Determination of Mercury in Animal Tissue

LECO Corporation; Saint Joseph, Michigan USA

Instrument: AMA254

Sample Preparation

Dried and powdered samples can be weighed directly into the boat placed on the balance. Freeze drying can also be used as a method of drying. In principle, fresh meat analyses are also possible. Due to the high fat content it is recommended to select a longer decomposition time (250 seconds) as well as to cover the sample in the boat with a Hg- and ash-free strip of filter paper which may serve as a combustion aid. The sample weights should not exceed 100 mg for very high fat samples.

Sample Weight

Dried, powdered samples or freeze-dried samples up to 150 mg; balance precision of 0.1 mg or better (higher sample weights are possible).

Accessories

614-822-114 Large Nickel Boats

Calibration Samples

LECO 502-813 Fly Ash, LECO 502-499 (BCR 143r), LECO 502-649 Dry Sludge (NIST 2781), or other suitable reference material

Analysis Time

~8 minutes

Method Profile

Drying Time:	60 seconds
Decomposition Time:	200 seconds
Cuvette Clear Time:	45 seconds
Dosing Delay Time:	0 seconds
Cell Selection:	Auto Select
Metric for Calculations:	Peak Area

Procedure

1. Determine the blank as follows.
   a. Enter "Blank" from the drop-down menu under the "Name" column.
   b. Click "Analyze"; the door will open and the nickel loop will be presented.
   c. Carefully place a 614-822-114 Large Nickel Boat into the nickel loop using clean tweezers.
   d. Click "OK" in the "Load Sample" window; the door will close and the analysis sequence will start automatically.
   e. Repeat steps 1a through 1d two more times. The system and boats will be purged of any interfering elements.
2. Calibrate the instrument as defined in the instructional manual.
   a. Analyze various sample weights of a relevant reference material in accordance to the absolute amount of mercury required to calibrate an appropriate dynamic range. The calibration samples are weighed into the 614-822-114 Large Nickel Boat.
   b. Enter each calibration sample with the appropriate ID code from the drop-down menu, and sample weight from an external balance measurement.
   c. Click "Analyze"; the door will open and the nickel loop will be presented.
   d. If there is a boat in the nickel loop, remove it and keep for later use.
   e. Carefully place the calibration sample boat into the nickel loop using clean tweezers.
   f. Click "OK" in the "Load Sample" window; the door will close and the analysis sequence will start automatically.
   g. Repeat steps 2a through 2f as per the calibration procedures.

      Note: The first analyzed sample after a long delay should be discarded. This sample should be considered a conditioner for the system, and not used for the actual calibration.
   h. Complete a calibration by following the calibration procedure as outlined in the manual.
   i. Verify the calibration by analyzing one of the calibration samples again. It should be within the expected tolerances. If not, repeat steps 2a through 2i.
3. Analyze the samples as follows.
   a. Weigh ~100 mg of the high concentration sample into a 614-822-114 Large Nickel Boat.

      NOTE: Use ~150 mg for low concentration samples.
   b. Enter a sample identification in the Name column and the sample weight in the Mass column.
   c. Click "Analyze"; the door will open and the nickel loop will be presented.
   d. If there is a boat in the nickel loop, remove it and keep for later use.
   e. Carefully place the sample boat into the nickel loop using clean tweezers.
   f. Click "OK" in the "Load Sample" window; the door will close and the analysis sequence will start automatically.

Organic Application Note

Delivering the Right Results

Typical Results

Beef Muscle, Nominal Value 0.0026 ppm

Sample Weight (mg)	*ng*	*ppm*
123.1	0.422	0.00343
117.4	0.329	0.00280
122.6	0.402	0.00328
131.9	0.371	0.00281
119.3	0.351	0.00294
129.5	0.386	0.00298
Mean Value:	*0.0030 ppm*	
SD:	*0.0003 ppm*	
RSD:	*2.58%*	

Muscle Tissue, Nominal Value 0.188 ppm

Sample Weight (mg)	*ng*	*ppm*
99.8	18.26	0.183
97.9	18.31	0.187
101.2	18.92	0.187
99.3	18.77	0.189
97.8	18.39	0.188
Mean Value:	*0.187 ppm*	
SD:	*0.002 ppm*	
RSD:	*1.12%*	

Pork, Nominal Value 0.003 ppm

Sample Weight (mg)	*ng*	*ppm*
87.5	0.333	0.00380
102.3	0.399	0.00390
98.4	0.378	0.00384
102.6	0.398	0.00388
95.3	0.360	0.00378
98.8	0.390	0.00395
Mean Value:	*0.00386 ppm*	
SD:	*0.00006 ppm*	
RSD:	*1.66%*	

Muscle Tissue, Nominal Value 0.188 ppm

Sample Weight (mg)	*ng*	*ppm*
99.8	18.26	0.183
97.9	18.31	0.187
101.2	18.92	0.187
99.3	18.77	0.189
97.8	18.39	0.188
Mean Value:	*0.187 ppm*	
SD:	*0.002 ppm*	
RSD:	*1.12%*	

Pork, Nominal Value 0.003 ppm

Sample Weight (mg)	*ng*	*ppm*
87.5	0.333	0.00380
102.3	0.399	0.00390
98.4	0.378	0.00384
102.6	0.398	0.00388
95.3	0.360	0.00378
98.8	0.390	0.00395
Mean Value:	*0.00386 ppm*	
SD:	*0.00006 ppm*	
RSD:	*1.66%*	

Pork Liver, Nominal Value 0.003 ppm

Sample Weight (mg)	*ng*	*ppm*
78.6	0.188	0.00239
79.9	0.213	0.00266
82.3	0.212	0.00258
91.5	0.211	0.00231
93.2	0.199	0.00213
Mean Value:	*0.00241 ppm*	
SD:	*0.00021 ppm*	
RSD:	*8.79%*	

Pork Kidney, Nominal Value 1.97 ppm

Sample Weight (mg)	*ng*	*ppm*
77.7	149.96	1.93
83.6	158.84	1.90
74.8	145.86	1.95
88.3	167.77	1.90
73.9	142.63	1.93
85.6	166.06	1.94
Mean Value:	*1.93 ppm*	
SD:	*0.02 ppm*	
RSD:	*1.08%*	

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