

Posters from Section IV

Reference materials for food composition analysis.

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Concerns with the quality of analytical measurements of food components are associated with many important decisions in food safety, scientific nutritional research and education, monitoring of appropriate regulations, and commerce in food products. The process to provide the measurements necessary to build the foundation of an accurate food composition database to be utilized for these decisions must be capable of producing harmonized accurate data. Previously attention has focused primarily on the process of generating food component measurements, i.e. the precision of the results from collaboratively studied Official Methods of Analysis following AOAC INTERNATIONAL guidelines. More recently focus has expanded to include the result of the measurement process, i.e. the accuracy of the data generated by the specific application of the procedure. The use of reference materials in conjunction with a tested reliable method plays a vital role in this expanded focus.

A number of components are required for any measurement system to produce harmonized accurate measurements. These include: (1) fundamental national/international standards to establish the accuracy base of the measurements; (2) methodology and technology capable of realizing adequate reproducibility and accuracy of measurement; (3) reference materials to establish accuracy and 'traceability' to the fundamental standards; and (4) mechanisms to monitor and provide feedback on actual performance of the measurement process. These fit together into a hierarchy of measurement. The fundamental units are directly related to specific measurements through development of 'definitive' methods of analysis wherein all sources of bias are known and eliminated or understood with state-of-the-art precision and accuracy. These methods are developed, maintained and practiced at the highest level of the measurement process, often require highly sophisticated equipment with highly skilled personnel and are usually not procedures to be applied routinely on large numbers of samples. The inherent accuracy and precision of these definitive methods can be utilized by recognized authoritative entities to produce 'certified' reference materials with assigned component values. These certified reference materials then become artifacts (utilized for accuracy traceability to the fundamental units of the measurement system) to transfer the accuracy and precision technology of 'definitive' methodology to less complex routine or field methods capable of

use for large numbers of determinations. Development and availability of these reference materials is presently a weak link in the establishment of a robust system for producing quality measurements for many food components.

A number of food matrix 'certified' reference materials are available from several sources, notably, the Measurement and Testing Program in Brussels, Belgium and the National Institute of Standards and Technology in the USA. These are not complete for all food types, nor for all food components, especially for organic components such as vitamins.

In order to expand its mission and scope in 'Promoting Quality Measurements and Method Validation in the Analytical Sciences', AOAC INTERNATIONAL has formed a Technical Division on Reference Materials (TDRM). The TDRM has grown to over 350 members worldwide, and has initiated a number of activities to identify, promote and make available reference materials for use with AOAC methods of analysis.

Evaluating analytical data quality for food composition data bases. Joanne M. Holden.

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The evaluation of analytical data quality is an integral part of the development and use of databases for food components. Compiler and users of food composition data require indicators of data quality to effectively manage the database and to determine the suitability of data for specific purposes. Interest in the relationship of dietary intake to health status has stimulated the demand for accurate and representative estimates of food components. Analytical data quality is based upon five facets of the data generation process which can vary independently of each other and, yet, affect the overall quality of the final estimate. They include the representativeness of the sample, sample handling procedures, validation of analytical method, analytical quality control, and the number of samples analyzed. The continuum of quality 'points' or rating scale for each facet can be defined. Acceptability within a facet is based upon the availability of specific acceptable information pertaining to critical points in the process. Expert systems to document and evaluate food composition data for Se, Cu, and five carotenoids have been developed. The carotenoids and selenium systems are being updated to develop a multi-nutrient prototype expert system to facilitate the standardization documentation and decision-making processes required for determining analytical data quality.