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Use of the combined uncertainty of measurement result for testing compliance of food commodities with legal limits

For measurement of chemical contaminants the major components of uncertainty are the Sampling (S), Sub-Sampling (SS), homogenization of sub-sampled material, Sample Processing (SP) and Analysis (A). The uncertainty of the measurement Result (R) is calculated as:

$$CV_R = \sqrt{CV_S^2 + CV_{SS}^2 + CV_{Sp}^2 + CV_A^2} = \sqrt{CV_S^2 + CV_L^2}$$

In case of trace organic contaminants the major contributor to the combined uncertainty is the sample amounts up to 70% and 80% of total variance of analysis of pesticide residues and mycotoxins, respectively. Nevertheless, it attracts very little attantion. For verifying compliance with maximum legal limits there are two distictly different situations. In case of pre-market control it has been certified that at least a specified proportion of the product in terms of the minimum size and mass of bulk/laboratory sample complies with the legal limit. Therefore, the combined uncertainty (CVR) has to be taken into account. Once a commodity is on the market the official decision on its compliance will be made based on the average concentration of the analyte in the sample taken according to the relevant standard procedure and the uncertainty of the result (CV_L) excluding sampling. CV_L is normally determined as part of the validation of the method. Determination of CV_S requires special study applying for instacs range statistics, fully nested or staggered designes. We have carried out extensive experimental and computer modelling work to determine the characteristics of sampling distribution and magnitude of sampling uncertainty. The results are utilised to provide guidance for correctly perform control of food commodities for testing compliance with legal limits.

Biography

Árpád Ambrus graduated as Chemical Engineer at the Technical University of Budapest. He has obtained the degree of candidate of science in 1980. He is the Member of organizations like, FAO/WHO. He took part in joint meeting on pesticide residues. He is a part of Sub-committee of Food Safety of Hungarian Academy of Science. He is elected as a Member of Editorial Board of the *J Environmental Science and Health*. He is the Chairman of Codex Committee on methods of analysis and sampling. He has published over 80 papers in peer-reviewed scientific journals and edited 2 books.

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