Foliose Lichen

Mercury in Lichen
by Direct Mercury Analysis

Nippon Instruments (NIC) Model MA-3000 Mercury Analyzer

At a Glance:

- **Mercury in Lichen**
- **Direct Mercury Analysis**
- **High Temperature Combustion**
- **Gold Amalgamation**
- **Atomic Absorption via Dual-Cell Technology**
- **No Sample Preparation**

Mercury Results:

Sample	Hg (mg/kg)	%RSD
Lichen-1 (n=3)	0.178	0.43
Lichen-2 (n=3)	0.505	0.23
Lichen-3 (n=3)	0.256	0.42
Lichen-4 (n=3)	0.332	0.98
Lichen-5 (n=3)	0.122	3.46
Lichen-6 (n=3)	0.195	1.35
NIST-2782 (n=3)	1.173	0.75

Overview

Lichen is a complex organism that is commonly found growing on tree bark, rocks, and many other places. Since it can be commonly found on tree bark, it has been researched as an environmental indicator of air pollution. Lichen from trees near coal-fired power plants or chlor-alkali plants that are known to release high levels of mercury into the atmosphere have shown significant levels of mercury adsorption, especially in down-wind locations.

Instrumentation

Total mercury analysis of such organisms is easily accomplished using the Model MA-3000 Mercury Analyzer. The samples are weighed into a sample boat, loaded into the autosampler, registered in the software, and the MA-3000 accurately and precisely analyzes up to 100 samples at a time, completely unattended.

Procedure

1) Load a sample boat onto the balance and tare it.
2) Weigh 30-50 mg of Lichen sample into the sample boat.
3) Load the boat into the autosampler tray.
4) Register the sample name and weight into the software, select the method, and press start.

MA-3000 Method

Step	Temp	Time
DRY	0	0
Decomp1	180C	2min
Decomp2	800C	2min

Calibration

The MA-3000 is easily calibrated by measuring liquid standards from a certified source, or by direct analysis of reference materials.

Results & Discussion

Each of the lichen samples (collected in the US Pacific Northwest) was measured sequentially in triplicate. The MA-3000 proved to be a very accurate and precise mercury analyzer for the measurement of mercury in lichen. The Lichen-5 sample was noted to be much less homogeneous than the other samples, which explains the increased variability in the replicate results.

For verification of accuracy, a certified reference material, NIST 2782 (Industrial Sludge) was measured before and throughout the sample analysis sequence. The certified value for Hg in NIST 2782 is 1.10 mg/kg (+/- 0.19). The MA-3000 result was easily within the certified range.

MA-3000 Key Details

- No Sample Digestion
- 100-Pos. Autosampler
- 0.001ng to 2,000ng Linear Range
- Dual-Cell Detector
- EPA 7473, ASTM D6722, ASTM 7623, UOP 1009

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