REQUASUD

Assigned value determination on soil materials throughout the whole analytical field introducing bias correction from reference materials

V. Planchon[1], M. Renneson[2], M.J. Goffaux[3], V. Genot[2], G. Colinet[2]

[1]Walloon Agricultural Research Center, Agriculture and Natural Environment Departement,
[2]ULg-Gembloux Agro-Bio Tech,
[3]REQUASUD, Rue de Liroux, 9, 5030 Gembloux, Belgium

cra-w

Walloon Agricultural Research Centre

Context

🌱 **SOIL analyses :** important increase

Estimation of SOIL fertility
and management of inputs (fertilizer, …)

REQUASUD organizes proficiency testing schemes (PT) in different fields.

ISO 17043
ISO 13528
ISO 5725

BUT **SMALL NUMBER** of laboratories participating (n=8)

➡ Development of a method which guarantees the best evaluation of the participant's performance

Material

Each lab : 6 dried soil samples = diversity of Walloon soils

Two types of materials in the REQUASUD soil PT scheme
- Certified Reference Materials (MRC) from BIPEA
- Punctual material

- important to cover the analytical field for each parameter
- only used once during interlaboratory comparison

Method

Comparison of the results of the small number of laboratories to a reference value in order to avoid a global drift of the participants results.

pHKCl
Total N
Carbon C
…

agronomical parameters

Statistical analysis

Assigned value of MRC = certified reference value (as described in ISO 13528) estimated by the participants of the BIPEA PT's (robust mean evaluated on about 45 participants)

Assigned value of one punctual material = consensus value from all participants
= robust mean of the PT's results **or** = mean of this results obtained after outliers suppression (Cochran/Grubbs tests ISO 5725)

To avoid a bias between the participants on those materials, the method to calculate assigned value has been adapted :

The determination of assigned values of punctual materials is made by calibration with certified reference values which covered the whole analytical field

Every year, new external references materials are introduced to complete a graph with the consensus value of the external reference materials, in abscise, and, the certified value of the material in ordinate. This graph allows establishing standardization curves and standardization equations which are used to evaluate consensus assigned value of participants.

Results

Step 1
During an initial PT, only CRM were introduced in order to obtain a regression equation which establishes the bias of the participants throughout the whole analytical field.

Step 2
The assigned value (y) of the punctual material (PM) is determined on the mean value obtained by the participants (x), after suppression of outliers, corrected based on the standardization equations, as in figure 1 where y=1.0861x-0.511.

If the value of the PM=7.25, its value after correction=(1.0861x7.25)-0.511=7.36

pHKCl 1N

y = 1,0861x - 0,511
R² = 0,9984

blue line : bissector
green line : regression curve based on CRM

Certified values of CRM
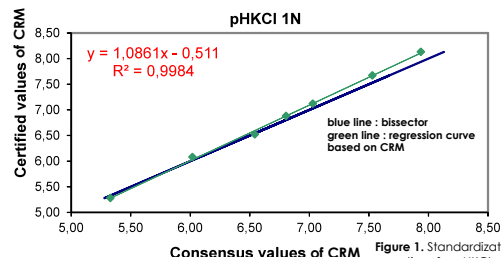
Consensus values of CRM

Figure 1. Standardization equations for pHKCl on soil samples

Conclusion

The method described above allows determining the performance scores for a few number of participants at a PT and the accuracy of their results.

REQUASUD provides punctual materials for soils PT's throughout the whole analytical field; those materials are as reliable as reference materials thanks to an appropriate correction of the assigned values.

Wallonie