



Project Title: ICP-OES of Salt for Composition under ISO
Project Number: P231085
Customer: Tara Kelley
Company: Great Deal Products Landscape Supplies

Sample List:

<i>Element Midland ID</i>	<i>Customer Sample Information</i>
P231085-1	Dragon Melt
P231085-2	Hot Pink
P231085-3	Green Earth
P231085-4	Icinator

Report Number: R231085-1r0
Date Submitted: 12/29/2023
Analyst(s): J. Evers
Databook #: 4112 (JAE)

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QC (Initial/Date): THD 01/15/2024

ICP-OES of Salt for Composition under ISO

Summary

Four samples of de-icing salt were submitted for analysis by inductively coupled plasma-optical emission spectroscopy (ICP-OES) for sodium (Na), magnesium (Mg), calcium (Ca), and potassium (K) content. The elemental determination was then used to indirectly determine the content of sodium chloride (NaCl), magnesium chloride hexahydrate (MgCl₂ * 6 H₂O), calcium chloride (CaCl₂), and potassium chloride (KCl).

Experimental

An aliquot of each test material was ground using a mortar and pestle to homogenize. Each sample was then weighed and dissolved into an acid matrix for analysis. A reagent blank was prepared similarly without test material. All solutions were analyzed using a Thermo Scientific iCAP 6300 Duo ICP-OES following Element Midland SOP-INORG-002.

Results and Discussion

The instrument system suitability was tested prior to analysis and found to be acceptable. The instrument was calibrated using freshly prepared multi-element calibration standards and was successful with an R² value greater than 0.995 for all elements of interest. Results of the ICP-OES analysis are summarized in Table I. Results were corrected for the blank and dilution factor and were reported in units of µg/g (ppm). Using the calculated elemental values, the percentages of NaCl, MgCl₂ * 6 H₂O, CaCl₂, and KCl were indirectly determined as summarized in Table II. The results were normalized and reported in units of weight percent.

Table I. Summary of the ICP-OES Elemental Data for Salt Samples

<i>Sample ID</i>	<i>Dragon Melt (P231085-1)</i>	<i>Hot Pink (P231085-2)</i>	<i>Green Earth (P231085-3)</i>	<i>Icinator (P231085-4)</i>
Units	µg/g	µg/g	µg/g	µg/g
Calcium	3410	1600	1440	7960
Potassium	80.1	1890	8400	809
Magnesium	329	702	3200	1320
Sodium	392,000	369,000	366,000	372,000

Table II. Summary of Indirect Salt Determination

Sample ID	Dragon Melt (P231085-1)	Hot Pink (P231085-2)	Green Earth (P231085-3)	Icinator (P231085-4)
<i>Units</i>	%	%	%	%
CaCl ₂	0.936	0.466	0.409	2.24
KCl	0.0152	0.379	1.64	0.157
MgCl ₂ * 6 H ₂ O	0.273	0.617	2.73	1.12
NaCl	98.8	98.5	95.2	96.5