



PT FOR SUBSTANCES OF EMERGING CONCERN IN DRINKING WATER
STATE-OF-THE-PLAY REPORT GERMANY

9th International Workshop on Proficiency Testing
 Portorož, Slovenia, 12 October 2017

Ulrich Borchers, Peter Balsaa
 (IWW)
 Frank Baumeister, Michael Koch
 (AQS-BW)


Eurachem
 A focus for analytical chemistry in Europe

Affiliated Institute of the
 DVGW
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 JRF

AQS Baden-Württemberg

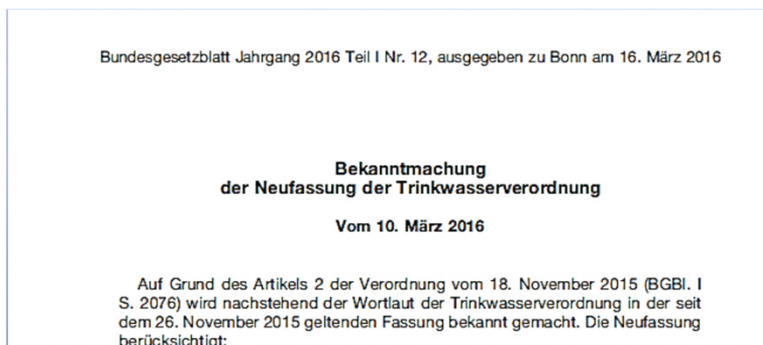
Topics

- **Drinking water labs in Germany** Current Topic
 - Legal requirements
 - QM requirements including PT participation
- **The system of harmonized drinking water PTs in Germany**
- **Extension of the PT scheme to substances of emerging concern**
- **Design of the PT schemes**
- **Results (examples)**
- **Conclusions**

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Legal requirements Germany

- **Drinking water analysis is regulated by law through the German Drinking Water Regulation 2001 (TrinkwV 2001)**
- **Based on the European Drinking Water Directive (98/83/EC)**




Legal basis for Drinking Water PTs in Germany

- **Article 15, clause 4, No. 4:**
 - Laboratories are obliged to participate in external **quality assurance systems**
 - ▶ successfully and on a regular basis
 - also required for accreditation according to EN ISO/IEC 17025
 - **In Addition → Notification** of labs by the responsible federal health ministries of the federal states (“Länder”)
 - Compliance of all lab requirements checked by “Independent Bodies” (§ 15, 5)
 - ▶ Includes also the check of successful PT participation

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Recommendations Drinking Water PTS – Environment Agency

Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz 2003 - 46:1094-1095
DOI 10.1007/s00103-003-0726-y

**Umwelt
Bundesamt**

Empfehlungen des Umweltbundesamtes

Empfehlung für die Durchführung von Ringversuchen zur Messung chemischer Parameter und Indikatorparameter zur externen Qualitätskontrolle von Trinkwasseruntersuchungsstellen

Empfehlung des Umweltbundesamtes nach Anhörung der Trinkwasserkommission des Bundesministeriums für Gesundheit und Soziale Sicherung beim Umweltbundesamt

- **Recommendations have been published in 2003 after**
 - ▶ Consultation with relevant PTS providers
 - ▶ Discussion by German drinking water commission

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Environment Agency recommendations

■ Several samples

- with different concentration levels
- relevant to the drinking water limits
- lower limits of application of standardised methods



Umwelt
Bundesamt

■ Choice of methods not regulated

■ Standardised methods to be preferred

■ PT schemes have to ensure that the performance of a lab is checked **representatively**

■ Cycle for offering all parameters of DW regulation:

- **2 - 3 years**
- → to pass all accredited parameters

■ Acceptable value $|z_U| \leq 2$

■ Successful = more than half of values are acceptable



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7

The four Drinkingwater PT providers in Germany

■ Public Health Authority Lower Saxony

■ Environment Agency North Rhine-Westfalia

■ Public Health Authority Hamburg

■ AQS Baden-Wuerttemberg

Trinkwasser-Ringversuche in Deutschland

Veranstalter:

Niedersächsisches
Landesgesundheitsamt
Standort Aurich
Luchtenburger Weg 24
26603 Aurich
Frau Dr. Katrin Luden
Tel.: 04941 / 9171-0
Fax: 04941 / 9171-10
E-Mail: ringversuch.aurich@nlga.niedersachsen.de
Web: <http://www.nlga.niedersachsen.de/>



Niedersächsisches
Landesgesundheitsamt

LANLW NRW
Leibnizstr. 10
45659 Recklinghausen
Frau Sibylle Föllmer
Tel.: 0211 / 1590-2333
Fax: 0211 / 1590-2415
E-Mail: sibylle.fuellmer@lanw.nrw.de
Web: http://www.lanw.nrw.de/analytik/trinkw_rvhw_ringv/

Landesamt für Natur,
Umwelt und Verbraucherschutz
Nordrhein-Westfalen



Institut für Hygiene und Umwelt
Marckmannstr. 129b
20539 Hamburg
Frau Dr. Karla Ludwig-Baxter
Tel.: 040 / 42845-3645
Fax: 040 / 4273-10891
E-Mail: karla.ludwig-baxter@hu.hamburg.de
Web: <http://www.hamburg.de/bgv/ringversuche>



Institut für Hygiene und Umwelt
Hamburger Landesinstitut für Lebensmittelsicherheit,
Gesundheitsschutz und Umweltuntersuchungen

AQS-BW
am Institut für Siedlungswasserbau
Universität Stuttgart
Bandstraße 2
70569 Stuttgart
Herr Dr. Frank Baumeister
Tel.: 0711 / 695-65446
Fax: 0711 / 695-53769
E-Mail: info@aqsbw.de
Web: <http://www.aqsbw.de>

AQS Baden-Württemberg
an der
Universität Stuttgart



Stand: November 2016




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8


Topics

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PT scheme for “emerging drinking water substances” (EDWS)

- **Supplementary to the routine set of 5 organic PTs**
- **fills the gap in the field of a comprehensive and sustainable quality management approach for routine labs**
- **parameter list of the EDWS system was derived from queries amongst water authorities and drinking water laboratories**
- **The first list of “hot targets”**
 - Pharmaceuticals (human and veterinary)
 - X-ray contrast agents
 - Hormones
 - Sweeteners
 - Fluorosurfactants (e.g. PFOS and PFOA)
 - Complexing agents (e.g. EDTA)

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Design of the EDWS PT scheme

- **3 different drinking water test samples**
 - 3 concentration levels
 - appropriate low concentrations
- **samples based on a spiked real drinking water**
- **assigned values from formulation**
- **statistical evaluation according to ISO 13528:2015**
 - with the Q/Hampel method (estimator)
- **Assessment of results**
 - $|z_U| \leq 2$ → satisfactory
 - $2.0 < |z_U| < 3.0$ → questionable
 - $|z_U| \geq 3.0$ → unsatisfactory



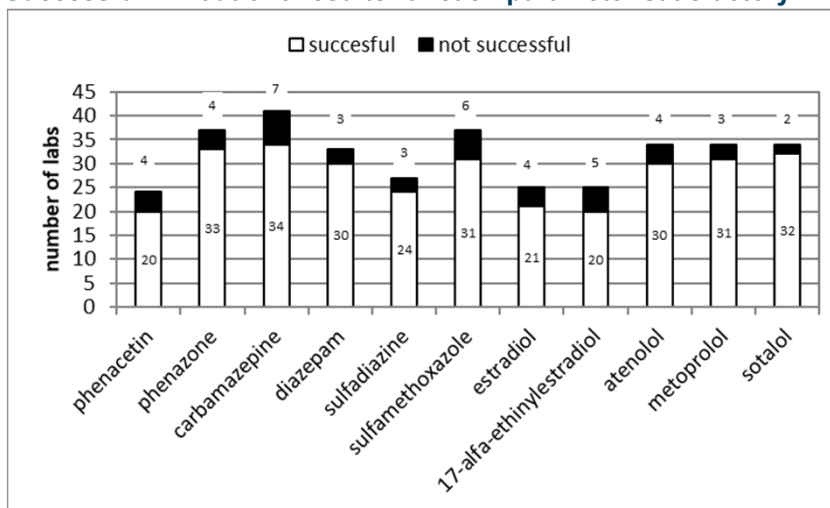
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Overview EDWS PT since 2013							
Code	Parameter	Substance group	RSD, min [%]	RSD, max [%]	Conc., min [µg/l]	Conc., max [µg/l]	N
S1 1/13	Cyclamate	Sweetener	15	18	0,17	1,71	27
S1 1/13	Saccharin	Sweetener	15	22	0,21	1,85	26
S2 8/13	Carbamazepine	Pharmaceuticals human	10	17	0,06	0,4	41
S3 2/14	Nonyl phenol	Hormones	36	44	0,11	0,4	32
S4 5/14	PFOA	Fluorosurfactant	16	19	0,04	0,38	33
S4 5/14	PFOS	Fluorosurfactant	24	25	0,03	0,39	33
S6 6/15	Amidotrizoic acid	X-ray contrast agents	17	34	0,11	0,4	32
S6 6/15	Iopamidol	X-ray contrast agents	18	21	0,11	0,37	35
S1 2/16	Saccharin	Sweetener	18	25	0,1	0,96	25

Topics	
<ul style="list-style-type: none"> ■ Drinking water labs in Germany <ul style="list-style-type: none"> • Legal requirements • QM requirements including PT participation ■ The system of harmonized drinking water PTs in Germany ■ Extension of the PT scheme to substances of emerging concern ■ Design of the PT schemes ■ Results (examples) ■ Conclusions 	<div style="border: 1px solid blue; padding: 2px 10px; display: inline-block;">Current Topic</div>
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EDWS PT 8/13: Pharmaceuticals and Hormones

■ **Successful = 2 out of 3 results for each parameter satisfactory**

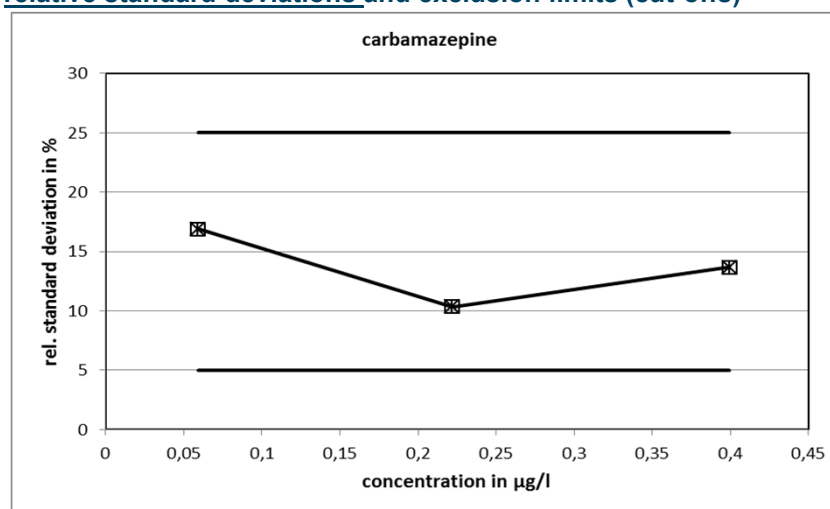


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15

EDWS PT 8/13: Pharmaceuticals and Hormones

■ **relative standard deviations and exclusion limits (cut-offs)**

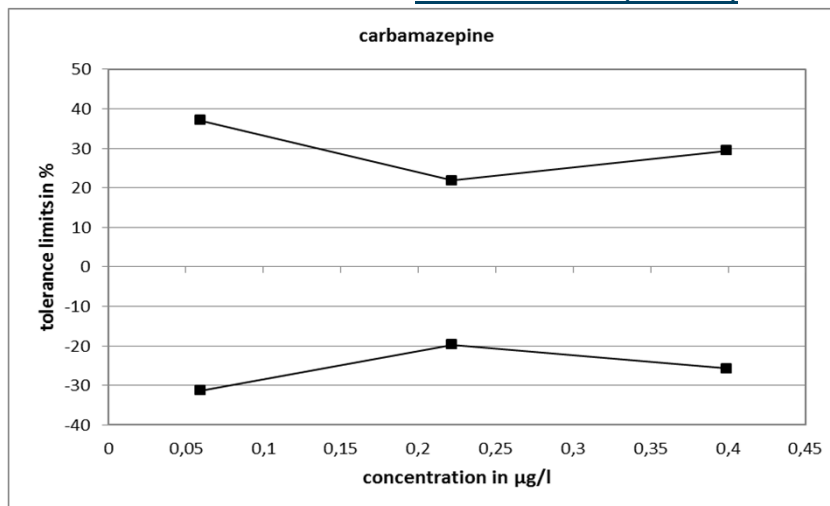


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16

EDWS PT 8/13: Pharmaceuticals and Hormones

■ relative standard deviations and exclusion limits (cut-offs)

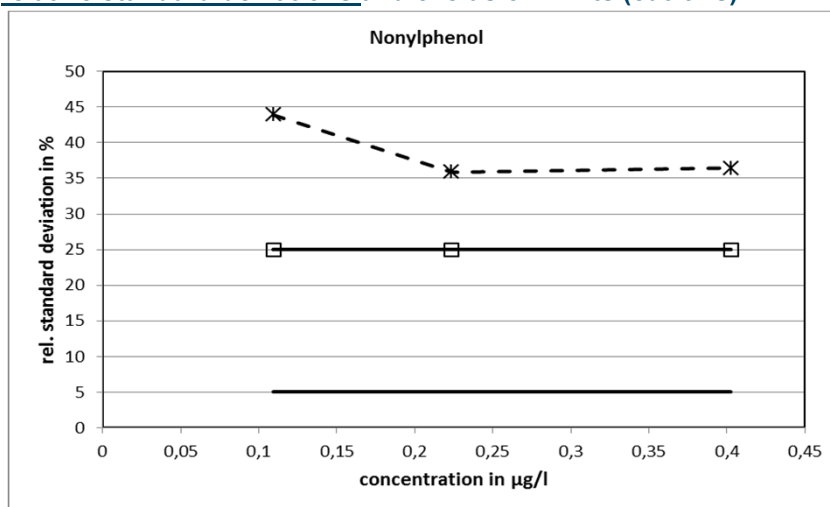


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17

EDWS PT 2/14: Alkylphenols

■ relative standard deviations and exclusion limits (cut-offs)

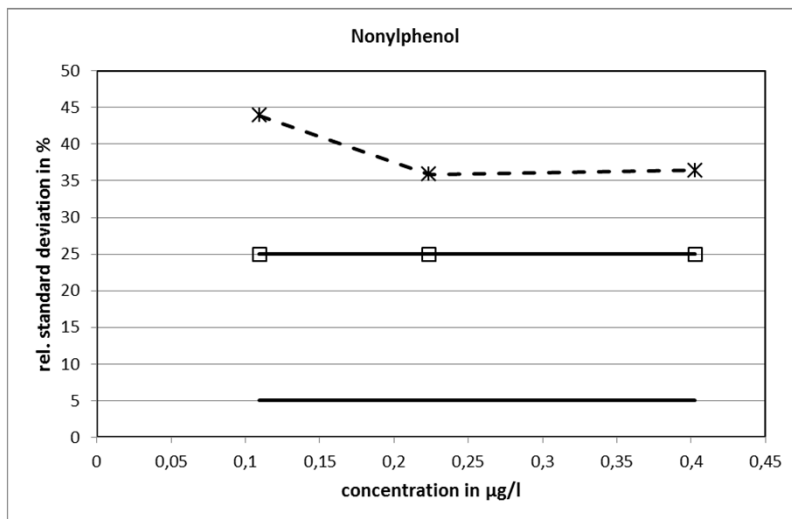


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18

EDWS PT 2/14: Alkylphenols

■ relative standard deviations and exclusion limits (cut-offs)

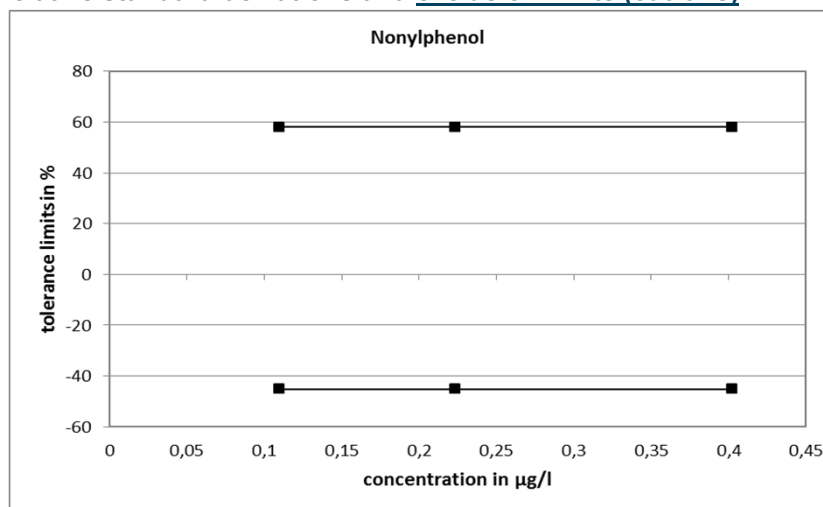


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EDWS PT 2/14: Alkylphenols

■ relative standard deviations and exclusion limits (cut-offs)



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20

The problem with Nonylphenol

4-Nonylphenol

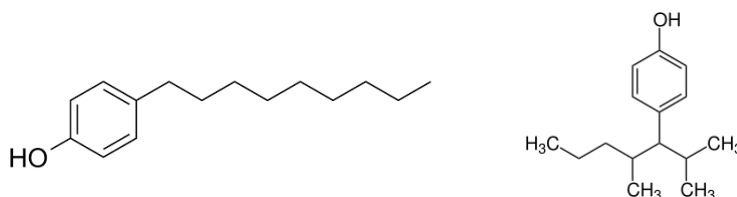
- Commonly branched

CAS No. 84852-15-3

- In accordance with priority substance list WFD

Commercial products are always a mixture of isomers

- potentially varying ratios between isomers



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Current Topic

Conclusions

■ EDWS Scheme nicely fills the gap in the field of exotic organic parameters in drinking water

- relevant (low) concentration levels
- real drinking water matrix
- assigned values from formulation
- statistical evaluation according to recognized standards
- 30 - 40 labs



■ helps German labs to fulfil the requirements of

- accreditation
- in combination with notification by health authorities

■ open for other labs (all documentation also available in English)

- www.aqsbw.de/en



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23

www.iww-online.de
info@iww-online.de



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IWW Rheinisch-Westfälisches Institut für
 Wasserforschung gemeinnützige GmbH

IWW Rheinisch-Westfälisches Institut für Wasser
 Beratungs- und Entwicklungsgesellschaft mbH
 Moritzstraße 26
 45476 Mülheim an der Ruhr
 Telefon: +49 (0) 208 4 03 03-0
 Fax: +49 (0) 208 4 03 03-80



Dr. Ulrich Borchers

u.borchers@iww-online.de

Telefon: +49 (0) 208 4 03 03-210



Dr. Peter Balsaa

p.balsaa@iww-online.de

Telefon: +49 (0) 208 4 03 03-221



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