Interlaboratory comparisons within the framework of the Laboratory Club “Best Solutions", a network of food and water testing laboratories in the Kyrgyz Republic

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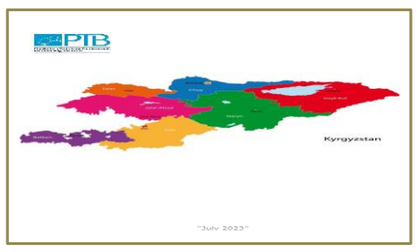


INTRODUCTION

Along with the use of validated methods, Inter-laboratory comparisons (ILC) testing is an important element in laboratory quality assurance and provides an independent assessment of the competence of participating laboratories. In 2019, the “Laboratory Club Best Solutions” was founded in the Kyrgyz Republic. This laboratory network has currently a membership of 12 public and private water and food testing laboratories. One of the activities of this Laboratory Club is to organize interlaboratory comparisons between member laboratories.

MOTIVATION AND GOALS

Initiatives to participate jointly in ILC/Proficiency Testing by Laboratory Club members started in 2020 by using established and accredited Proficiency Testing (PT) schemes. Since 2022, the Laboratory Club organizes own ILCs in line with ISO/IEC 17043 requirements as alternative to PT participations. The scheme was trialed for water samples and next ILCs are planned to be conducted by the Laboratory Club using food matrices. It is planned that the national accreditation body will consider the results from the ILC scheme of the Laboratory Club during the accreditation process.

ILC SCHEME

ILCs of hydrogen ion concentration (pH) and Cadmium (Cd) in water were conducted amongst LC members. Test samples have been prepared by use of Certified Reference Material with known reference value and measurement uncertainty. Each sample has been approved for dispatch by the accredited laboratory after completion of homogeneity and stability tests by replicate measurements of the duplicate samples. The scheme and its procedures are aligned to ISO 17043, e.g., related to test sample preparation, assigned value, homogeneity and stability tests, statistical evaluation, reporting, procedures, packaging, labelling, competent staff. Documented instructions to participants are detailed. Initially the test sample preparation has been subcontracted, while the cadmium in water ILC was produced by the BCISM, Center for Standardization and Metrology food and water laboratory.

Outcomes of the ILCs pH and cadmium in water are shown below. Two defined approaches for statistical calculations of ILC test data and for calculation of z-Scores were used:

a) The reference value of an ILC test sample coming from the certified value of the used Reference Material and
b) The robust mean of all participants results excluding outliers from normal distribution.

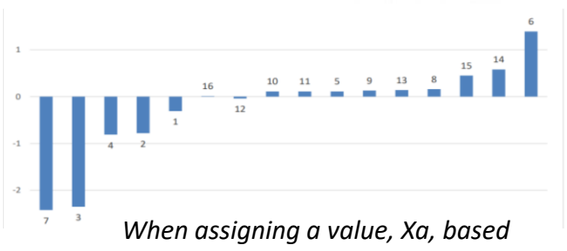
ILC SCHEME RESULTS

1. ILC pH in water

Results by assigning a value, Xa,

a) based on the certified value of the reference material
b) based on the average results of the participants.

Ready for dispatch	Storage until dispatch
0.3 x SD between pH values of all samples is lower or equal to the uncertainty of the reference value of the CRM.	The storage until dispatch depends on the stability test results.



When assigning a value, Xa, based on the certified value of the reference material

Value assignment, Xa, based on the robust mean of participants results

2. ILC Cadmium (Cd, concentration) in water

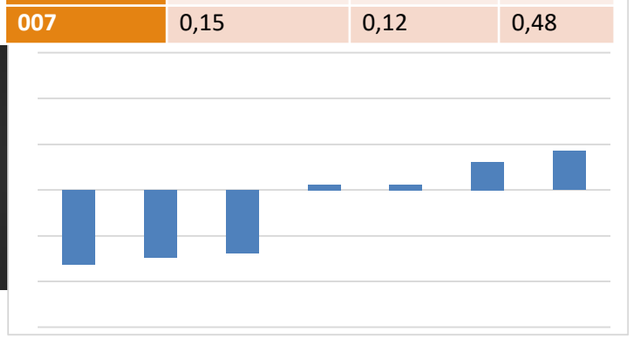
Results show assigned values, xa, based on the robust mean of the participants results.

ILC sample preparation: The water quality is important

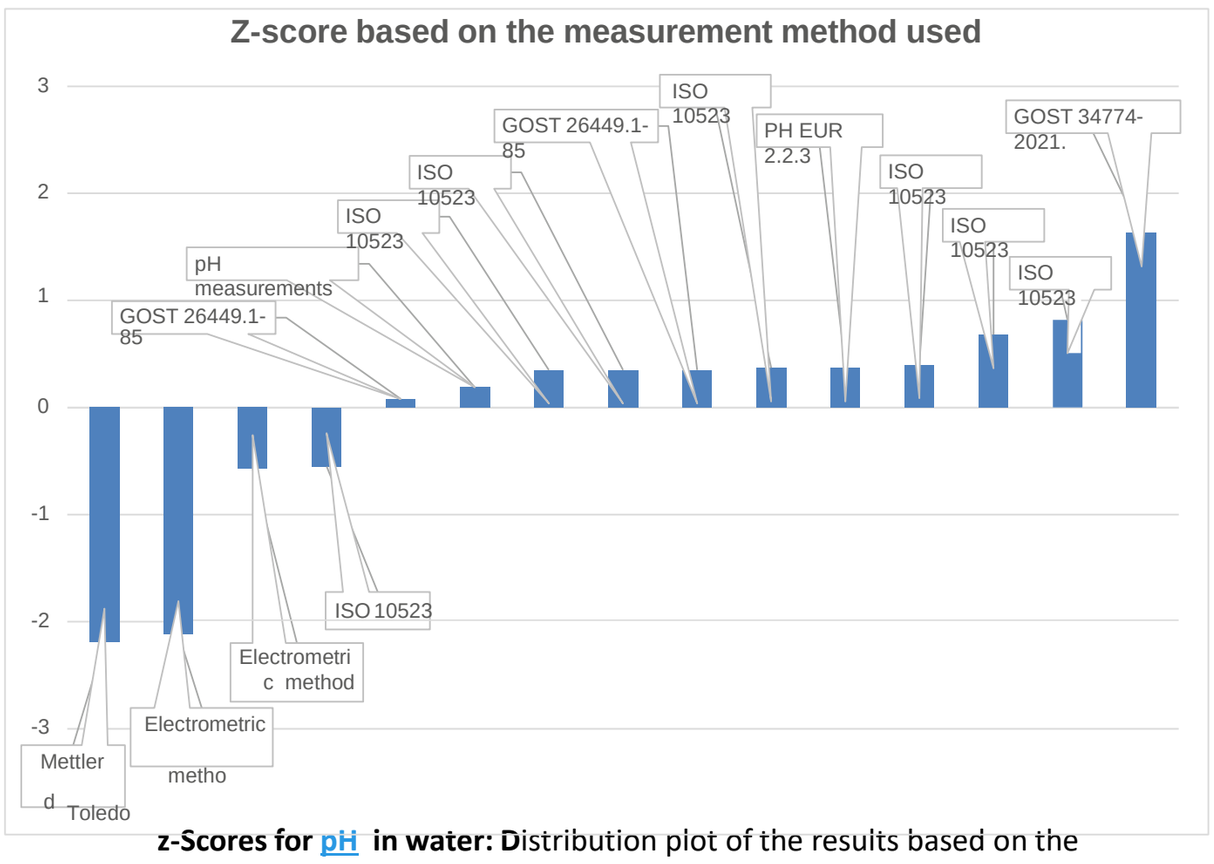
ICAP 7200 Duo Spectrometer

ILC Report Cd in water; the assigned value, *xa*, is based on the robust mean of the participants results

Number of the lab	Result	z-Score	En value
001	0,09	-1,63	-1,58
002	0,13	0,12	0,14
003	0,15	0,61	0,97
004	0,09	-1,38	-1,66
005	0,09	-1,47	-1,39
006	0,15	0,85	0,51
007	0,15	0,12	0,48



Distribution of **z-Scores for Cd content**: Plot of the distribution of the results (by laboratory numbers)



z-Scores for pH in water: Distribution plot of the results based on the measurement method used

CONCLUSIONS

Food laboratories in the Kyrgyz Republic do not widely participate in accredited PT schemes. The national ILC scheme that was trialed with more laboratories from the Central Asian region showed normal distribution of the result when using Certified Reference Material. It thus presents a valid option for external quality assurance when using a scheme that is aligned to ISO 17043 requirements. In all the ILC scheme supports with an elaborated report allowing the participating laboratories to monitor their performance and to compare them with those of their peers and supported already to identify potential challenges to improve test results.

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