



QUALITY CONTROL ACTIVITIES IN MICROBIOLOGICAL FOOD TESTING INCLUDING PT TESTS AND THE RELEVANT INTERPRETATIONS

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INTERNAL AND EXTERNAL QUALITY CONTROL OF MICROBIOLOGICAL ANALYSIS

- Validation in quantitative and qualitative analysis
- Estimation of Measurement uncertainty in quantitative and qualitative analysis ,
- Participating in PT tests and Interlaboratory comparison tests
- Verification, quality control analysis

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INTERNAL QUALITY CONTROL – VALIDATION FOR QUANTITATIVE AND QUALITATIVE ANALYSIS

The Validation - quality control procedures in a food microbiological testing laboratories includes use of spiked samples contaminated with reference culture, checking the linearity of dilutions, assessing repeatability and reproducibility of the method during routine analysis and estimation of standard deviations.

Validation for qualitative analysis in microbiological testing - Minimum LOD, Precision, Specificity, Sensivity

Minimum LOD – Limit of detection is the lowest amount of the analyte that can be detected by the method at a specified level of confidence.

Precision - the degree of coincidences with among individual test results obtained under current conditions

Selectivity (specificity) – is ability of the method to distinguish the target culture (analyte) from the matrix. Determination of the total number of negative results correctly assigned in the presumptive inspection

Sensitivity - is ability of the method determine the target analyte to be determined. Determination of the total number of positive cultures or colonies correctly assigned in the presumptive inspection

Validation of quantitative microbiological testing - Repeatibility, reproducibility, trueness, recovery

Repeatability – variability of results when measurements is carry out in same conditions (same lab, same personnel, same mediums, same equipment etc).

Reproducibility - variability of results when measurements is carry out in different conditions (different method, different personnel, different mediums, different equipment etc).

$$S_r = \sqrt{\frac{1}{n} \sum_{i=1}^n \frac{(y_{iA} - y_{iB})^2}{2}}$$

Trueness – is how close the mean of an several number of measurement results to the true value or reference value .

Recovery – it is ratio with reference results and number of microorganisms which have founded. Results obtained on test materials of the same matrix could, in principle, be corrected for recovery on the basis of the recovery found for the reference material. You can use certified reference material, with known content, or with spiked sample known concentration to blank sample with comparing a MacFarland Standard.

Sterility control

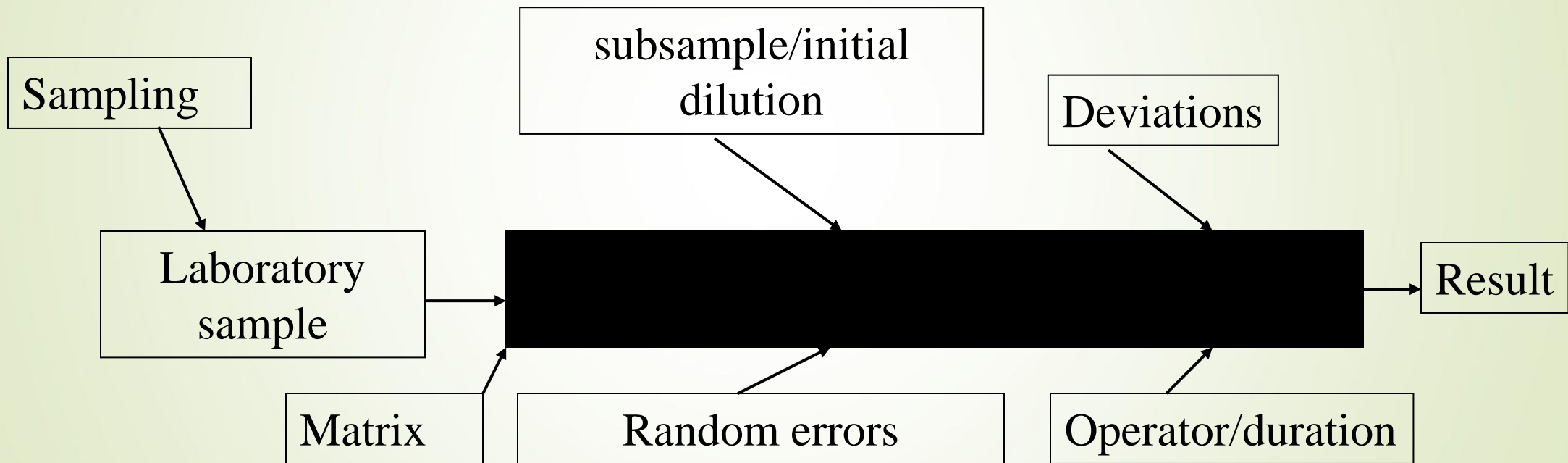
The medium should prepare according to appropriate method. If the medium is liquid state we can pouring to test tube, but solid mediums added to Petri dishes. After incubation check the medium`s state. It have to be without any turbidity, color changing etc.

Positive test guide /using of pure reference culture strain

For the purpose of quality control of the tests, we take a pure culture from a tested microorganism (for example, salmonella). A certified culture adding to 25 gr sterilized any sample (meat eg) with buffered enrichment broth.

Linearity control – linearity between different dilutions. For example first dilutions result (10^{-1}) is 145cfu/ml, second dilutions result (10^{-2}) is 21cfu/ml. Acceptable criteria for 21cfu/ml are from 134-325.

COMPONENTS OF MEASUREMENT UNCERTAINTY FISHBONE



External Quality control Proficiency test or Interlaboratory comparison tests

There are many different proficiency tests designed for microbiological analysis. However, when choosing a PT programmes paid close attention to “ ISO/ IEC Guide 43-1 Proficiency testing by interlaboratory comparisons – Part 1 : Development and operation of proficiency testing schemes “ and ILACG 13: 2000 Guidelines for the requirements for the competence of the providers of proficiency testing schemes “ standard requirements and instructions relating to test method, matrix, and work range in current laboratory.

Parameters, analysts and method must be selected before participating in the proficiency test. For assessing of participants' performance PT test providers refer to “z-score”. "Z-score" is differences of among laboratory and method deviations with assigned value:

$$Z = \frac{(x - \mu)}{\sigma}$$

x – laboratory result μ - Assigned value σ – standard deviation

MOST POPULAR PT PROVIDERS

The most popular PT test organisers are LGC standards, EPTIS (www.eptis.bam.de), FEPAS (www.csl.gov.uk), FAPAS (www.csl.gov.uk), Aquacheck (www.aquacheck.net), PHLS Water Microbiology EQA Scheme, QM (www.qualitymanagement.co.uk).

THANK YOU