



**Food &
Pharmaceutical**

HRMS analysis

Technical Bulletin

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ALS performs determination of PCDD/F and indicator and dioxin-like PCBs in bio samples by isotope dilution method using HRGC-HRMS. The procedure fulfills the conditions and requirements of the US EPA 1613 (for PCDD/F) and the US EPA 1668 (PCBs) and related European directives for food and feed.

Dioxins are part of a persistent organic pollutants group (POPs), where further include chemically related polychlorinated biphenyls (PCBs), polychlorinated biphenyls especially dioxin-like (dioxin-like PCBs), also known as coplanar PCB (coplanar PCB), polybrominated diphenyl ethers (PBDE) known as flame retardants and polyaromatic hydrocarbons (PAHs). Dioxins include 75 PCDD congeners and 135 PCDF congeners, of which 17 are the most toxic.

Offered PCBs testing in food- and feedstuffs:

- Dioxin-like PCBs
- Indicator PCBs (PCBs (PCB 28,52,101,138,153,180 and their sum)
- Sum of 209 PCBs
- Combined package of dioxin-like PCBs and indicator PCBs

Range of dioxins testing in food- and feedstuffs:

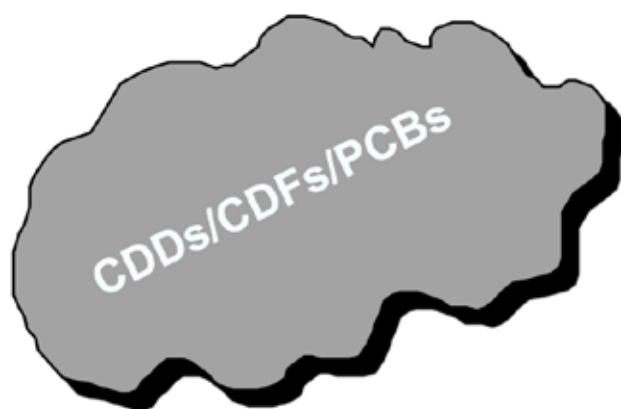
- PCDD/F
- Combined package of PCDD/F, dioxin-like PCBs and indicator PCBs



Reporting

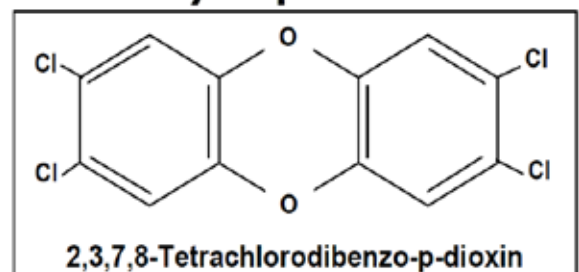
Limits of quantification are in accordance or even lower than limits stated in the European legislation.

Dioxins, sum of polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), are expressed as World Health Organisation (WHO) toxic equivalents, using the WHO-toxic equivalency factors (WHO-TEFs), and the sum of dioxins and dioxin-like PCBs (sum of PCDDs, PCDFs and PCBs), is expressed as WHO toxic equivalent, using the WHO-TEF.



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Toxicity Equivalence of



WHO-PCDD-TEQs and WHO-PCB-TEQs is calculated using WHO-2005-TEFs. The WHO-PCB-TEQ Lowerbound and Upperbound is reported only for all dioxin-like PCBs.

Determination of all POPs in our laboratory is performed accredited in compliance with ISO 17025 standard requirements.

Instrumentation

Our analyses are performed by specialized equipments for organic ultratrace determinations using modern high resolution gas chromatography – high resolution mass spectrometry (HRGC – HRMS). Gas chromatographs are equipped by autosampler and specific separation columns. These GC/MS systems enable measurement with a better sensitivity and are therefore mainly used for analysis with higher requirements on LOQ.

The use of a polar column or a medium polar column enables sufficient separation of PCDD and PCDF congeners, even if groups of chlorinated homologues are overlapped. The use of a non polar column enables the separation of groups of chlorinated homologues and shows more stability and lower bleeding, resulting in better LOD.

Benefits of this equipment are:

- occurrence of false positives is reduced due to the more specific detector;
- HRMS shows a better sensitivity - absolute sensitivity is at a level of a few tens of femtograms per injection, which corresponds to a level of ppt to ppq in the sample;
- occurrence of false negatives is reduced due to low limits of detection;
- by using HRMS, less material (matrix) is required for the analysis, and the range of analyzed matrixes is broadened to biological materials and ambient air where LRMS has no effect;
- more rigorous periodic traceability and more strict QA/QC procedures improve the reliability of determination.



TAT, standard and express service

Our standard Turnaround Time (TAT) for these analyses is 10 days, from receipt of the samples in our laboratory. Express service for testing is available in 3-5 days, on request.

Standardly tested matrixes are:

- Food, foodstuffs
- Feeding stuffs, mixtures
- Kaolinitic clays, minerals
- Biota samples (vegetal, animal)
- Biological materials (serum, blood...)



Containers

Each sample shall be placed in a clean, inert container, offering adequate protection from contamination, loss of analytes by adsorption to the internal wall of the container and against damage in transit. All necessary precautions shall be taken to avoid any change in composition of the sample, which might arise during transportation or storage. The sample storage and transportation has to be performed in a way that maintains the integrity of the foodstuff samples. The samples must be stored and transported in

glass, aluminium, polypropylene or polyethylene containers. For solid food samples is suitable a wide mouth amber glass jar with teflon (or alu foil) lined cap. For liquid food samples is recommended a narrow mouth amber glass jar with teflon lined cap. Pack in container with packing material to avoid breakage.

For feed samples, it is necessary to provide the laboratory with 100g of feed/feedstuff.

Necessary sample amount for specific food samples as follows:

Foodstuffs	Minimum required sample amount (g)
Meat and meat products (excluding edible offals) of the:	
bovine animals	100
poultry	300
pigs	100
Liver of terrestrial animals	100
Muscle meat of fish and fishery products	40
Muscle meat of wild caught fresh water fish (exception of diadromous fish species caught in fresh water)	40
Muscle meat of wild caught eel and its products	40
Fresh liver and derived products (exception of marine oils)	40
Marine oils	25
Raw milk and dairy products	300
Hen eggs and egg products	100 (minimum 4 eggs)
Fat of the following animals:	
bovine animals	15
poultry	25
pigs	50
Mixed animal fats	30
Vegetable oils and fats	30
Foods for infants and young children	500



Shipping services

For more information about shipping the samples to ALS, please contact our Customer service.

CONTACTS

ADDRESS ALS Czech Republic, s.r.o. Na Harfě 336/9, 190 00 Praha 9

E-MAIL czsupport.food@alsglobal.com **TEL** 00420 226 226 998