

THE ROLE OF INTERCOMPARISON EXERCISES IN THE CORRECTION FOR BIAS OF TRITIUM DETERMINATION IN ENVIRONMENTAL WATER SAMPLES

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In this paper the role of participating in consecutive intercomparison exercises with a reference laboratory (National Institute of Standards and Technology) is shown as a way to take into account the bias of the laboratory method to determine tritium in environmental water samples. Bias and its uncertainty are applied to the activity concentration obtained by liquid scintillation counting as usually measured in routine and non-routine samples.

However, the value for bias is observed to change according the measuring settings as well as the instrument model used, likely due to a little different fitting in their calibration curves.

On the basis of the NORDTEST technical report (TR 537 Ed 3.1), the laboratory bias is calculated together with its uncertainty percentage and then applied to the activity concentration obtained from samples.

Furthermore, a study of the bias variation was done in a wide range of concentrations in conditions of “within in laboratory reproducibility”, from 12 Bq/L until almost 40.000 Bq/L , by three analysts in two different counters (Perkin Elmer TR-2550 AB and TR – 3180 SL).

Results showed acceptable bias in the whole range when measurements were done in the TR-3180 SL but a deviation was observed in the older instrument as the activity level increased over 20.000 Bq/L.

Finally, a discussion if the laboratory bias should be consider as a result of the entire bias obtained by the laboratory in “within in laboratory reproducibility” conditions, rather than an individual bias obtained according the instrument used in repeatability conditions, is carried out.