

Measure Uncertainty



calculations in proficiency tests

Gunnar Andersson

EURL-*Campylobacter* Workshop 2023



Co-funded by the
European Union

Aim

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

Table 1: Guidance values of acceptable MU for enumeration of bacteria with a colony-count technique (in log₁₀ cfu/g).

*Source: AFSSA opinion, 2008⁵

	Homogeneous matrix		Heterogeneous matrix	
	Method without confirmation	Method with confirmation	Method without confirmation	Method with confirmation
Total number of colonies				
≤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 Campylobacte

- 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.

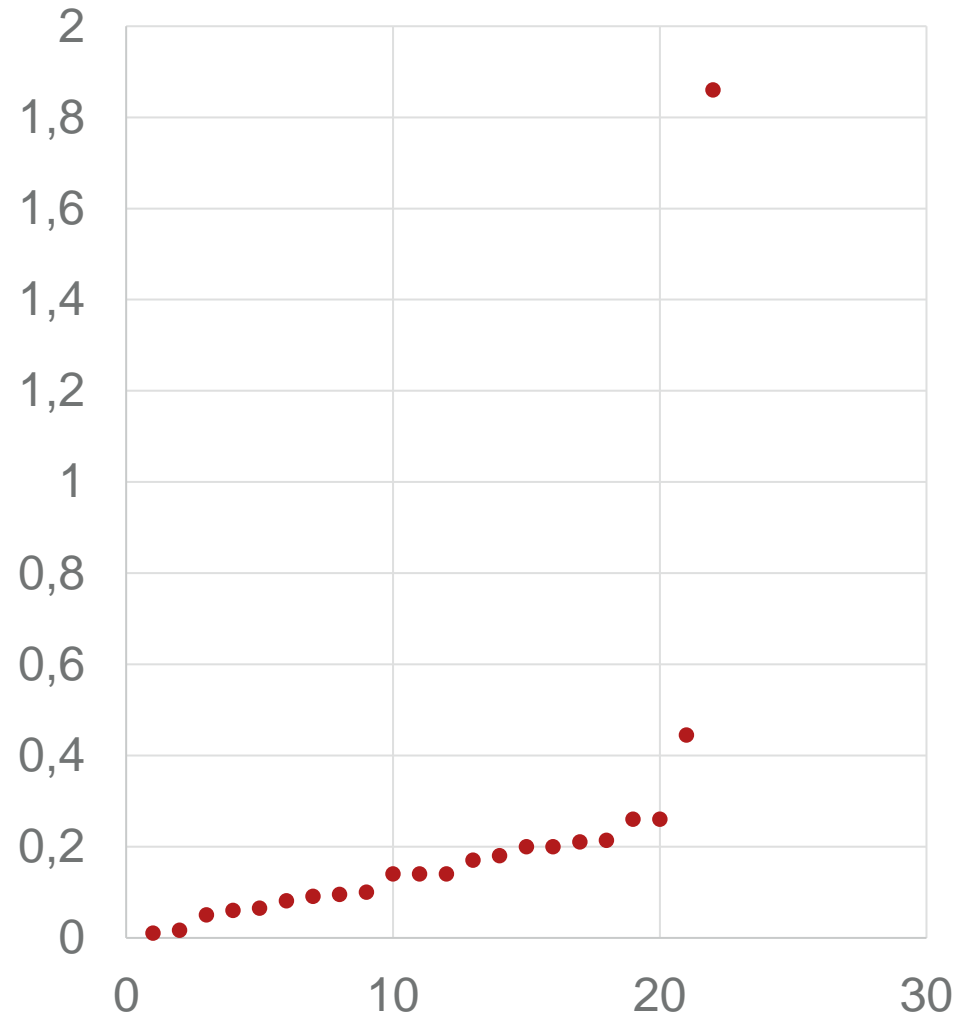
What protocol was used?

- EN ISO 19036:2019 (most)
- ISO/TS 19036:2006/Amd 1:2009 (3 lab)
- Did you encounter problems?

What was reported

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

Technical uncertainty

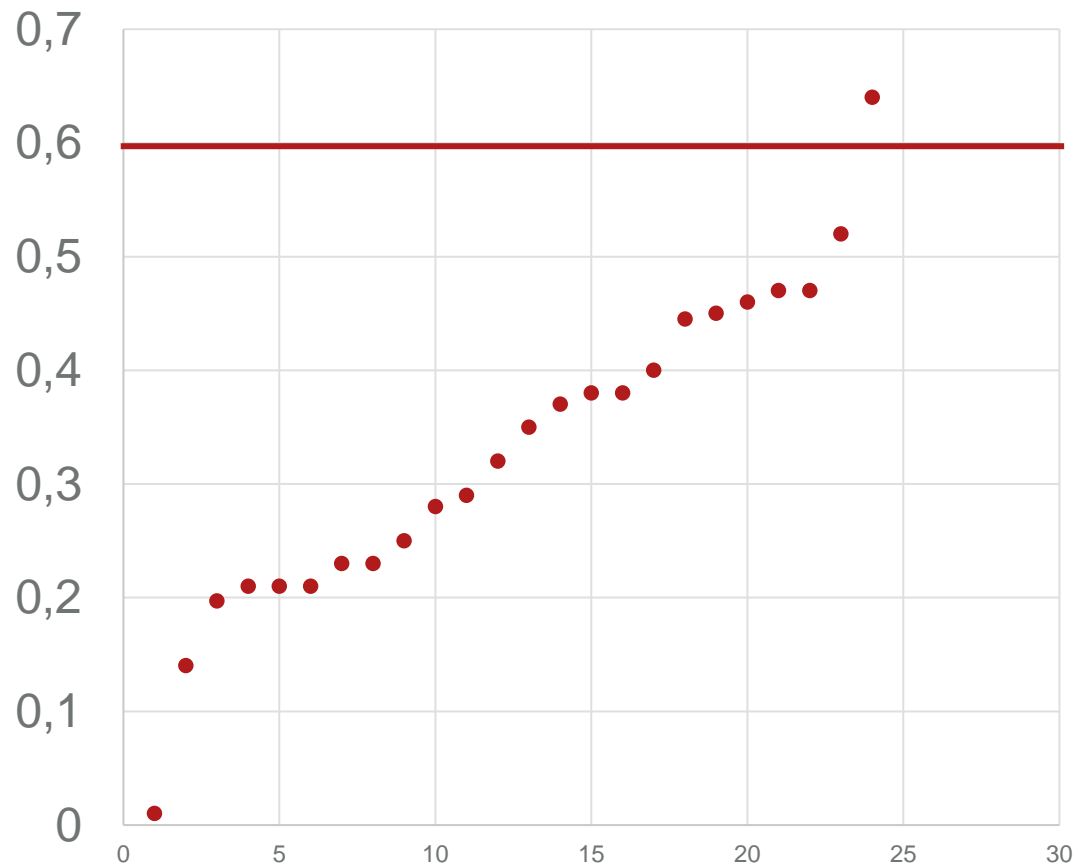


Deviating responses

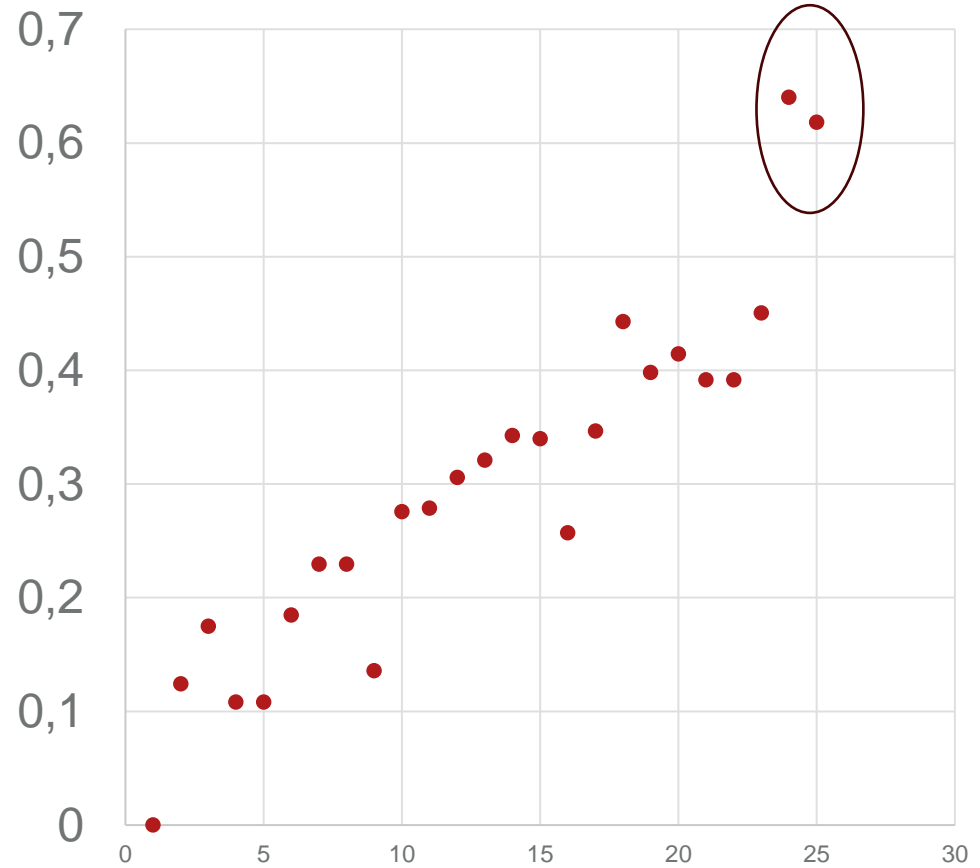
- 0.14 (MU= 0,28)
- ± 0.21 lg cfu for *C. jejuni* and *C. coli*,
- ± 0.37 lg cfu for *C. lari*
- >1.8 log/cfu
- Are the instructions ambiguous regarding format of response?

Combined Uncertainty

Total U



U without Tech U



$\sqrt{U_{tot}^2 - U_{tech}^2}$

Conclusions

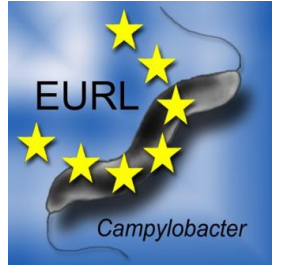
- MU is similar for all samples with same matrix.
- The measurement uncertainty is generally acceptable
- There are some deviations that may be due to miscalculation
 - One where combined $U = \text{tech } U$ (no matrix u)
 - A few very high. Connected with low counts?
 - Some report u others U

Final notes

- What would it take to doublecheck your calculations?
 - All numeric format in response
 - (the formula used to calculate u may be given in another box)
 - Uniform format (u , U or interval)
 - What value of matrix uncertainty was used.
 - For confirmation, one ratio not a list.
- Is there a need to check the calculations?



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Thank you for your attention!

Questions?

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