

CERTIFICATE

Matrix certified reference material of sewage sludge

METRANAL® CRM AN-OK01

This Certificate is designed in accordance with ISO Guide 31

Name:

AN-OK01: sewage sludge with certified values of selected PCB, PAH and elements.

The certified reference material AN-OK01 was prepared by spiking selected relevant organic compounds into the original natural matrix

Packing:

40 g of powder of the respective sewage sludge with a particle size of less than 100 µm in amber glass bottle. The sample is stabilized by radiation 25kGy.

Intended use:

This certified reference materials is intended primarily for use in realizing metrological traceability, validation of analytical methods and the transfer of property values to other materials of similar composition.

Recommended analytical methods for method dependent measurements:

Gas and liquid chromatography, flame AAS, ETA-AAS, ICP-OES, ICP-MS

Specification:

The date of production: November 2019

Shelf life: 5 years from the date of production

Metrological traceability:

Metrological traceability is realized by using certified calibration standards solutions for the calibration of measurement methods used (direct traceability to SI unit) and/or by simultaneous analysis of a matrix CRM (RM) of similar composition.

Homogeneity and stability:

Homogeneity and short term stability has been demonstrated according to the ISO GUIDE 35.

Sample preparation:

Contents of element fractions extractable by aqua regia according to the ISO 11466.
For organic compounds, the most frequently used are the following methods: EPA 8310, 8082A, 8081 or equivalent.

Storing and instruction for use:

This CRM has to be stored in original bottle -18°C (in a dark and dry place). The materials should be analysed in the "as received" state and their dry weight should be determined on non-analysed aliquots oven-dried at 105°C till the constant weight. The material in the bottle must be rehomogenized before each use by mechanical shaking of the content for 1-2 minutes. The bottle should be opened a minimum of 2 minutes after rehomogenization in order to prevent an escape of fine powder particles from the bottle into the environment and their sedimentation.

Certified and indicative values and their uncertainties:

The certified and indicative selected PCB and PAH are summarized in Table 1 and 2. The certified and indicative values of extractable element fraction are summarized in Table 3. The overall means evaluated have been given a status of certified and indicative values using the following criteria: data should be available from at least two independent analytical methods, at least 5 and 3 accepted laboratory means should be available for calculation of the overall mean for certified and indicative value, respectively. At combined uncertainties presented, the contribution of uncertainty of characterization of a particular property value is dominant.

Table 1: Certified and indicative values of selected PCB and their associated uncertainties.

PCB	AN-OK01	
	concentration [µg/kg]	uncertainty [µg/kg]
28	307	27
52	111	4
101	(276)	(55)
118	(41.4)	(6.5)
138	231	17
153	234	14
180	303	29

All values corrected to a dry mass at 105°C

Uncertainty – expanded combined uncertainty (k=2)

() indicative value

Table 2: Certified and indicative values of selected PAH and their associated uncertainties.

PAH	AN-OK01	
	concentration [mg/kg]	uncertainty [mg/kg]
anthracene	(0.203)	(0.040)
benzo[a]anthracene	1.23	0.15
benzo[b]fluoranthene	3.38	0.28
benzo[k] fluoranthene	1.69	0.12
benzo[a]pyrene	1.81	0.19
benzo[g,h,i]perylene	1.32	0.15
phenanthrene	5.06	0.49
fluoranthene	4.87	0.40
chrysene	3.86	0.24
indeno[1,2,3-c,d] pyrene	1.23	0.16
naphthalene	(0.54)	(0.12)
pyrene	5.46	0.41

All values corrected to a dry mass at 105°C

Uncertainty – expanded combined uncertainty (k=2)

() indicative value

Table 3: Certified and indicative values of contents of element fractions extractable by aqua regia

Element	AN-OK01	
	concentration [mg/kg]	uncertainty [mg/kg]
As	10.3	0.3
Be	1.02	0.08
Ca	(23 550)	(980)
Cd	6.76	0.47
Co	24.5	0.6
Cr	66.8	3.0
Cu	205	8
Hg	2.72	0.25
K	(3670)	(480)
Mg	(8190)	(230)
Mo	(6.25)	(0.58)
Ni	56.5	2.6
Pb	60.4	2.3
V	33.5	2.7
Zn	675	25
total P	21 900	1000
total N	(39 100)	(2 100)
loss of ignition	47.4 %	0.2 %

All values corrected to a dry mass at 105°C

Uncertainty – expanded combined uncertainty (k=2)

() indicative value

Analytika®, spol. s r.o. will be monitoring this RM over the period of its validity. If substantive changes of reference values occur, Analytika®, spol. s r.o. will notify the purchaser.

Note:

Detailed information about the production, homogeneity testing and characterization of this CRM are described in the Certification report, which is available on request.

Producer:


ANALYTIKA®, spol. s r.o.
Department of reference materials
Ke Klíčovu 2a/816
190 00 Prague 9 – Vysočany
Czech Republic

www.analytika.net
sales@analytika.net

phone: +420 286 589 616

Quality management systems of company ANALYTIKA®, spol. s r.o.:

ČSN EN ISO 9001:2016
ČSN EN ISO/IEC 17025:2018
ČSN EN ISO 17034:2017

Manager of Department of RM:

Ing. Daniela Weissnerová

Head of production department:

Mgr. Mirka Petránková

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