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Ring test
Organic contaminants in leaching (soil)
P2538-RT

Summary

The entire report is available to participants only.

The ring test was designed on behalf of PROOF-ACS GmbH by

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The ring test was realised, evaluated, authorised and the report was approved by

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DAkkS Deutsche Akkreditierungsstelle D-EP-22211-01-00

PROOF-ACS is a DAkkS accredited proficiency testing provider according to DIN EN ISO 17043:2010 (D-EP-22211-01-00). This ring test is not covered by the scope of accreditation.

PROOF-ACS GmbH does not have any analytical laboratory facilities of its own. Homogeneity testing and stability testing are subcontracted to laboratories, accredited according to DIN EN ISO 17025. The subcontracted laboratory may also participate in the ring tests. If so, the laboratory is treated in the same way as other participants and the same rules of confidentiality apply.

The proficiency test evaluates the performances of laboratories with respect to their ability to identify and organic contaminants in an eluate, which is prepared of a soil material.

Phenols, chlorobenzenes, chlorophenols, PCBs and polycyclic aromatic hydrocarbons (PAH) are covered by the test.

The scope of parameters is defined as

- the phenols phenol, catechol, resorcinol, hydroquinone, o-, m-, and p-cresol, and the sum of phenols,
- the chlorobenzenes 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,3,5-trichlorobenzene, 1,2,3,4-tetrachlorobenzene, 1,2,3,5-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene, and the sum chlorobenzenes,
- the chlorophenols 2-chlorophenol, 3-chlorophenol, 4-chlorophenol, 2,3-dichlorophenol, 2,4-dichlorophenol, 2,5-dichlorophenol, 2,6-dichlorophenol, 3,4-dichlorophenol, 3,5-dichlorophenol, 2,3,4-trichlorophenol, 2,3,5-trichlorophenol, 2,3,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 3,4,5-trichlorophenol, 2,3,4,5-tetrachlorophenol, 2,3,4,6-tetrachlorophenol, 2,3,5,6-tetrachlorophenol, pentachlorophenol, and the sum chlorophenols,
- the PCBs PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153, PCB-180, and the sum PCBs,
- the PAHs acenaphthene, acenaphthylene, anthracene, benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene, pyrene, naphthalene, methylnaphthalene, the sum 15 PAHs, the sum of naphthalene and methylnaphthalene.

A 2:1 eluate is prepared from a soil material, which is free from contamination with the parameters covered by the test. The eluate is spiked with selected parameters out of the scope of parameters as defined above (see table below). Catechol and resorcinol are spiked as well, but a high degree of degradation was observed. Catechol and resorcinol are thus not considered for evaluation.

13 laboratories from Germany took part in the test. All 13 labs reported results and are considered for evaluation.

The performance of laboratories in the test is evaluated according to

- the *identification* of the spiked organic compounds. Parameters, which are not reported and not marked as “not analysed” are considered false negative. Results related to unspiked parameters are only considered if they are at relevant concentration levels. Such findings are considered false positive.
- the *comparability* of the results. The evaluation of the comparability is based on the z-score model. The absolute value of the z-score should be at least ≤ 2. The comparability criterion is applied to all parameters except 1,2,3,5-tetrachlorobenzene, 3-chlorophenol, and 2,3,4,6-tetrachlorophenol.

- the *trueness* of the results. The trueness is expressed as the coverage of the spiked level in %. The coverage should be at least between 70 and 120 % of the spiked level. The trueness criterion is applied to the spiked chlorobenzenes and spiked chlorophenols.
- The results related to the sum of the different groups of compounds are presented for information only. The results are not considered to evaluate the performance of the labs in the test.

Results

Parameter	Spiked level [µg/l]*	Assigned value [µg/l]	Total number of results	**Comparability criterion:** no. of participants, with |z-score| ≤ 2	**Trueness criterion:** no. of participants with results within 70-120 % recovery of the spiked level
Phenol	5.2	3.57	9	7	Not applicable
o-Cresol	3.8	2.82	9	9	Not applicable
p-Cresol	1.8	0.922	9	9	Not applicable
1,2,4-Trichlorobenzene	0.47	0.210	10	7	1
1,2,3,5-Tetrachlorobenzene	0.18	-	8	Not applicable	1
Hexachlorobenzene	0.033	0.0150	8	7	0
3-Chlorophenol	0.11	-	6	Not applicable	3
2,4,5-Trichlorophenol	0.23	0.178	7	6	4
2,3,4,6-Tetrachlorophenol	0.087	-	4	Not applicable	2
PCB 52	0.016	0.00574	12	8	Not applicable
PCB 138	0.062	0.0142	12	7	Not applicable
PCB 180	0.056	0.00966	12	7	Not applicable
Anthracene	0.027	0.0171	11	10	Not applicable
Benz[a]anthracene	0.083	0.0334	10	9	Not applicable
Fluoranthene	0.11	0.0746	11	11	Not applicable
Phenanthrene	0.12	0.0848	11	9	Not applicable
Pyrene	0.051	0.0319	11	9	Not applicable
Naphthalene	0.22	0.157	11	9	Not applicable

* The spiked levels of phenols, PCBs, and PAHs are provided for information only.

To summarise:

- 13 laboratories reported results. The laboratories were free to choose if they report results related to all five groups of compounds or a selection of it.
- 9 labs reported results related to phenols, 10 labs related to chlorobenzenes, 7 labs related to chlorophenol, 12 labs related to PCBs, and 11 labs related to PAHs.
- Three labs reported false negative results of phenol, 1,2,4-trichlorobenzene, resp. 1,2,3,5-tetrachlorbenzene.
- Seven labs reported false positive results related to 1,2,3-trichlorobenzene, 1,3,5-trichlorobenzene, 2-chlorophenol, PCB 28, PCB 101, PCB 118, PCB 153, acenaphthene, fluorene, and methylnaphthalene.
- 7 out of 9 labs reported comparable results related to all three spiked phenols.
- None of the labs passes the comparability criterion and the trueness criterion for all three spiked chlorobenzenes.
- 2 out of 7 labs pass the comparability criterion and the trueness criterion related to all three spiked chlorophenols.
- 7 out of 12 labs reported comparable results related to all three spiked PCBs.
- 5 out of 11 labs reported comparable results related to all six spiked PAHs.