ColdBlock™ Technologies Inc.

APPLICATION NOTE

# NIST 1849b – Infant Nutritional Formula

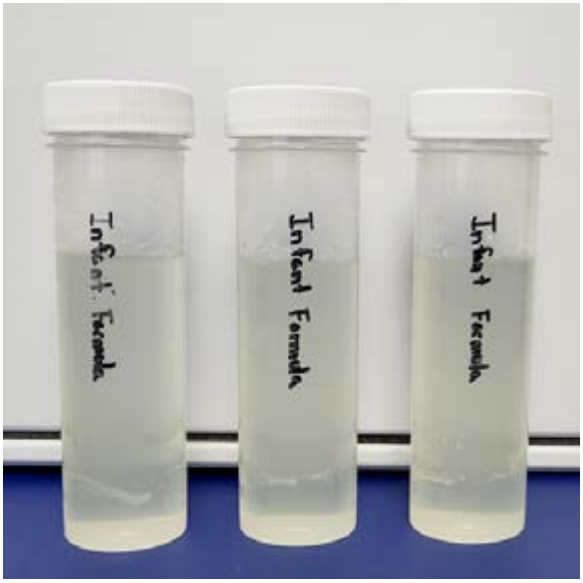
## SUMMARY

The application note summarizes the digestion of NIST 1849b, an infant nutritional formula 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:** | ■ 101% Iron<br>■ 101% Molybdenum<br>■ 97% Selenium |

## 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 1849b 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 1849b is a milk-based, hybrid infant/adult nutritional powder, prepared by a manufacturer of infant formula and adult nutritional products

# NIST 1849b – Infant Nutritional Formula

## Results

| NIST 1849b – Adult/Infant Nutritional Formula I | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **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** | | | | | | | |
| **Cr** | 1.033 | 1.015 | 1.051 | 0.913 | 1.005 | 0.926 | 0.948 | 0.041 | 4.3% | 92% |
| **Cu** | 18.96 | 18.66 | 19.26 | 18.93 | 18.69 | 18.29 | 18.64 | 0.3 | 1.4% | 98% |
| **Fe** | 168 | 160.6 | 175.4 | 174 | 174 | 161 | 170 | 6.4 | 3.8% | 101% |
| **Mg** | 1570 | 1540 | 1600 | 1531 | 1599 | 1518 | 1549 | 36 | 2.3% | 99% |
| **Mo** | 1.741 | 1.678 | 1.804 | 1.764 | 1.766 | 1.740 | 1.757 | 0.012 | 0.7% | 101% |
| **P** | 3750 | 3620 | 3880 | 3802 | 3900 | 3952 | 3885 | 62 | 1.6% | 104% |
| **Se** | 0.816 | 0.791 | 0.841 | 0.759 | 0.802 | 0.822 | 0.794 | 0.026 | 3.3% | 97% |
| ***Ca** | 5050 | 4830 | 5270 | 5122 | 4975 | 4805 | 4968 | 129 | 2.6% | 98% |
| ***Mn** | 46.4 | 44.3 | 48.5 | 44.1 | 42.9 | 43.2 | 43.4 | 0.5 | 1.2% | 94% |
| ***K** | 9014 | 8924 | 9104 | 9035 | 8723 | 8964 | 8907 | 133 | 1.5% | 99% |
| ***Na** | 4155 | 4055 | 4255 | 5127 | 4103 | 4277 | 4502 | 448 | 9.9% | 108% |
| ***Zn** | 141.9 | 138 | 145.8 | 161.1 | 147.1 | 138.6 | 148.9 | 9.3 | 6.2% | 105% |

* Non-Certified Values

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