



EA MLA Signatory Český institut pro akreditaci, o.p.s. Olšanská 54/3, 130 00 Praha 3

issues

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

CERTIFICATE OF ACCREDITATION

No. 378/2023

Masarykova univerzita with registered office Žerotínovo náměstí 617/9, 602 00 Brno, Company Registration No. 00216224

> for the Testing Laboratory No. **1666** RECETOX: Trace Analytical Laboratories

> > Scope of accreditation:

Special trace and ultratrace analysis of organic compounds and elements in environmental samples, biotic samples, food and feed; sampling of air, soils, and bottom sediments to the extent as specified in the appendix to this Certificate.

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 17025:2018

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

This Certificate of Accreditation replaces, to the full extent, Certificate No.: 149/2022 of 17. 3. 2022, or any administrative acts building upon it.

The Certificate of Accreditation is valid until: 17. 3. 2027

Prague: 13. 7. 2023





Jan Velíšek Director of the Department of Testing and Calibration Laboratories Czech Accreditation Institute

Entity accredited according to ČSN EN ISO/IEC 17025:2018:

Tests

Masarykova univerzita

CAB number 1666, RECETOX: Trace Analytical Laboratories Kamenice 753/5, budova A29, 625 00 Brno

Detailed information on activities within the scope of accreditation (determined analytes / source literature) is given in the section "Specification of the scope of accreditation"

Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMSSOP-LSA-031 (except chap. 3, b to o, US EPA Method 1613B; ČSN EN-1948-2; ČSN EN-1948-3; ČSN EN-1948-4)Outdoor and indoor air2ReservedZReservedSOP-LSA-031 (except chap. 3, b to o, US EPA Method 1613B; ČSN EN-1948-3; ČSN EN-1948-4)Soils, sediments, ash, moss, and needles2ReservedSOP-LSA-031 (except chap. 3 a to b and chap. 3 g to oSoils, sediments, ash, moss, and needles	-
2ReservedSOP-LSA-031Soils, sediments, ash, moss, and needles0000000000	-
Determination of persistent organic pollutants (POP) by isotope dilution method SOP-LSA-031 (except chap. 3 a to b and chap. 3 g to o	-
³ HRGC-HRMS EPA Method 1613B; EPA Method 1668B; EPA Method 1614)	
4Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMSSOP-LSA-031 (except chap. 3 a to f and chap. 3 to o, EPA Method 1613B; ČSN EN 1528-1; ČSN EN 1528-2; ČSN EN 1528-3; ČSN EN 1528-4)Food and feed	-
Determination of persistent organic pollutants (POP) by isotope dilution methodSOP-LSA-031 (except chap. 3 a to n EPA Method 1613B; EPA Method 1668B; EPA Method 1614)Cell tissues and breast milk	-
6 Determination of polycyclic aromatic hydrocarbons (PAH) by GC-MS/MS method (PAH) by	-
Determination of indicator polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), and cyclodiene pesticides by isotope dilution method GC- MS/MSSOP-LSA-056 (EPA- MethodTO-4A)Outdoor and indoor air	-
8 Determination of trace elements ⁶ SOP-LSA-807 Whole blood and its components (serum, plasma) and urine	-

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Subject of the test	Degrees of freedom ³
9	Determination of dry matter by gravimetry and water content (moisture content) by calculation from measured values	SOP-LSA-057 (ČSN EN 15934, method A; ČSN 46 7092-3)	Soils, food, feed, biological material of animal and plant origin	-
10	Determination of fat by gravimetry	SOP-LSA-058 (ČSN EN ISO 2450; ČSN EN ISO 17189; ISO 11085)	Food and feed	-
11	Determination of selected polar per- and polyfluorinated substances (PFASs) by isotope dilution method LC-MS/MS	SOP-LSA-510	Surface, drinking and sea water	-
12	Determination of selected polar per- and polyfluorinated substances (PFASs) by isotopic dilution method LC-MS/MS	SOP-LSA-510	Blood serum, plasma, and breast milk	-
13	Determination of mercury by a single-purpose analyzer AMA 254	SOP-LSA-808	Whole blood and its components (serum, plasma), urine, breast milk, hair, soils, sediments, fly ash, moss, and needles	-
14	Determination of selected persistent organic pollutants (POP) by isotope dilution method GC-MS/MS	SOP-LSA-031 except chap. 3 p. b to o (EPA Method 1613B; EPA Method 1668B; EPA Method 1614)	Outdoor and indoor air	-
15	Determination of selected persistent organic pollutants (POP) by isotope dilution method GC-MS/MS	SOP-LSA-066	Blood serum, plasma	-

¹ asterisk at the ordinal number identifies the tests, which the laboratory is qualified to carry out outside the permanent laboratory premises

² if the document identifying the test procedure is dated, only these specific procedures are used. If the document identifying the test procedure is not dated, the latest edition of the specified procedure is used (including any changes)

³ the laboratory does not apply a flexible approach to the scope of accreditation



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Explanatory notes:

GC-MS/MS – Gas Chromatography/Mass Spectrometry HRGC-HRMS – High Resolution Gas Chromatography/High Resolution Mass Spectrometry ICP-MS – Inductively Coupled Plasma Mass Spectrometry LC-MS/MS – Liquid Chromatography/Mass Spectrometry AMA – Single-Purpose Atomic Absorption Spectrometer

Specification of the scope of accreditation:

Test ord. no.	Detailed information on activities within the scope of accreditation (determined analytes)
1, 3, 4, 5, 14	Polychlorinated dibenzo- <i>p</i> -dioxins PCDD and polychlorinated dibenzo- <i>p</i> -furans PCDF (2378-TCDD, 12378- PeCDD, 123678-HxCDD, 123478-HxCDD, 234678-HxCDD, 1234678-HpCDD, OCDD, 2378-TCDF, 12378- PeCDF, 23478-PeCDF, 123678-HxCDF, 123478-HxCDF, 234678-HxCDF, 123789-HxCDF, 1234678-HpCDF, 1234789-HpCDF, OCDF, calculation of TEQ PCDD/F parameters from measured values); dioxin-like polychlorinated biphenyls PCB (PCB 77, PCB 81, PCB 105, PCB 114, PCB 118, PCB 123, PCB 126, PCB 156, PCB 157, PCB 167, PCB 169, PCB 189, calculation of PCB sum and TEQ parameters from measured values); indicator polychlorinated biphenyls PCB (PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180, calculation of PCB sums from measured values); polybrominated diphenyl ethers PBDE (BDE 28, BDE 47, BDE 99, BDE 100, BDE 153, BDE 154, BDE 183, BDE 209)
6	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(123cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene, Biphenyl, Retene, Benzo(b)fluorene, Benzo-naphtho-thiophene, Benzo(ghi)fluoranthene, Cyclopenta(cd)pyrene, Triphenylene, Benzo(j)fluoranthene, Benzo(e)pyrene, Perylene, Dibenzo(ac)anthracene, Anthanthrene, Coronene) and calculation of the sums of PAH from measured values
7	Polychlorinated biphenyls PCB (PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180), calculation of PCB sums from measured values; heptachlor, heptachloroepoxide cis- (= exo, B), heptachloroepoxide trans- (= endo, A), aldrin, dieldrin, endrin, endrin aldehyde, endrin ketone, isodrin, oxychlordane, cis-nonachlor, trans- nonachlor, trans-chlordane (= gama), cis-chlordane (= alfa), endosulfan I (= alpha), endosulfan II (= beta), endosulfan sulfate, chlordecon, methoxychlor, mirex, hexachlorocyclohexane HCH (alpha-HCH, beta-HCH, gamma-HCH, delta-HCH, epsilon-HCH), pesticides (p,p'-DDT, o,p'-DDT, p,p'-DDE, o,p'-DDD, o,p'-DDD), pentachlorobenzene, hexachlorobenzene, calculation of the sums of HCH and pesticides from measured values
8	As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Se, Zn
11, 12	Per-and polyfluoroalkyl substances PFAS in the range of: Perfluoro-n-butanoic acid (PFBA), perfluoro-n-pentanoic acid (PFPeA), perfluoro-n-hexanoic acid (PFHxA), perfluoro-n-heptanoic acid (PFHpA), perfluoro-n-octanoic acid (PFOA), perfluoro-n-nonanoic acid (PFNA), perfluoro-n-decanoic acid (PFDA), perfluoro-1-butanesulfonate (PFBS), perfluoro-n-hexanesulfonate (PFHxS), perfluoro-n-octanesulfonate (PFOS)
15	Indicator polychlorinated biphenyls PCB (PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180, calculation of the sums of PCB from measured values); polybrominated diphenyl ethers PBDE (BDE 28, BDE 47, BDE 99, BDE 100, BDE 153, BDE 154, BDE 183, BDE 209), new type retardants (aDP, sDP), pesticides (p,p'-DDT, o,p'-DDE, o,p'-DDE, p,p'-DDD, o,p'-DDD)



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Specification of the scope of accreditation:

Test ord. no.	Detailed information on activities within the scope of accreditation (source literature)	
8	Gajek, R., Barley, F., & She, J. W. (2013). Determination of essential and toxic metals in blood by ICP-MS with calibration in synthetic matrix. Analytical Methods, 5(9), 2193-2202;	
	Wahlen, R., Evans, L., Turner, J., & Hearn, R. (2005). The Use of Collision/Reaction Cell ICP-MS for the Simultaneous Determination of 18 Elements in Blood and Serum Samples. Agilent ICP-MS application literature.	
11	Susan T. Wolf and William K. Reagen, Method and validation for the analysis of perfluorinated compounds in water by pre-sampling isotope dilution-direct injection-LC/MS/MS, Anal. Methods, 2013, 5, 2444. SOP 511	
12	S. Salihovic, A. Kärrman, G. Lindström, P. Monica Lind, L. Lind, B. van Bavel, A rapid method for the determination of perfluoroalkyl substances including structural isomers of perfluoroactane sulfonic acid in human serum using 96-well plates and column-switching ultra-high performance liquid chromatography tandem mass spectrometry, J Chromatogr. A, Volume 1305, 2013, Pages 164-170. SOP 514, SOP 515	
13	Operating Instructions, Altec s.r.o., Prague, 2002.	
	Díez, S., Montuori, P., Querol, X., Bayona, J.M. Total mercury in the hair of children by combustion atomic absorption spectrometry (Comb-AAS), (2007) Journal of Analytical Toxicology, 31 (3), pp. 144-149.	
	Száková, J., Kolihová, D., Miholová, D., Mader, P. Single-purpose atomic absorption spectrometer AMA-254 for mercury determination and its performance in analysis of agricultural and environmental materials (2004) Chemical Papers, 58 (5), pp. 311-315.	
	Spevácková, V., Korunová, V., Cejchanová, M., Vobecký, M. Sampling procedure and a radio-indicator study of mercury determination in whole blood by using an AMA 254 atomic absorption spectrometer (2004) Analytical and bioanalytical chemistry, 380 (2), pp. 346-350.	
14	van Bavel B, Geng D, Cherta L, Nácher-Mestre J, Portolés T, Ábalos M, Sauló J, Abad E, Dunstan J, Jones R, Kotz A, Winterhalter H, Malisch R, Traag W, Hagberg J, Ericson Jogsten I, Beltran J, Hernández F. Atmospheric- pressure chemical ionization tandem mass spectrometry (APGC/MS/MS) an alternative to high-resolution mass spectrometry (HRGC/HRMS) for the determination of dioxins. Anal Chem. 2015 Sep 1;87(17):9047-53.	
15	Samira Salihovic, Lisa Mattioli, Gunilla Lindström, Lars Lind, P. Monica Lind, Bert van Bavel, A rapid method for screening of the Stockholm Convention POPs in small amounts of human plasma using SPE and HRGC/HRMS, Chemosphere, Volume 86, Issue 7, 2012, Pages 747-753.	
	Samira Salihovic, Helena Nilsson, Jessika Hagberg, Gunilla Lindström, Trends in the analysis of persistent organic pollutants (POPs) in human blood, TrAC Trends in Analytical Chemistry, Volume 46, 2013, Pages 129-138.	
	Jordan Stubleski, Petr Kukucka, Samira Salihovic, P. Monica Lind, Lars Lind, Anna Kärrman, A method for analysis of marker persistent organic pollutants in low-volume plasma and serum samples using 96-well plate solid phase extraction, Journal of Chromatography A, Volume 1546, 2018, Pages 18-27.	



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Sampling

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Ordinal number	Sampling procedure name	Sampling procedure identification ¹	Subject of sampling
1	Air sampling for the determination of persistent organic pollutants (POPs) and metals using solid sorbent (polyurethane foam, filter, polyurethane foam + filter)	SOP-LSA-921 (ČSN EN ISO 16000-1, ČSN EN ISO 16000-12, ČSN EN 12341, ČSN EN 14902, ČSN EN 15549, ISO 12884)	Outdoor and indoor air
2	Reserved		
3	Bottom sediment sampling for the determination of persistent organic pollutants (POPs) and metals	SOP-LSA-980 (ČSN ISO 5667-12, ČSN EN ISO 5667-15)	Bottom sediment
4	Soil sampling for the determination of persistent organic pollutants (POPs) and metals	SOP-LSA-985 (ISO 18400, ČSN EN ISO 16133)	Soil

for dated documents identifying sampling procedures, only those specific procedures are used; for undated documents identifying sampling procedures, the most recent edition of that procedure (including any changes) is used

