ColdBlock™ Technologies Inc.

APPLICATION NOTE

NIST 1549a – Whole Milk Powder

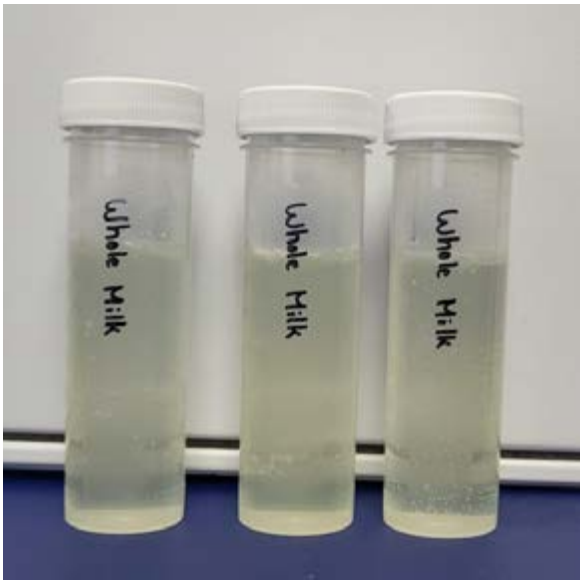
SUMMARY

The application note summarizes the digestion of NIST 1549a, a whole milk powder standard reference material using ColdBlock™ Digestion Pro Series Technology.

Instrument:	ColdBlock CBM (with quartz test tubes), chiller, ICP-MS
Published:	May 2024
Digestion Time:	20 Minutes
Acid Used:	HNO_3 & H_2O_2
Average ColdBlock Recovery vs. CRM:	■ 94% Calcium ■ 99% Potassium ■ 98% Zinc

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_3 was added and mixed with the sample
4. Sample was digested at 65% power for 20 minutes
5. 2mL of ≥ 30% H_2O_2 was added
6. Samples were cooled and bulked to 40mL using 2% $HNO_{3\ v/v}$



NIST 1549a after bulk-up to 40mL

DISCUSSION

- Samples were digested in triplicate
- Samples were filtered prior to analysis by ICP-MS
- H_2O_2 (Sigma Aldrich 95321, Hydrogen peroxide solution ≥30%, for trace analysis)
- HNO_3 (Analytichem, 250-038-175, Nitric Acid, PP, 67-70%)
- NIST 1549a is a whole milk powder blended and packaged by High Purity Standards (Charleston, SC).

NIST 1549a – Whole Milk Powder

Results

NIST 1549a – Whole Milk Powder										
Method:	**0.5g**	**10mL HNO_3 digested at 65% power for 20 minutes, then added 2mL H_2O_2, let cool and bulked to 40mL with 2% $HNO_{3\ v/v}$**								
Element	**NIST Certified Values (mg/kg)**	**95% Confidence Limits**		**Sample A**	**Sample B**	**Sample C**	**Average (mg/kg)**	**Stdev**	**% RSD**	**% Recovery**
		Low	**High**							
Ba	0.566	0.527	0.605	0.509	0.553	0.546	0.536	0.019	3.6%	95%
Ca	8810	8570	9050	8226	8256	8348	8277	52	0.6%	94%
Mg	892	830	954	869	896	788	851	46	5.4%	95%
Mn	0.184	0.16	0.208	0.161	0.194	0.186	0.180	0.014	7.8%	98%
P	7600	7100	8100	6924	6976	7121	7007	83	1.2%	92%
K	11920	11490	12350	10731	12278	12238	11749	720	6.1%	99%
Se	0.242	0.216	0.268	0.256	0.229	0.264	0.250	0.015	6.0%	103%
Na	3176	3118	3234	3865	3180	2927	3324	396	11.9%	105%
Sr	2.14	1.95	2.33	2.23	2.15	2.00	2.13	0.10	4.5%	99%
Zn	33.8	31.5	36.1	30.0	36.9	32.3	33.1	2.9	8.7%	98%
***Cu**	0.638	0.589	0.687	0.693	0.670	0.669	0.677	0.011	1.6%	106%
***Fe**	1.85	1.12	2.58	1.78	1.89	1.82	1.83	0.05	2.5%	99%
***Mo**	0.377	0.305	0.449	0.328	0.371	0.383	0.361	0.024	6.5%	96%
***Ni**	0.068	0.054	0.082	0.064	0.054	0.082	0.067	0.012	17.4%	98%

* Non-Certified Values

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