

Ring test Bisphenols, BADGE and BFDGE in canned food P2504-RT



Summary

The entire report is available to participants only.

The ring test was designed, realised, evaluated, and authorised on behalf of PROOF-ACS GmbH by

Dr. Rieke Himstedt-Klüver
Project Manager PROOF-ACS GmbH
Project coordinator

The report was approved by

Dr. Birgit Schindler
Managing Director PROOF-ACS GmbH
Project coordinator

Participants with any comments or concerns related to this ring test are invited to contact:

PROOF-ACS GmbH
Gottlieb-Daimler-Str. 1
28237 Bremen
Phone: +49 421 388 928 50
E-mail: proof@proof-acs.de
www.proof-acs.de



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 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.

All reports issued by PROOF-ACS are copyright by PROOF-ACS GmbH ©PROOF-ACS GmbH 2025. All Rights Reserved. The report may not be copied or duplicated in whole or in part by any means without prior permission of PROOF-ACS. Anyone wishing to use data for their own publications should first seek permission from PROOF-ACS. In general, citations of the data or the report in full or in part should follow the general rules for scientific citations.

The proficiency test evaluates the performances of laboratories with respect to their ability to identify and quantify bisphenols and bisphenol derivatives in pea soup in accordance with Commission Regulation (EU) 2024/3190. The regulation prohibits the use of hazardous bisphenols and hazardous bisphenol derivatives in food contact materials and food.

The regulation defines that, if the European Union Reference Laboratory (EURL) has developed or recommended a method, this method shall be used. Any method for quantification of bisphenol A or other hazardous bisphenols or hazardous bisphenol derivatives shall have a detection limit of 1 µg/kg.

As no standardised method is available, all labs were free to choose their own method for the quantification. According to the regulation, all laboratories are requested to include bisphenol A and bisphenol S in their scope, as they are listed in part 3 of annex VI to regulation (EC) No 1272/2008. BADGE is also listed in annex VI, not classified as category 1A or 1B, but considered endocrine disrupting. Further bisphenols and bisphenol derivatives are not defined yet. Therefore, the scopes of the laboratories differ.

The scope of the ring test is

- for the bisphenols, bisphenol A, bisphenol B, bisphenol F, and bisphenol S,
- for the bisphenol derivatives, BADGE, BADGE.H₂O, BADGE.2H₂O, BADGE.HCl.H₂O, BADGE.HCl, BADGE.2HCl, BFDGE, BFDGE.H₂O, BFDGE.2H₂O, BFDGE.HCl.H₂O, BFDGE.HCl, and BFDGE.2HCl, and
- optional, the sum of BADGE (after hydrolysis) and the sum of BFDGE (after hydrolysis).

A commercially available pea soup is chosen as matrix of P2504-RT. The soup is homogenised and provided as blank material upon request. The blank material is free from bisphenols and bisphenol derivatives above the respective limits of quantification.

The homogenised pea soup is spiked with a mix-solution of four bisphenols and four bisphenol derivatives, solved in methanol (see table below).

Eight laboratories across five countries (Austria, Germany, Ireland, Italy, and Vietnam) took part in the test. Seven labs reported results and are considered for evaluation.

The performance of laboratories in the test is evaluated according to

- the identification of the spiked bisphenols and bisphenol derivatives. Parameters, which are not reported and not marked as “not analysed” are considered false negative.
- 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 bisphenol A. The comparability criterion is not applicable to all other parameters due to the limited number of reported results.
- 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 all parameters.

Results

Parameter	Spiked level [µg/kg]	Assigned value [µg/kg]	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
Bisphenol A	26	27.6	7	6	5
Bisphenol B	45	-	5	not applicable	3
Bisphenol F	34	-	6	not applicable	4
Bisphenol S	75	-	7	not applicable	4
BADGE	320	-	2	not applicable	2
BADGE.H ₂ O	56	-	2	not applicable	1
BADGE.HCl.H ₂ O	140	-	2	not applicable	1
BFDGE (sum)	130	-	2	not applicable	2

To summarise:

- 7 laboratories reported results. The laboratories were free to choose if they report results related to all 8 parameters or a selection of it.
- None of the labs reported false negative results.
- All seven laboratories reported results related to bisphenol A and bisphenol S. Six labs reported results related to bisphenol F and five reported results related to bisphenol B.
- The performance of most of the laboratories for the quantification of bisphenol A is good, and the chosen methods are suitable for the quantification. The assigned value of bisphenol A is in good accordance with the spiked level. The performance related to the other bisphenols varies in quality.
- Data related to the bisphenol derivatives are limited. Only two labs reported results. The quantification of the bisphenol derivatives is challenging, as the epoxy groups of the derivatives are well known to react with the water and/or the saline content of the matrix.
- One of the labs quantified all bisphenols and bisphenol derivatives correctly and two labs quantified all bisphenols within their limited scope correctly.
- Four labs implemented a LOQ of ≤ 1 µg/kg for bisphenol A and bisphenol S. Three labs implemented a LOQ of ≤ 1 µg/kg for all bisphenols and bisphenol derivatives within their scope. One lab reports LOQs > 1 µg/kg for the bisphenols not mentioned in the regulation. Three labs report LOQs above 1 µg/kg and should try to improve the sensitivity of the analytical methods to reach LOQs of ≤ 1 µg/kg.
- None of the labs reported results related to BADGE and BFDGE after hydrolysis.