Control charts to evaluate long-term performance in Proficiency Tests

A.Sorbo,[a] A.Colabucci[a] and L.Ciaralli[a]

[a] European Union Reference Laboratory for Chemical Elements in Food of Animal Origin (EU-RL CEFAO)- Department of Food Safety and Veterinary Public Health, Istituto Superiore di Sanità, Rome, Italy;
email – angela.sorbo@iss.it

The European Union Reference Laboratory for Chemical Elements in Food of Animal Origin (EU-RL CEFAO) as Proficiency Tests (PT) Provider, accredited according to ISO 17043:2010[1], yearly organizes exercises on the determination of chemical elements in milk, meat, liver and fish. The schemes are addressed to the National Reference Laboratories (NRLs) of the European Union. Each PT is planned giving priority to the matrices and elements for which Maximum Levels (MLs) are set in CR 1881/2006[2] and following amendments as well as to those mainly considered in National Monitoring Control Plans. Samples to be distributed are prepared in EURL-CEFAO laboratories using materials purchased on the market and often adjusting the concentration levels of the analytes around their MLs.

During the five-year period 2006-2011, PTs were planned as a long-term programme pursuing the general objective of providing the NRLs with a scheme that gave them the opportunity to check and improve the performance of their analytical methods and to verify the effectiveness of any corrective actions through the repetition of the same matrix.

Control charts give participants the possibility of having a long term follow-up of their performance and promoting the improvement in Quality Control. To this aim, two Shewart Control Charts for z-scores are prepared according to ISO 13528:2005[3] for each laboratory; a control chart is relevant to milk while the other is more appropriate for the matrices having the analytes at higher concentration. The z-scores are assigned using values of $\sigma p_{EU\text{-}RL\ CEFAO}$ that correspond to the level of performance appropriate to the demand. ("fitness for purpose" approach). The control charts are updated and made available in the restricted area of EU-RL website at each PT round.

Due to the high number of rounds, Cusum charts, reporting the cumulative sum of the z-scores, are also evaluated by EU-RL CEFAO in order to identify problems that cause a bias in the measurement method.

[1]ISO/IEC 17043:2010 Conformity assessment- General requirements for proficiency testing
[2] Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs
[3]ISO 13528:2005 Statistical methods for use in Proficiency Testing by Interlaboratory Comparisons