NEW PT SCHEME FOR YEAST ASSAYS FOR THE DETECTION OF ESTROGENIC EFFECTS IN DRINKING WATER AND WASTE WATER USING A NEW EVALUATION CONCEPT BASED ON PRECISION PROFILES AND Z SCORE PROFILES

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Abstract

Reproducibility and repeatability of biochemical methods are often highly dependent on the underlying concentration or measurement signal. Determining the reproducibility precision profile provides a better overview of the relationship between precision parameters and the underlying concentration level than calculating reproducibility and repeatability separately for each individual sample. Similarly, instead of determining individual z scores, a z score profile provides better insight into the performance of individual participants.

A new proficiency test scheme has been launched for the analysis of estrogenic activity in water samples by means of the recombinant yeast bioassay Arxula Yeast Estrogen Screen (A-YES®) according to ISO/DIS 19040-2. This assay allows the detection of estrogenic activity in the range 2-30 ng/L EEQ (17β-estradiol equivalent concentration). In order to obtain precision and z score profiles, four different water samples (spiked surface water, spiked sewage effluent, municipal sewage influent and hospital sewage influent) were each analysed at 6 dilution levels. In total, 14 laboratories participated in this study.

In a first step, the repeatability and reproducibility of the A-YES® method were evaluated following ISO 5725-2. In a second step, the relationship between the concentration and the two precision parameters was determined across all sample dilutions and matrices. It was also checked whether systematic effects between the different dilution levels are observed, separately for each sample. Finally, z scores and a z score profile were determined for each laboratory. Precision and z score profiles allow a much more reliable assessment of laboratory performance than precision estimates or z scores computed on the basis of a single concentration; moreover, profiles obtained from different rounds of the PT scheme can easily be compared. Although this new PT scheme was first conducted for the A-YES® method, it is important to point out that it is also applicable for all yeast assays.

Keywords

interlaboratory study, proficiency test, A-YES, precision profile, z score profile