

Providing Innovative Solutions to Analytical Chemists

1.0 DESCRIPTION: Matrix Reference Material **AgroMAT Compost** (CP-1)
 Catalogue Number: 140-025-111
 Lot Number: **S131024030**
 Expiration Date: 2 years from date of shipment (See Ship Date label on bottle)

2.0 CONSENSUS VALUES (See section 8 for additional details):

Parameter	Units	Consensus Value	Uncertainty (+/-)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
pH	-----	7.00	0.06	6.94 – 7.05	6.49 – 7.50
Organic Matter	%	63.4	2.3	61.2 – 65.7	44.7 – 82.2
NO ₃ -N	mg/kg	35.9	4.2	31.7 – 40.1	8.21 – 63.6
N-Total	%	2.25	0.06	2.19 – 2.32	1.79 – 2.72
H ₂ O	%	6.28	0.41	5.87 – 6.69	3.16 – 9.41
C/N Ratio	-----	17.1	0.8	16.3 – 17.9	11.3 – 22.9
Al-Total	mg/kg	4579	317	4262 - 4896	1909 – 7249
As-Total	mg/kg	2.24	0.12	2.12 – 2.36	1.46 – 3.02
Ca-Total	mg/kg	18 530	430	18 100 – 18 960	15 189 – 21 870
Cd-Total	mg/kg	0.719	0.055	0.663 – 0.774	0.313 – 1.124
Co-Total	mg/kg	3.00	0.17	2.84 – 3.17	1.78 – 4.22
Cr-Total	mg/kg	16.1	1.0	15.0 – 17.1	7.66 – 24.5
Cu-Total	mg/kg	76.2	2.7	73.5 – 78.9	51.7 – 100.7
Fe-Total	mg/kg	25 547	1021	24 526 – 26 568	16 458 – 34 637
Hg-Total	mg/kg	0.142	0.016	0.126 – 0.158	0.027 – 0.257
K-Total	mg/kg	2373	121	2252 - 2495	1360 – 3387
Mg-Total	mg/kg	1720	64	1656 - 1785	1166 – 2275
Mn-Total	mg/kg	710	14	696 - 725	583 – 838
Mo-Total	mg/kg	1.21	0.08	1.13 – 1.29	0.645 – 1.78
Na-Total	mg/kg	(908)	----	----	----
Ni-Total	mg/kg	11.1	0.6	10.6 – 11.7	6.42 – 15.9
P-Total	mg/kg	6711	199	6511 - 6910	5060 – 8361
Pb-Total	mg/kg	15.6	0.6	14.9 – 16.2	10.1 – 21.1
S-Total	mg/kg	3215	135	3080 - 3350	2296 – 4134
Se-Total	mg/kg	0.899	0.085	0.813 – 0.984	0.390 – 1.408
Zn-Total	mg/kg	248	6	242 - 254	196 - 300

3.0 APPROVAL AND REVISION:

Approval: Daniel Boisvert, Chemist
 Date of Issue of Report: January 13th, 2014
 Date of revision: October 21st, 2016



4.0 DESCRIPTION AND INTENDED USE:

The Matrix Reference Material CP-1 is a compost (not spiked or fortified) with a particle size of -35 mesh. It is designed to be used for quality control verification or methods development for compost analysis by different techniques for the listed parameters. Not intended for calibration.

5.0 INSTRUCTIONS FOR USE AND STABILITY:

Instructions for use: The material must be dried at 105°C for two hours before use. Before weighing, mix the material by shaking the container to avoid segregation in the bottle. In order to have a representative sample, the minimum use quantity must be 1 g to conform to previous homogeneity testing. Acid digestion is the normal procedure used for total extractable metals and nitrogen (Kjeldahl). See more details on section 8. Do not use a total digestion procedure. Results are to be calculated on a dry weight basis.

Stability: This MRM is guaranteed to be stable up to 2 years from the shipping date provided the material is kept sealed, stored under normal laboratory conditions and used according to good laboratory practices. Shipping date will be stamped on container at time of shipping. **SCP SCIENCE** will monitor the stability of representative samples regularly and if any changes occur that invalidate the reported results, **SCP SCIENCE** will notify purchasers.

Date of last verification: March 12th, 2019

6.0 HAZARDOUS INFORMATION:

Please refer to the associated Safety Data Sheet (SDS) for information regarding this product (available at <http://www.scpscience.com/ecert>).

7.0 PREPARATION METHOD AND HOMOGENEITY:

Preparation Method: The initial sample has been dried, crushed and sieved through a 20 mesh sieve. The “fines” portion has been further crushed and sieved with 100% of the material passing through a 35 mesh screen. The final material has then been packaged in 100 g containers and tested for homogeneity.

Homogeneity: The homogeneity of the material has undergone third party verification by Particle Size Analysis and by metals oxides analysis using an X-ray fluorescence spectrometer. The method used for material homogeneity determination is based on ISO Guide 35.

8.0 ANALYSIS AND DETERMINATION OF CONSENSUS VALUES:

These values were the result of an inter-laboratory study involving forty-seven international laboratories. Each laboratory was asked to supply analysis data for a specific list of elements. Not all the laboratories supplied data for the different parameters. Consensus values are based on an average of 58 values per parameter (85 values being the highest and 26 values being the lowest). Values in brackets are not certified as less than 10 values were received. They are provided for information only.

Most of participating labs employed an extraction method based on EPA-3050B (or NF EN ISO 11466). HNO₃, HNO₃/HCl or HNO₃/HCl/H₂O₂ digestion method was used. ICP-MS and ICP-AES have been used for metals quantification by most of inter-laboratory Study participating laboratories. The % humidity has been determined by drying at 105oC. Organic matter was determined by ignition at 360oC and 550oC. Most laboratory used colorimetry, ion chromatography (IC) or Segmented Flow Analyzer (SFA) to measure nitrates. Water extraction method and pH-meter was used for soil pH. Most participating labs used soil ratio 1:1 or 1:2 (soil:water) for pH testing. Combustion or Colorimetry has been used for % nitrogen.

The outliers were removed using the Dixon Test and by data comparison after confirmation that there was neither a connection between outliers and the methods used for analysis nor between the outliers and the nature of the sample.

The Confidence Interval has been calculated using the 95% Confidence Level (equivalent to 2σ) using the following formula:

$x \pm ts/\sqrt{n}$ where

n:	number of data
s:	Standard Deviation of the Average
t:	factor for Student Test
x:	Reference Value

The Confidence Interval should be used for routine quality control.

The Tolerance Interval has been calculated using again a 95% probability with a 95% inclusion of the population. The following formula was used:

$x \pm ks$ where
k: factor for two-sided Tolerance Limits
s: Standard Deviation of the Average
x: Reference Value

The Tolerance Interval is an indication of the lowest possible value and the highest possible value based on the complete set of data, exclusive of outliers, used to calculate the Consensus value.

The following table is a guideline on how to interpret the results:

Results within Confidence Interval	Method working properly
Results outside Confidence Interval but within Tolerance Interval	Method may need improvement
Results outside Tolerance Interval	Method not working properly

9.0 REFERENCES:

ISO Guide 30: Terms and definitions used in connection with reference materials
ISO Guide 31: Reference materials – Contents of certificates, labels and accompanying documentation
ISO Guide 35: Certification of reference materials--General and statistical principles
Standard Reference Materials-Handbook for SRM Users - John K. Taylor
Quality Assurance of Chemical Measurements - John K. Taylor
EPA 3050B - Acid Digestion of Sediments, Sludges and Soils (Revision 2, December 1996)

10.0 QUALITY SYSTEM CERTIFICATIONS:

ISO 9001 Certification: This reference material was produced in a facility which operates under a **registered** ISO 9001 Quality Management System. Please consult our web site for a copy of the most recent revision of our certificate of registration.

ISO 17025 Accreditation: **SCP SCIENCE (Corporate Headquarters)** operates an ISO 17025:2005 **accredited** laboratory. Please consult our web site for a copy of the most recent revision of our certificate and scope of accreditation.

ISO 17034 Accreditation: **SCP SCIENCE (Corporate Headquarters)** is an ISO 17034 accredited Reference Material Producer. Please consult our website for a copy of our most recent certificate and scope of accreditation.

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