

**The Appendix is an integral part of
Certificate of Accreditation No.: 378/2023 of 13/07/2023**

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

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“

Tests

Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Subject of the test	Degrees of freedom ³
1	Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMS	SOP-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 air	-
2	Reserved			
3	Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMS	SOP-LSA-031 (except chap. 3 a to b and chap. 3 g to o EPA Method 1613B; EPA Method 1668B; EPA Method 1614)	Soils, sediments, ash, moss, and needles	-
4	Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMS	SOP-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	-
5	Determination of persistent organic pollutants (POP) by isotope dilution method HRGC-HRMS	SOP-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	SOP-LSA-055 (EPA- Method TO-13A)	Outdoor and indoor air	-
7	Determination of indicator polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), and cyclodiene pesticides by isotope dilution method GC-MS/MS	SOP-LSA-056 (EPA- Method TO-4A)	Outdoor and indoor air	-
8	Determination of trace elements ⁶ by ICP-MS method	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'-DDE, p,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'-DDT, p,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. <i>Analytical Methods</i> , 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. <i>Agilent ICP-MS application literature</i> .
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, <i>Anal. Methods</i> , 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 perfluorooctane sulfonic acid in human serum using 96-well plates and column-switching ultra-high performance liquid chromatography tandem mass spectrometry, <i>J Chromatogr. A</i> , 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) <i>Journal of Analytical Toxicology</i> , 31 (3), pp. 144-149. Száková, J., Koliňová, 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) <i>Chemical Papers</i> , 58 (5), pp. 311-315. Speváčková, 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) <i>Analytical and bioanalytical chemistry</i> , 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. <i>Anal Chem</i> . 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, <i>Chemosphere</i> , 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, <i>TrAC Trends in Analytical Chemistry</i> , 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, <i>Journal of Chromatography A</i> , Volume 1546, 2018, Pages 18-27.

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Sampling

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

¹ 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