

# NRC KINO-1 Quinoa Flour

## SUMMARY

The application note summarizes the digestion of KINO-1, a Quinoa Flour Certified Reference Material using ColdBlock™ Digestion Pro Series Technology.

**Instrument:** ColdBlock CBM sample digester, chiller & ICP-MS

**Published:** March 2023

**Digestion Time:** 10 Minutes

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

**Average ColdBlock Recovery vs. CRM:**

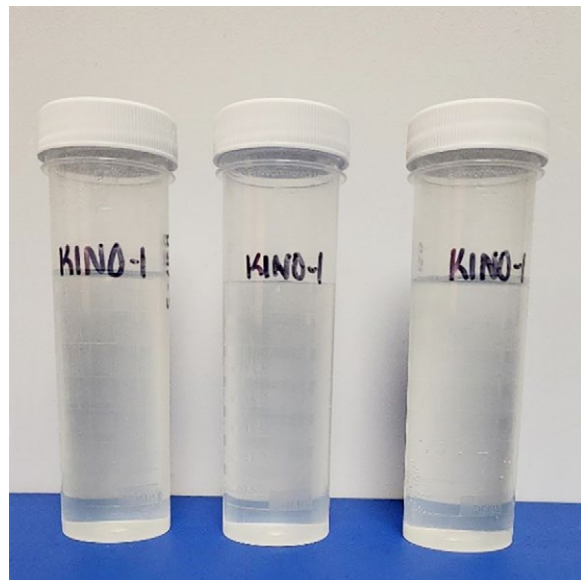
- 94% Cadmium
- 114% Lead
- 99% Selenium

## METHODOLOGY

1. Chiller temperature was set to -5°C
2. 0.5g of each sample was weighed and placed into a ColdBlock™ Digestion vessel
3. 15 mL of HNO<sub>3</sub> + 2mL H<sub>2</sub>O<sub>2</sub> was added
4. Sample was digested at 70% power for 10 minutes
5. Samples were cooled and bulked to 40mL using 2% HNO<sub>3</sub> + 0.5% HCl<sub>v/v</sub>

## DISCUSSION

- Samples were mostly clear after digestion – no visible material remains
- Samples were filtered prior to analysis



KINO-1 is a Certified Reference Material prepared at the National Research Council Canada (NRC). The source of material was food-grade quinoa flour from Northern Quinoa Production Corporation (Saskatoon, SK, Canada)

KINO-1; Quinoa Flour; Certified Reference Material; National Research Council Canada; Ottawa, Ontario Canada (November 2018)

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## Results

NRC KINO-1 (Quinoa Flour)										
Method:	0.5g	15mL HNO <sub>3</sub> + 2mL H <sub>2</sub> O <sub>2</sub> Digest at 60% power for 10 minutes.								
Element	Reference Value (mg/kg)	95% Confidence Limits		Sample A	Sample B	Sample C	Average (ppm)	Stdev	% RSD	% Recovery
		Low	High							
As	0.001	0.00062	0.00138	<	<	<	N/A	N/A	N/A	N/A
*Ca	720	620	820	705	759	662	708	39.75	5.6%	98%
Cd	0.063	0.057	0.069	0.062	0.060	0.057	0.060	0.002	3.4%	95%
Fe	84.1	81.5	86.7	88	86	85	86.5	1.40	1.6%	103%
Hg	0.00097	0.00071	0.00123	<	<	<	N/A	N/A	N/A	N/A
*K	6010	5290	6730	5639	6000	6168	5936	220.60	3.7%	99%
*Mg	1970	1670	2270	1981.458	1946.288	1945.26	1958	16.83	0.9%	99%
*Na	37	29	45	40	37	36	37	1.70	4.5%	101%
Pb	0.0028	0.002	0.0036	<	<	<	N/A	N/A	N/A	N/A
Se	0.17	0.15	0.19	0.18	0.17	0.13	0.16	0.02	12.1%	94%
Sr	2.49	2.31	2.67	2.43	2.36	2.36	2.36	0.03	1.4%	95%
Zn	30.6	29.8	31.4	36.074	33.274	29.087	32.8	2.87	8.8%	107%

\*Represents reference values for which insufficient data is available to provide a comprehensive estimate of uncertainty