

Highlights TC Metrology in Chemistry

Hanspeter Andres, TC-MC Chair

Boras, Sweden
22 – 23 May 2019



Agenda

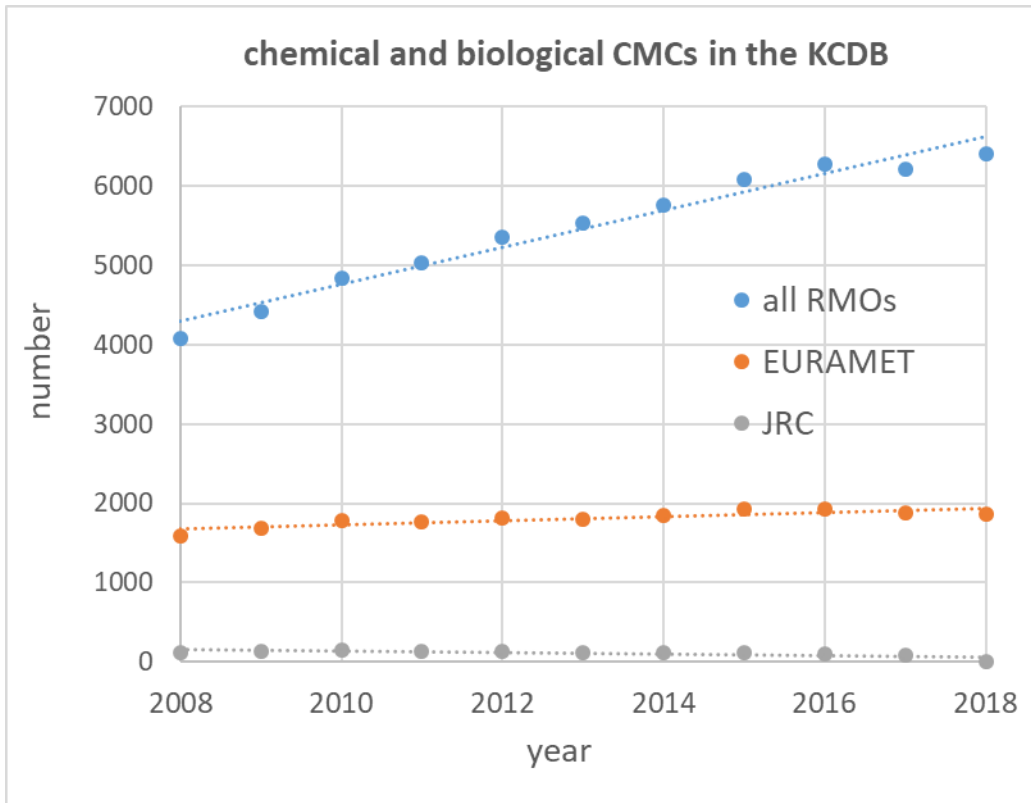


- Technical Committee Metrology in Chemistry
- 1. CMCs and SI traceability
- 2. Comparable particle number concentrations $< 2 \text{ cm}^{-3}$
- 3. Second edition of DI workshop

TC Metrology in Chemistry overview

- 27 national contacts + 1 observer
- 20 NMIs and 20 (-1) DIs have chemistry programs
- 4 technical subcommittees
(gas analysis, inorganic analysis, electrochemical analysis, organic and bio analysis)
- 1 strategy working group
(supplemented with a bio-metrology expert)
- 1 annual plenary meeting
(2019 in Brno, 2020 in Bern)
- 2nd DI support workshop
- 3 related EMNs (+ 3 in planning stage)

CMC and SI traceability chem-bio CMCs over time



- all RMOs
~ +250 year
- EURAMET
~ +30 year
~ 40 % > 30 %
- JRC
142 > 62 > 0
~ 7 % > 5 % > 0 %

- SI traceability in the chem-bio field proliferates

CMC and traceability

SI traceability via JRC I



- reviewed EURAMET CMCs with SI traceability via JRC
- identified 11 inorganic CMCs from 3 NMIs/DIs

NMI / DI	Measurand / Analyte	Source of traceability	CRM expiry date
LGC (UK)	$n(^{234}, ^{235}, ^{236}\text{U})/n(^{238}\text{U})$	IRMM-184	-
IJS (SI)	$w(\text{As}), w(\text{Ca}), w(\text{Fe}), w(\text{Zn})$	IRMM-530R	Feb 2020
TUBITAK UME (TR)	$w(\text{Cd})$ $w(\text{Cu})$	IRMM-622 IRMM-632	-

- IJS (SI): 6 CMCs based on INAA
- SI traceability via IRMM-530R (Al-0.1%Au alloy)
- Re-certification after expiry by other NMIs/DIs possible

CMC and traceability

SI traceability via JRC II

- Bio-community missed to review their CMCs
- Chair's analysis revealed 7 bio-CMCs (Cat 11 Food)

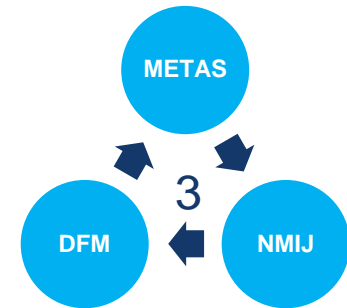
NMI / DI	Measurand / Analyte	Source of traceability
LGC (UK)	GMOs / maize and soya	e.g. ERM-BF410K, ERM-AD413, ... purity assessment by JRC
NIB (SI)	GMOs / maize and soya	e.g. ERM-F418D, ERM- BF423D, ... purity assessment by JRC
TUBITAK UME (TR)	GMOs / raw maize	ERM-AD413, ERM-AD413ek purity assessment by JRC

- International bio-community now aware of issue
- mentioned SI traceability questionable
- dPCR is replacing qPCR

comparable $P_N < 2 \text{ cm}^{-3}$
details EURAMET 1453



- Pilot: METAS
- Participants: METAS, DFM, NMIJ
- Optical particle counters (OPC)
- Particle sizes: 300 nm - 5 μm
- Particle type: solid or non-volatile-liquid (e.g. PSL, NaCl)
- Concentration range: $<0.5 \text{ cm}^{-3}$ - 2 cm^{-3}



Examples of commercial instruments:

Lasair (PMS)



Abakus (Klotz)



AeroTrak (TSI)



Solair (Lighthouse)



KC-22A (Rion)



KC-31 (Rion)



comparable $P_N < 2 \text{ cm}^{-3}$
results EURAMET 1453



- Each participants generated his own calibration aerosol
- counting efficiency of transfer OPCs vs own standard

- Comparable results for all three transfer OPCs!

2nd DI support workshop a look back to edition 1 (2017)



- Invitation to DI without CMCs after 5 years as A-DI
- four of five concerned A-DIs followed invitation



CMC accepted



adapted scope
follow-up workshop 2



participated
BIPM.QM.K1



Laboratory for oil testing

participated
CCQM.K146
follow-up workshop 2

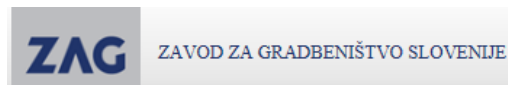
Second edition of DI workshop first look at the outcome (2019)



- Invitation to all A-DI without CMCs yet
- Four of seven A-DIs followed invitation, two responded



WHO IU reference laboratory
bio-activity outside CIPM MRA
UK designation clarification



adapted scope
no CIPM MRA activities
national discussion



Laboratory for oil testing

CCQM.K146
help with traceability
await report
to submit CMCs



BIPM.QM.K1
awaiting report
to submit CMCs,
QMS approved



BIPM.QM.K1
awaiting report
to submit CMCs



EURAMET.QM-S11
await report
to submit CMCs

Thank you



Metrology in
Chemistry