

BERM₁₄

**14th International Symposium on
Biological and Environmental Reference Materials**

**October 11-15, 2015
Gaylord National Resort & Convention Center
National Harbor, Maryland 20745 USA**



Poster Sessions

Posters will be on display throughout the organized sessions, Monday, October 12 at 8:30 am through Thursday, October 15 at 3:45 pm. Authors will be present for Poster Session 1 on Tuesday and Poster Session 2 on Wednesday at 2:30 pm - 4:00 pm.

Poster Session 2 - Developments in Reference Materials for Food, Clinical, Environmental

Wednesday, October 14

46 New CRMs for food analysis

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The IRMM continuously develops new certified reference materials (CRMs) for food analysis. CRMs are chosen and optimised to be as useful as possible for quality control and calibration of measurements made in support of EU legislation on food safety and quality. In addition, CRMs are developed to assist researchers with new analytical tasks in response to emerging concerns. The following new CRMs are presented: Milk Powder CRMs for the contents of 15 elements (ERM[®] BD150 and BD151) and 7 vitamins (ERM-BD600). Each was tailored to match legislation for safety limits and nutritional labelling by spiking raw milk at the start of the processing process. By collaboration with expert laboratories, it was possible to certify this wide range of analytes with low uncertainties. Perfluoroalkyl substances (PFASs), which have industrial applications such as in textiles and pesticides, can have hazardous biological effects and are highly persistent in the environment. Their use is restricted by legislation. The CRM IRMM-427 contains certified mass fractions of four PFASs in fish tissue and CRM IRMM-428 contains certified mass concentrations of six PFASs in drinking water. These provide comparability and traceability of PFASs measurement results for food analysis. For seafood, two new CRMs, ERM CE278k (Mussel tissue) and ERM-BB422 (Fish tissue) were produced and certified for mass fractions of nutrient and contaminant elements. Mycotoxins are toxic fungal metabolites that may appear in agricultural crops and food products, for which legislation has set maximum limits. ERM[®]-BC717 (Maize) was further characterised to provide certified values for nivalenol and deoxynivalenol.

48 T-2 and HT-2 toxins in oat flakes: A new certified reference material

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Plant pathogenic fungi of the genus *Fusarium* are predominant mycotoxin producers in moderate climate zones. *Fusarium* toxins occur worldwide in a wide variety of foods and feeds, particularly in highly consumed cereals and cereal based products. As the consumption of mycotoxin-contaminated products may induce acute and long-term chronic effects to human and animal health, determination and reduction of these compounds in food and feed is subject to the work of regulators, food business operators and researchers. The toxicologically and economically most important *Fusarium* mycotoxins are zearalenone (ZEN) as well as the type A (T-2 and HT-2 toxin) and type B trichothecenes (e.g. deoxynivalenol (DON)). While for DON and ZEN EU maximum levels are already in effect[1], only indicative levels for the sum of the T-2 and HT-2 toxins in food and feed were set[2]. To enforce the maximum levels and thus reduce consumer risks, strict controls of food and feed are of prime importance. For the sum of these reasons, certified (matrix) reference materials (CRMs) for *Fusarium* toxins are required. In the frame of the ERM[®] (European Reference Materials) initiative BAM has currently completed one CRM project on the field of mycotoxins (ERM[®]-BC720: T-2 and HT-2 toxins in oat flakes) based on ISO Guide 35[3] to reduce the current gap of available CRMs for mycotoxins in food. References [1] Commission Regulation (EC) No 1126/2007. [2] Commission Recommendation 2013/165/EU [3] ISO Guide 35 Reference materials: General and statistical principles for certification ISO/REMCO, 2006.

50 Use of Multivariate Statistical Techniques in the Homogeneity Evaluation of a Candidate Bovine Kidney Reference Material

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Evaluation of the homogeneity of reference materials is typically performed using a one way analysis of variance approach, as described in ISO Guide 35:2006. The present work describes the use of multivariate techniques such as principal component analysis (PCA) and hierarchical cluster analysis (HCA) that can complement traditional univariate analysis for the homogeneity evaluation of a candidate bovine kidney reference material. The candidate reference material was prepared using 35 kg of fresh bovine kidney from cattle reared under controlled conditions. The kidneys were grinded, lyophilized and sieved to achieve a material with particle size less than 100 micrometers. The concentration of some inorganic constituents (As, Co, Cr, Fe, K, Mg, Mn, Na, Se and Zn) was determined using Instrumental Neutron Activation Analysis, (INAA). Multivariate techniques take into account the correlation among many variables at the same time, and for this reason, they can provide much more information than univariate techniques, for example, by showing an underlying structure of data not visible by other means. On the other hand, they also make possible a graphical representation of a larger amount of information allowing a simpler visualization of the data set and facilitating its evaluation.

52 Certification of 24R,25-Dihydroxyvitamin D3 in NIST Standard Reference Materials

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24R,25-Dihydroxyvitamin D3 (24R,25(OH)2D3) is a major catabolite of 25-hydroxyvitamin D metabolism and is an important vitamin D metabolite used as a catabolism marker and indicator of kidney disease. The National Institute of Standards and technology (NIST) has developed serum-based standard reference materials (SRM 972a and SRM 2973, Vitamin D Metabolites in Human Serum) primarily for use in evaluating the accuracy of procedures for determination of vitamin D metabolites in human serum. It is also intended for use in validating secondary reference materials. In conjunction with the development of these SRMs, NIST has developed isotope-dilution liquid chromatography tandem mass spectrometry (ID-LC/MS/MS) methods for 25-hydroxyvitamin D3 and 25-hydroxyvitamin D2 in human serum that are recognized by the Joint Committee for Traceability in Laboratory Medicine (JCTLM) as reference measurement procedures (RMPs) of a higher-order. SRM 972a currently has certified values for 25-hydroxyvitamin D3, 25-hydroxyvitamin D2, and 3-epi-25-hydroxyvitamin D3. Recently NIST has also developed a candidate RMP for the determination of 24R,25(OH)2D3 in human serum using ID-LC/MS/MS. This method was used for value assignment of 24R,25(OH)2D3 in SRM 972a and SRM 2973, which can serve as an accuracy base for the routine methods used in clinical laboratories.