INTERLABORATORY COMPARISONS OF PARAMETERS CONCERNED WITH THE QUALITY OF PORABLE WATERS, STAGE II

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The following laboratories participated in the above project: Analytical Chemistry Section, CISIR; Central Environmental Authority; Centre for Analytical Research and Development, University of Colombo; Department of Chemistry University of Kelaniya; Department of Civil Engineering, University of Moratuwa; Division of Occupational Hygience, Department of Labour; Environmental Laboratories Ltd.; Geological Survey Department; National Aquatic Resources Agency; National Water Supply and Drainage Board; and Water Resources Board.

As the stage I of the project, seven parameters in two synthetic water samples have been analysed and the results from all even laboratories have been compared[1] In stage II of the project, a synthetic water sample III A which conforms to the WHO International Standards for potable waters and a natural water sample III B were distributed among the eleven laboratories. The sample III A was analysed for magnesium, sulphate, nitrate, iron, chromium lead and total dissolved solids, whereas the sample III B was analysed for BOD_3 and COD. There was a definite improvement of the results reported for magnesium and sulphate indicating an achievement in the stage I of the interlaboratory comparison. However, the results reported for nitrate by five laboratories have been rejected with 90% confidence. Concentrations of iron chromium and lead reported by many laboratories generally agreed with the reference data. Determinate errors in reporting the total dissolved solids by two laboratories have been identified. The laboratory representatives decided to repeat BOD and COD and the theoretical aspects in the calculation of COD have been discussed.

Based on the above results, a synthetic water sample IV A containing nitrate, iron and chromium and a natural water sample IV B were distributed. The laboratory representatives were very much concerned on the extremely poor interlaboratory precision and accuracy obtained for the analysis of nitrate. They discussed the possible determinate errors in the methods employed and decided to take necessary precautions in the analysis of the next sample. Consequently, a synthetic water sample V A containing nitrate, iron, phosphate and amonia; a natural water sample V B; and a synthetic water sample V C in sterilzed containers were distributed. It was concluded that the direct colorimetric method used for the determination of nitrate is erroneous if adequate measures are not taken regarding the nature of the sample. The COD values reported by three laboratories with the sample VB and also with the sample V C were found to be very accurate and precise. The laboratory representatives discussed the problems associated with some analytical methods and decided to recheck three parameters, namely, nitrate, phosphate and ammonia. Three separate synthetic water samples VI A, VI B, and VI C containing nitrate, phosphate and ammonia respectively were distributed and discussion on the results is still in progress. In this exercise, we have achieved an improved interlaboratory precision by: (a) rejecting erroneous analytical methods, (b) eliminating personal errors, (c) taking special precautions in the preparation of analytical standards (d) using special methods of handling and distribution of samples.

Reference

Gunawardhana, H. Dasarath (1986) Proc. Sri Lanka Assoc. Sci., 42 (1), 176

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