< 0.045		
2378TCDF	0,1	0,0938	0,0094	0,0094
12378PeCDF	0,03	0,0570	0,0017	0,0017
23478PeCDF	0,3	0,0513	0,015	0,015
123478HxCDF	0,1	< 0.019	BLOD	0,0019
123678HxCDF	0,1	< 0.017	BLOD	0,0017
234678HxCDF	0,1	< 0.021	BLOD	0,0021
123789HxCDF	0,1	< 0.024	BLOD	0,0024
1234678HpCDF	0,01	< 0.022	BLOD	0,00022
1234789HpCDF	0,01	< 0.032	BLOD	0,00032
OCDF	0,0003	< 0.049	BLOD	0,000015
TCDF		0,241		
PeCDF		0,273		
HxCDF		0,434		
HpCDF		< 0.026		
PCB81	0,0003	0,228	0,0000684	0,0000684
PCB77	0,0001	3,21	0,000321	0,000321
PCB126	0,1	1,09	0,109	0,109
PCB169	0,03	0,0840	0,00252	0,00252
PCB123	0,00003	0,616	0,0000185	0,0000185
PCB118	0,00003	131	0,00393	0,00393
PCB114	0,00003	1,17	0,0000351	0,0000351
PCB105	0,00003	34,9	0,00105	0,00105
PCB167	0,00003	NA	0	0
PCB156	0,00003	NA	0	0
PCB157	0,00003	NA	0	0
PCB189	0,00003	NA	0	0
Sum of PCDDs		0,565	BLOD	0,0536
Sum of PCDFs		0,948	0,0265	0,0351
Sum of PCBs		172	0,117	0,117
Sum of PCDDs/Fs		1,5	0,026	0,089
Sum of PCDDs/Fs + PCBs		174	0,14	0,21

	Göta älv 2 Göteborg			
	TEF	/g fresh weig	pg TEQ/g fresh weight	
			BLOD=0	BLOD=(LOD)
2378TCDD	1	< 0.024	BLOD	0,024
12378PeCDD	1	< 0.022	BLOD	0,022
123478HxCDD	0,1	< 0.0089	BLOD	0,00089
123678HxCDD	0,1	< 0.014	BLOD	0,0014
123789HxCDD	0,1	< 0.010	BLOD	0,0010
1234678HpCDD	0,01	< 0.014	BLOD	0,00014
OCDD	0,0003	< 0.021	BLOD	0,0000063
TCDD		0,0960		
PeCDD		0,118		
HxCDD		0,118		
HpCDD		< 0.015		
2378TCDF	0,1	0,222	0,0222	0,0222
12378PeCDF	0,03	0,0486	0,00146	0,00146
23478PeCDF	0,3	0,0906	0,0272	0,0272
123478HxCDF	0,1	< 0.0075	BLOD	0,00075
123678HxCDF	0,1	< 0.0094	BLOD	0,00094
234678HxCDF	0,1	< 0.0062	BLOD	0,00062
123789HxCDF	0,1	< 0.0083	BLOD	0,00083
1234678HpCDF	0,01	< 0.0083	BLOD	0,000083
1234789HpCDF	0,01	< 0.011	BLOD	0,00011
OCDF	0,0003	< 0.015	BLOD	0,0000045
TCDF		0,326		
PeCDF		0,206		
HxCDF		0,138		
HpCDF		< 0.009		
PCB81	0,0003	0,302	0,0000906	0,0000906
PCB77	0,0001	6,20	0,000620	0,000620
PCB126	0,1	2,58	0,258	0,258
PCB169	0,03	0,157	0,00471	0,00471
PCB123	0,00003	4,29	0,000129	0,000129
PCB118	0,00003	552	0,0166	0,0166
PCB114	0,00003	7,45	0,000224	0,000224
PCB105	0,00003	183	0,00549	0,00549
PCB167	0,00003	NA	0	0
PCB156	0,00003	NA	0	0
PCB157	0,00003	NA	0	0
PCB189	0,00003	NA	0	0
Sum of PCDDs		0,332	BLOD	0,0494
Sum of PCDFs		0,670	0,0508	0,0542
Sum of PCBs		756	0,286	0,286
Sum of PCDDs/Fs		1,0	0,051	0,10
Sum of PCDDs/Fs + PCBs		757	0,34	0,39