



## Certificate of Analysis

AR 5029

CALCIUM OXALATE CRM

LOT # 522M

**Theoretical Values:**

H<sub>2</sub>O @ 200°C - 12.3%

CO @ 450°C - 19.2%

CO<sub>2</sub> @ 850°C - 30.1%

Total LOI - 61.6%

**% WEIGHT LOSS (ANALYSIS)**

H<sub>2</sub>O MEAN = 12.4% ± 0.1%

CO MEAN = 19.7% ± 0.1%

CO<sub>2</sub> MEAN = 29.3% ± 0.1%

LOI MEAN = 61.5% ± 0.2%

The uncertainty values represent the 95% confidence limit (k=2) where n=35.

This is High Purity (98%+) Calcium Oxalate Hydrate (CaC<sub>2</sub>O<sub>4</sub>·H<sub>2</sub>O). It is intended for use as a check sample for weight loss at specific temperatures by thermogravimetric analysis (TGA) or other valid tests. Analytical measurements were performed on a TGA701 instrument in accordance with ARI-LAB-624.

CRM's Employed for verification:

502-091 lot 1038 (HP Calcium Oxalate)

AR5029-520Y

The mean analytical values were derived by data sets showing comparative validation to the above-mentioned reference materials and reported in mass fraction. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. The precision values are derived using ISO Guide 35, the Guide to Uncertainty Measurement, and ANOVA. Refer to your test method or instrument manufacturer for any additional method derived uncertainty if needed. When necessary, professional judgment is applied toward consideration of data and statistical information. The statistical analysis and the overall direction and coordination of the analytical measurements leading to certification were performed by K.E. Dyer, Chief Chemist, at Alpha Resources.

This CRM was identified and prepared in accordance with ARI-LAB-672. Sample size and minimum sample size for this data was 1g nominal. Refer to your instrument manufacturer or test method for minimum and typical analysis sample size. This bottle contains 50g of fine powder and should be dried at 105°C for 1 hour prior to analysis to remove any residual H<sub>2</sub>O. An optional residual moisture or drying step can be added to the TGA method. Keep sealed and store under normal laboratory conditions. While unable to determine a definite shelf life this reference should be reviewed 10 years from certification.

The samples for round robin testing were selected in accordance with ARI-LAB-625. The above values relate only to the material used to produce this standard. Remedies for any claimed defect in this product will be limited to product replacement or refund of the purchase price. In no event, shall Alpha Resources be liable for incidental or consequential damages. This certificate cannot be reproduced except in its entirety.

This is a Certified Reference Material and is traceable metrologically and verified to the above-mentioned references. For good laboratory practice, it is recommended that all standards be verified as fit for purpose prior to use. These test results are accredited under the Alpha Resources LLC laboratory's ISO/IEC 17025 and ISO 17034 (RMP) accreditation issued by ANSI-ASQ/ANAB. Refer to certificate and scope of accreditation(s) AT-1200 and AR1920.

Certified November 16, 2022

Kent Dyer

Chief Chemist