Needle/Leaf Interlaboratory Comparison Test – Extended Evaluation

Please, note that you had to submit all results per parameter for all requested samples. Do not report zero (0) values. If your values are below the quantification limit, report the quantification limit (as minus LOQ).

Only four replicates above the quantification limits can be used for calculating an outlier free laboratory mean value. Results below the quantification limit are marked with "<" followed by the quantification limit of the laboratory (e.g. <0.1).

The results of the interlaboratory comparison test were evaluated according to DIN 38402/42 2005:09. This method identifies three types of outliers. With the Grubbs-test the four replicates from each laboratory can first be checked for outliers (outlier type 1). The next step is to compare the recalculated mean values of each lab with the mean value from all labs as well as with the Grubb-test for outliers (type 2). Marked outliers type 1 between the outlier free maximum and minimum mean values are not longer outliers, they will be included and will be used for the further evaluation of the interlaboratory comparison test. Finally, the calculated standard deviation from the laboratories must be compared with the total standard deviation (Cochran test) to eliminate laboratories with an excessive standard deviation (outlier type 3). The last step is to calculate the outlier free mean value (=target value for the ring test) and other statistical values.

With the outlier free mean value for each element/sample and the laboratory mean value the recovery must be calculated and compare with the tolerable limits (see table). Laboratory results inside these tolerable limits are marked green (pass the test); outside they are marked orange (fail the test).

If a limit of quantification (LOQ) is given from the laboratory, it will be checked first against the maximum acceptable LOQ (see table). Is it higher than the maximum acceptable LOQ the lab will fail (marked in orange) - is it equal or lower it will be checked then against the outlier free mean. Is the submitted LOQ within the tolerable limits the lab will pass (marked in green), is it outside the lab will fail (marked in orange) for this parameter/sample combination.

In case of very low concentrations interlaboratory comparison test samples will be excluded from evaluation (see table). This procedure is needed to avoid wrong qualification results influenced by inaccurate results. On the other hand there is often no practical need to detect these low concentrations in real samples, because it gives no additional information of the nutrient status (e.g. < 1 µg Cu/g is always deficiency) or of the pollution impact situation (e.g. < 20 ng Cd/g, < 1 µg Cu/g, < 0.2 µg Pb/g is always not polluted).

For passing the ringtest for each parameter, 50% or more of these sample results per parameter must be correct.

The ringtest results (qualification report) will be automatically uploaded and linked with the LQA-files to the monitoring results in the ICP-FORESTS database.