

## APPLICATION NOTE

# NIST 1575a - Trace Elements in Pine Needles

## SUMMARY

The application note summarizes the digestion of NIST 1575a, a pine needles standard reference material using ColdBlock™ Digestion Pro Series Technology.

**Instrument:** ColdBlock CBM (with quartz test tubes), chiller, ICP-MS

**Published:** July 2024

**Digestion Time:** 20 Minutes

**Acid Used:** HNO<sub>3</sub> & H<sub>2</sub>O<sub>2</sub>

**Average ColdBlock Recovery vs. CRM:**

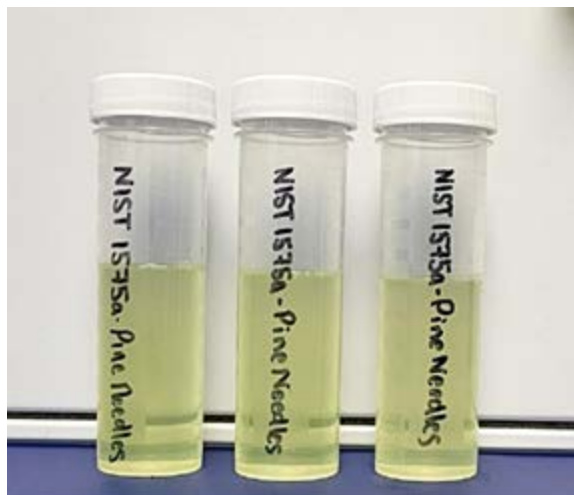
- 99% Iron
- 98% Phosphorus
- 106% Mercury

## METHODOLOGY

1. Chiller temperature was set to -5°C
2. 0.5g of each sample was weighed and placed into a quartz ColdBlock™ Digestion vessel
3. 10 mL of HNO<sub>3</sub> was added
4. Sample was digested at 65% power for 20 minutes
5. 2mL of ≥ 30% H<sub>2</sub>O<sub>2</sub> was added slowly
6. Samples were cooled and bulked to 40mL using 2% HNO<sub>3</sub><sub>v/v</sub>

## DISCUSSION

- Samples were digested in triplicate
- Samples were filtered prior to analysis by ICP-MS
- NIST 1575a consists of dried, jet milled, radiation sterilized, blended pine needle



NIST 1575a after digestion and bulk up to 40mL

## NIST 1575a - Trace Elements in Pine Needles

## Results

NIST 1575a Trace Elements in Pine Needles									
Method:	0.5g	10mL HNO <sub>3</sub> 65% power for 20 minutes, then slowly add 2mL of 30% H <sub>2</sub> O <sub>2</sub>							
Element	Consensus Value (ppm)	+/-	Sample A	Sample B	Sample C	Average (ppm)	Stdev	RSD	Recovery
Al	580	30	574	586	596	585	8.7	1.5%	101%
Ba	6.0	0.2	5.3	5.9	6.2	5.8	0.4	6.6%	96%
Ca	2500	100	2502	2383	2574	2486	78.6	3.2%	99%
Cd	0.233	0.004	0.253	0.251	0.273	0.259	0.01	3.8%	111%
Cu	2.8	0.2	3.2	3.1	3.0	3.1	0.1	2.6%	111%
Fe	46	2	43	46	48	46	2.2	4.9%	99%
K	4170	70	4059	4062	4111	4077	23.8	0.6%	98%
P	1070	80	1185	1128	1127	1147	27.1	2.4%	107%
Rb	16.5	0.9	15.7	15.6	15.4	15.6	0.1	0.7%	94%
Zn	38	2	37	37	39	37	0.9	2.4%	98%
Hg	0.0399	0.0007	0.0421	0.0427	0.042	0.0424	0.0002	0.6%	106%