
SWEDISH
VETERINARY
AGENCY

Measure Uncertainty

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EURL-*Campylobacter* Workshop 2024

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Aim

- Evaluate if measurement uncertainty is within acceptable limits
- Identify difficulties in the estimation and reporting of measurement uncertaiinty in the proficience tests
- Propose possible improvements of instructions and protocol

Guidance values of acceptable MU for enumeration

Table 1: Enumeration with colony-count technique (in $\log_{10}$ cfu/g).
*Source: AFSSA opinion, 2008[5]

	Homogeneous matrix		Heterogeneous matrix	
Total number of colonies	Method without confirmation	Method with confirmation	Method without confirmation	Method with confirmation
≤5	0,7	0,7	0,7	0,8
6-10	0,5	0,6	0,6	0,7
11-15	0,4	0,5	0,5	0,6
16-150 or 16-300, depending on the method	0,3	0,5	0,5	0,6

Acceptable MU for Campylobacter

- 1. For enumeration with a CCT including a confirmation step, i.e. enumeration of Campylobacter according to EN ISO 10272-2, of Lm according to EN ISO 11290-2 and of CPS according to EN ISO 6888-1:

- o ca. 0,5 log10 when a sufficient number of colonies are counted on the plate(s) retained for enumeration (low numbers excluded, see case 3) and when the product analysed is homogeneously contaminated;

- o ca. 0,6 log10 when a sufficient number of colonies are counted on the plate(s) retained for enumeration (low numbers excluded, see case 3) and when the product analysed is not homogeneously contaminated.

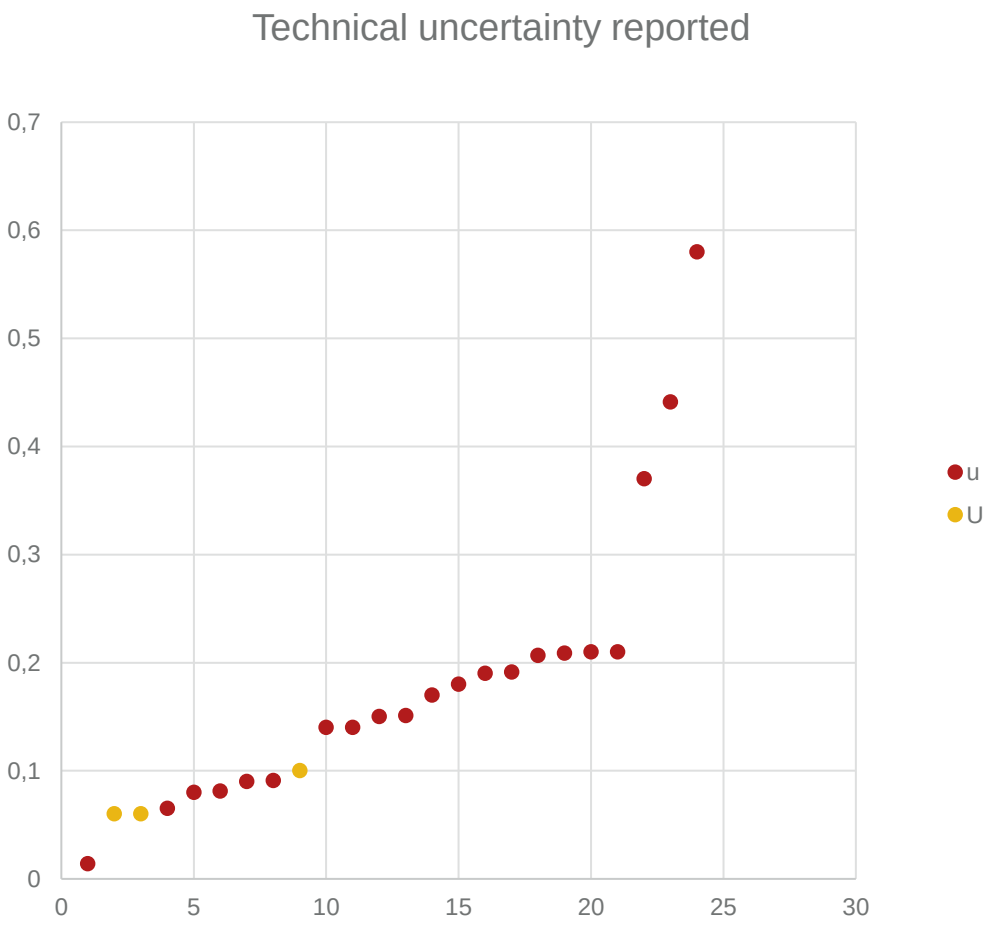
What protocol was used for Technical U?

- EN ISO 19036:2019 (20)
- ISO/TS 19036:2006/Amd 1:2009 (3 lab)
- NMKL No 8 (2008) (1 lab)
- Did you encounter problems?

What was reported

- Technical uncertainty
- 21/ 35 reports
- I lab used External Proficiency participation results
- Total uncertainty
- 22/35 reports

Technical uncertainty

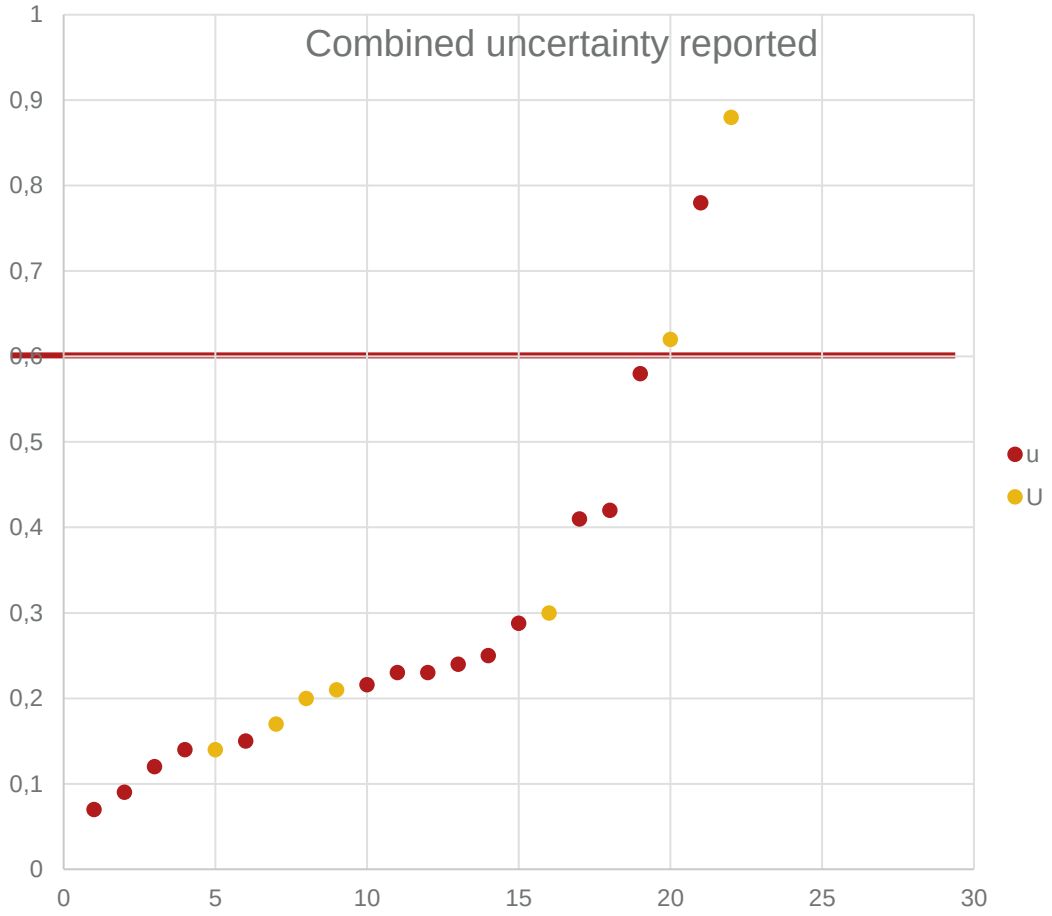


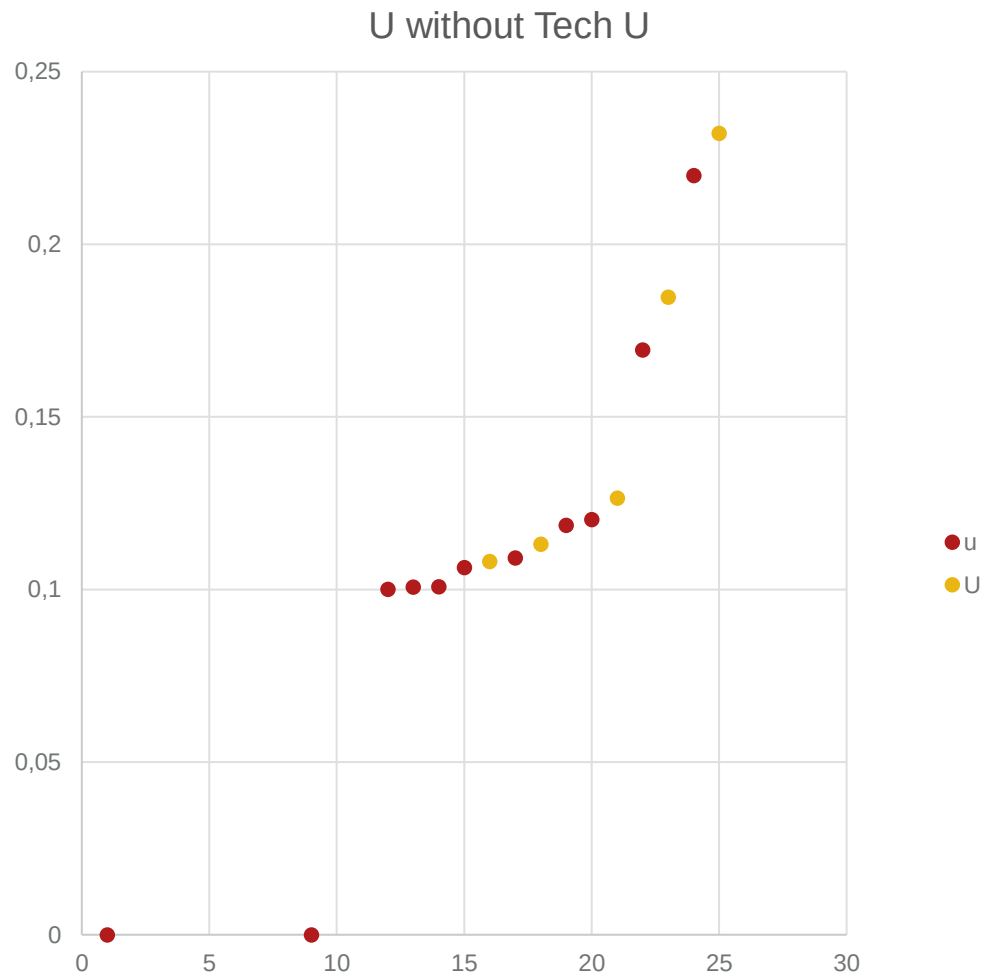
Deviating responses

- 0.14 (MU= 0,28)
- 0.21 log cfu
- 20%
- +/- 0,06
- ±0,06 (log10) CFU/g

- Are the instructions still ambigous regarding format of response?

Combined Uncertainty





Sqrt(Utot^2 – Utech^2)

Notes from labs

- Measurement uncertainty is not calculated as we are currently not accredited for enumeration

- Matrix uncertainty is not included as sampling is *outside the scope of the lab*

- We used matrix uncertainty value from EURL database for raw poultry meat (0.08) (number given here, not but not in column 38)

Conclusions

- MU is similar for all samples with same matrix.
- The measurement uncertainty is generally acceptable
- There is still an ambiguity in the reported uncertainty (u or U)
  - We asked for numerical value of u
  - When reported as interval or as x+/- b it suggests that U is reported
  - When numeric it suggests u
- The questions on MU needs to be further clarified to obtain unambigeous responses that allow us to check calculations

Wishlist

- All numeric format in response
  (formula used to calculate u may be in another column)
- Report in Uniform format (u, U or interval)
- Include what value of matrix uncertainty was used.

- Is there a need to check the calculations?

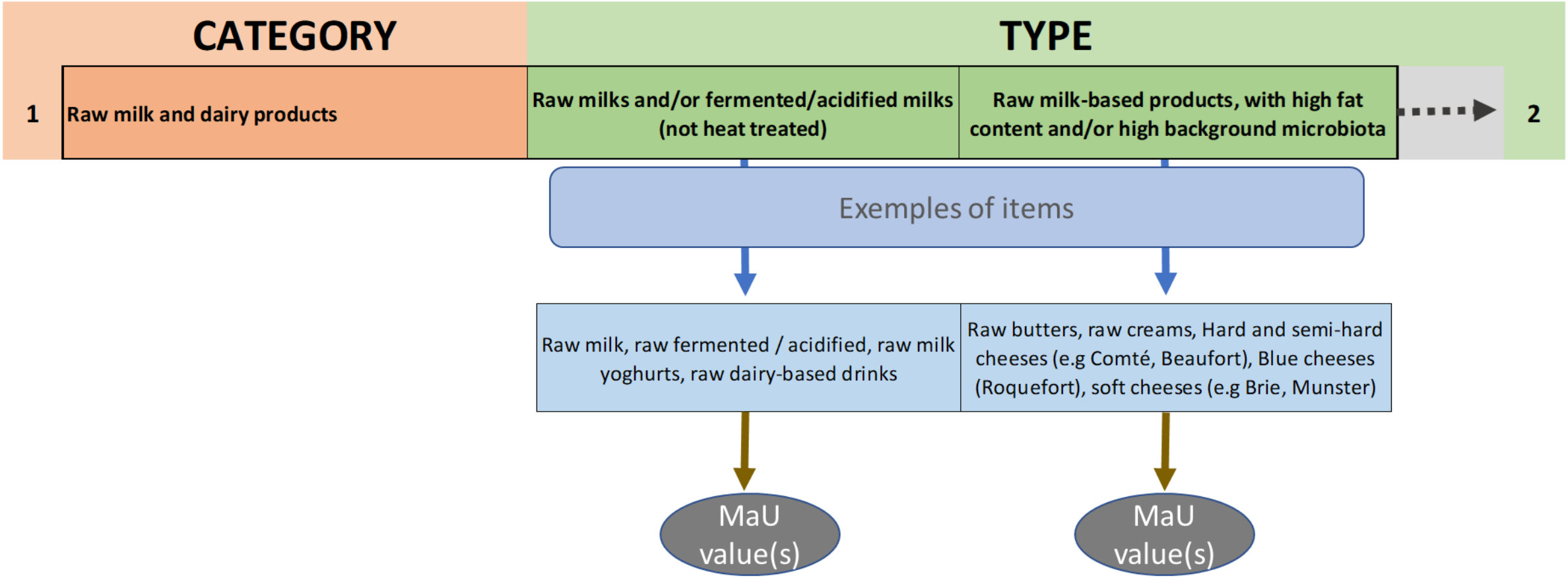
A new matrix uncertainty database

- At present, values of MaU can be obtained from the EURL database
- A French database, from 2020, hosts values of MaU from 78 experiments
- A project group of the, ISO/TC 34/SC 9/WG 2 “statistics” will merge the databases into one, hosted by the SC 9 website
- The projectgroup will present a proposal at the ISO/TC 34/SC 9/WG 2 on the 29th of November

User interface

- Basic needs
  - Recieve a value of MaU for a given category/type/item according to Annex A to ISO 16140-2
  - *Values only, online access*
- Advanced needs
  - Accreditation body, requests traceability
  - A laboratory suspects that a value is wrong (e.g bias, outlier)
  - A laboratory syspects systematic bias due to e.g. microorganism used
  - Revise standard
  - *Full database on request*

Categories / Types / Items illustrations & examples



According to annex A ISO 16140-2-2016 or ISO 16140-3-2021

Categories / Types / Items illustrations & examples

	CATEGORY (18)	TYPE (82)							
1	Raw milk and dairy products	Raw milks and/or fermented/acidified milks (not heat treated)	Raw milk-based products, with high fat content and/or high background microbiota						2
2	Heat-processed milk and dairy products	Pasteurized dairy products	Sterilized or UHT dairy products	Pasteurized milk-based products	Dry products				4
3	Raw meat and ready-to-cook meat products (except poultry)	Fresh meats (unprocessed)	Ready-to-cook meats (processed)						2
4	Ready-to-eat, ready-to-reheat meat products	Cooked meat products	Fermented or dried meat products	Raw cured (smoked) ($a_w > 0.92$)	Raw cured (smoked) ($a_w < 0.92$)	Canned meat (ambient stable)			5
5	Raw poultry and ready-to-cook poultry products	Fresh meats (unprocessed)	Ready-to-cool products (processed)						2
6	Ready-to-eat, ready-to-reheat meat poultry products	Cooked meat products	Fermented or dried meat products	Raw cured (smoked) ($a_w > 0.92$)	Canned meat (ambient stable)				4
7	Eggs and egg products (derivates)	Eggs (unprocessed)	Egg products (heat processed) with additives (salt or sugar > 2%)	Egg products (heat processed) without additives	Dry products				4
8	Raw and ready-to-cook fish and seafoods (unprocessed and processed)	Fish (unprocessed)	Shellfish (unprocessed)	Crustaceans (unprocessed)	Ready-to-cook fish and seafoods (processed)				4
9	Ready-to-eat, ready-to-reheat fishery products	Cooked fishery products	Acidified and marinated fishery products	Smoked or cured, and other processed products ($a_w > 0.92$)	Smoked or cured, and other processed products ($a_w < 0.92$)	Canned (ambient stable fish)			5
10	Fresh produce and fruits	Cut ready-to-eat fruits	Cut ready-to-eat vegetables	Produce grown in or in contact with the ground	Sprouts	Raw fruit/vegetable juices (unpasteurized)	Leafy greens	Vegetables and fruits (unprocessed) not described above	7
11	Processed fruits and vegetables	Heat-processed fruit/vegetable juices	Canned fruits and vegetables (ambient stable)	Heat-processed vegetables and fruits	Fermented/acidified vegetables				4
12	Dried cereals, fruits, nuts, seeds and vegetables	Low and IMF fruits ($a_w < 0.85$)	Seasonings	Nuts and seeds	Dried fruits and vegetables ($a_w < 0.60$)	Dried cereals	Flours		6
13	Infant formula and infant cereals	Probiotic ingredients	Non-probiotic ingredients	Non-probiotic infant formula	Probiotic infant formula	Non-probiotic infant cereals	Probiotic infant cereals		6
14	Chocolate, bakery products and confectionery	Pastries	Dry powdered products	Low moisture products	Dry and sugared low moisture products ($a_w < 0.85$)	Dry and sugared low moisture products ($a_w < 0.65$)			5
15	Multi-component foods or meal components	Composite foods with substantial raw ingredients (excluding patisserie)	Composite processed foods (cooked)	Ready-to-(re)heat food: refrigerated	Ready-to-(re)heat food: frozen	Ready to (re)heat food: ambient stable (canned)	Ready-to-(re)heat food: dry	Mayonnaise-based deli salads (acid) with raw ingredients	Mayonnaise-based deli salads (acid) with processed ingredients	Ambient stable acid foods (pH < 4.8)	9
16	Pet food and animal feed	Animal origin ingredients	Plant origin ingredients	Other ingredients	Dry food ($a_w \leq 0.7$)	Wet food ($a_w > 0.7$)	Canned	Animal feeds (bovine, ovine, pig)	Animal feeds (poultry)	Animal feeds (fish)	9
17	Environmental samples (food or feed production)	Equipment or production environment	Waters used in the manufacturing process								2
18	Primary production samples (PPS)	Animal faeces	Environmental samples and non-faeces								2

According to annex A ISO 16140-2-2016 or ISO 16140-3-2021

Points under discussion

- Who will curate new data?
- How to deal with values of MaU below 0.1?
- How to deal with duplicates?

MaU estimated twice for *almost* identical items

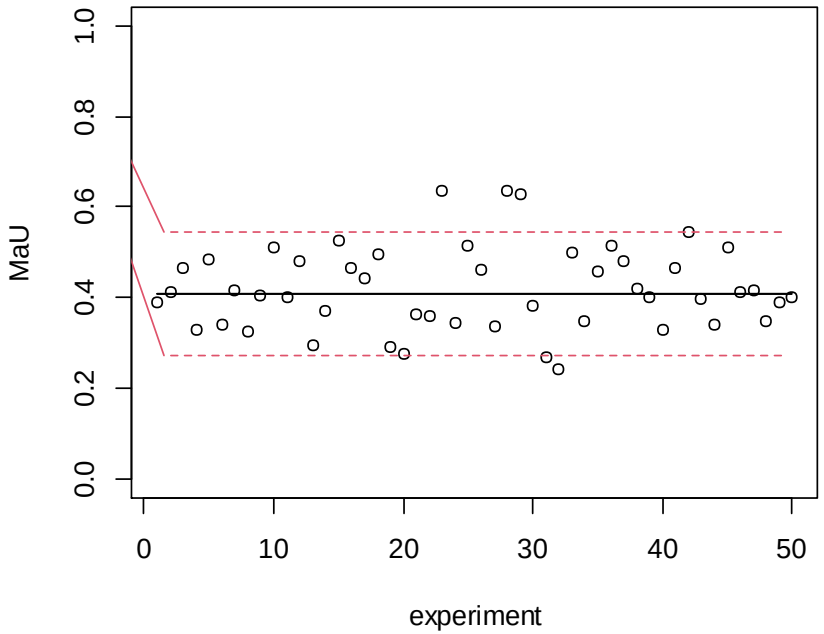
MaU reported 0.22 resp.0.42

Is one value wrong?

Are the items different in some way?

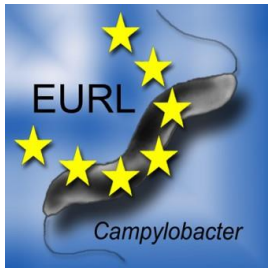
Will protocols yield different results?
(organism, setup etc)

50 experiments with same item



Thank you!

Questions?



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