Elemental Analysis Manual

for Food and Related Products

The following is a section of the Elemental Analysis Manual for Food and Related Products.

For additional information and to view other sections of the manual, visit the Elemental Analysis Manual for Food and Related Products web page at http://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm2006954.htm.

U.S. Department of Health & Human Services

U.S. Food and Drug Administration

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2.4 Contamination Control

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Clean laboratory procedures are necessary for trace element analysis. Efforts must be made to minimize the potential of contamination throughout the analytical procedure. Sources of contamination include air, containers, the analyst, apparatus, and reagents. Contamination control is a constant chore for a successful trace element analysis. Advice on controlling contamination is available in the literature[1-3].

2.4.1 ENVIRONMENTAL

For trace element analyses the samples should be processed in Class 100 workbenches located in a clean room of at least a Class 10,000 type. This environment will minimize and control contamination of samples and method blanks and allow achievement of the best analytical limits. The analytical instrument's sample introduction system should be arranged to have Class 100 clean air conditions by having a suitable clean air module positioned around the system. Some advice on preparing a clean laboratory is available in the literature[4-5].

2.4.2 LABORATORY WARE

Laboratory ware—All reusable laboratory ware (glass, polyethylene, PTFE, *etc*.) must be sufficiently clean for trace element analysis. The recommended cleaning procedure for all laboratory ware includes washing in clean-rinsing laboratory detergent, reagent water rinse, soaking at least 4 hrs in 10% nitric acid and final reagent water rinse. Rinse with 1% nitric acid immediately before use.

Disposable laboratory ware—All disposable laboratory ware such as autosampler cups and bottles/tubes for analytical solution storage should be rinsed with 1% nitric acid immediately before use. Disposable laboratory ware should be tested for contamination or pre-cleaned before using a particular lot.

Gloves—Use powder free vinyl, polyethylene, or nitrile. Do not use latex because of possible contamination. There are gloves manufactured for clean room use that are free from trace metals contamination.

Micropipettes—Air displacement micropipettes. Use with colorless disposable plastic tips since colored tips may be a source of contamination.

Note: Low-density polyethylene bottles are recommended for storage of standard and analytical solutions because of low cost and low trace metals contamination but other types of plastic bottles can be used such as high-density polyethylene, polypropylene, polystyrene, Teflon® etc. Teflon® FEP bottles are preferred from a contamination standpoint but high cost will usually limit their use to intermediate and standard solutions.

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