

American Laboratory Testing Association

ALTA soil analysis certification program update

Robert Miller and Mike Lindaman



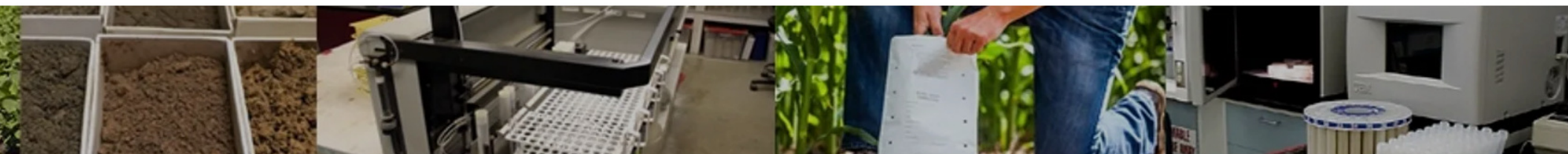
February 16, 2021



ALTA

AGRICULTURAL LABORATORY TESTING ASSOCIATION

[HOME](#) [ABOUT ALTA](#) [OFFICERS & ADVISORS](#) [SOIL ANALYSIS](#) [PLANT ANALYSIS](#) [CERTIFIED LABS](#) [ALTA MEMBERS](#) [MORE](#) ▾



About ALTA



ALTA

AGRICULTURAL LABORATORY TESTING ASSOCIATION

The Agricultural Laboratory Testing Association is an organization of professionals dedicated to:

- quality soil testing
- accurate reporting
- sound management advice
- information sharing

[VIEW PAGE](#)

[ALTA Soil Certification](#)

Officers & Advisors



Officers & Industry Advisors

A dedicated group of individuals committed to the quality of soil and plant tissue testing and the education / certification of member labs.

[VIEW PAGE](#)

[ALTA Plant Certification](#)

Certified Labs



The following member labs have met the qualifications for certification by ALTA as of Feb. 2, 2020.

[VIEW PAGE](#)

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ALTA Soil Analysis Certification (SAC)



Program Objective: Critically assess soil testing laboratory performance based on single blind proficiency soil samples¹ .

Methods:

pH (1:1)_{H₂O}, pH (1:1)_{Salt},

Bray P1, M3-P (Spec), M3-P (ICP)

NH₄oAc K, M3-K

Certification: Three required tests, independent assessment of lab bias and precision based on set performance standards ², three times annually.

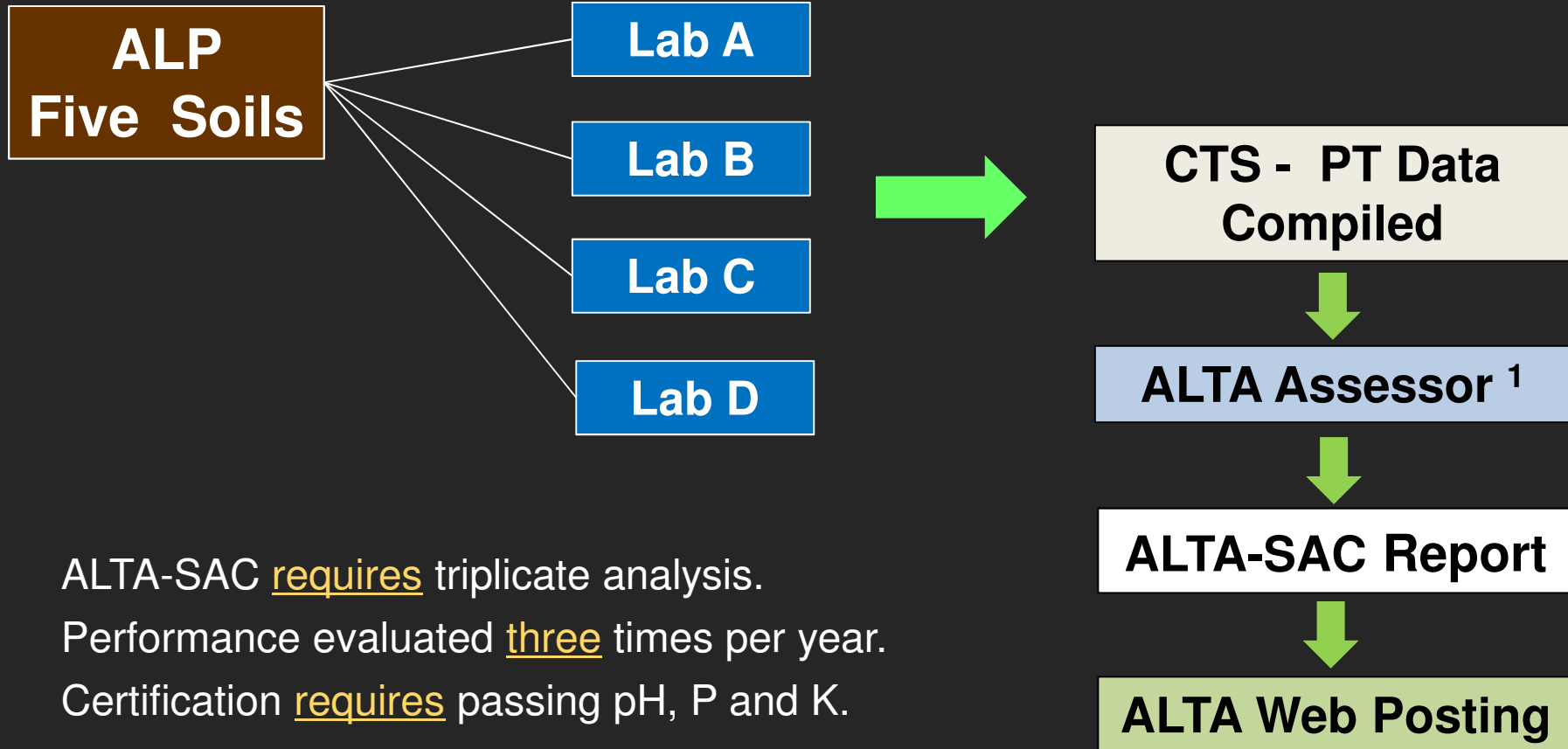
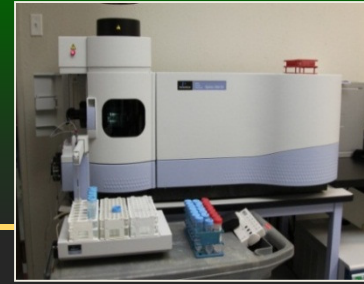


¹ PT data source, an accredited PT provider under ISO/IEC 17043.

² ALTA-SAC an approved certification program under NRCS 590 requirements.



ALTA-SAC Operation



ALTA-SAC requires triplicate analysis.
Performance evaluated three times per year.
Certification requires passing pH, P and K.

¹ Mike Lindaman, SAC Assessor

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ALTA-SAC certification criteria

ALTA
ANALYTICAL LABORATORY

ALTA-SAC Report - ALP Cycle 43
December 7, 2020

Lab ID	SRS - 2011		SRS - 2012		SRS - 2013		SRS - 2014		SRS - 2016	
	Mean	Precision %	Mean	Precision %	Mean	Precision %	Mean	Precision %	Mean	Precision %
US00A	7.00	0.0	7.30	0.0	6.20	0.0	5.70	1.0	6.30	0.0
US00A	6.80	0.0	7.30	0.0	6.10	0.0	5.70	1.0	6.20	0.0
US00A	7.01	0.1	7.30	0.1	6.21	0.1	5.94	1.0	6.44	0.0
US00A	7.01	0.4	7.25	0.0	6.15	1.0	5.62	1.0	6.52	0.0
US00A	6.87	0.1	7.30	0.0	6.11	0.0	5.66	0.0	6.28	0.0
US00A	6.80	0.0	7.17	0.0	6.07	0.0	5.96	0.0	6.10	0.1
US00A	7.01	0.0	7.42	0.0	6.20	0.0	5.80	0.0	6.57	0.0
US00A	6.87	0.0	7.30	0.0	6.10	0.0	5.66	0.0	6.57	0.0
US00A	6.87	0.0	7.30	0.0	6.08	0.0	5.70	0.0	6.26	0.0
US00A	6.81	0.0	7.34	0.0	6.10	0.0	5.70	0.0	6.27	0.0
US00A	7.00	0.0	7.30	0.0	6.17	0.0	5.76	0.0	6.20	0.0
US00A	6.90	0.0	7.31	0.0	6.20	0.0	5.80	0.0	6.50	0.0
US00A	6.80	0.0	7.18	0.0	6.08	0.0	5.66	0.0	6.10	0.0
US00A	6.77	0.0	7.00	0.0	5.97	0.0	5.67	0.4	6.26	0.0
US00A	6.80	0.0	7.01	0.0	6.08	1.0	5.67	1.0	6.21	1.4
US00A	6.90	0.0	7.30	0.0	6.10	0.0	5.70	0.0	6.40	0.0
US00A	6.83	0.0	7.21	0.1	6.07	0.1	5.66	0.0	6.26	0.0
US00A	6.77	0.1	7.17	0.0	6.00	0.0	5.57	0.0	6.10	0.0
Median	6.90		7.30		6.16		5.70		6.30	
95% CL	6.10		6.14		6.10		6.14		6.14	
P ₉₅ %	0.02		0.01		0.02		0.04		0.00	

*Data ALP Cycle 43. Confidence Limits based on 95% of Median Method. Precision Page 3 & 4. Specific data no precision data.

Soil Test ¹	Method Criteria
pH	Median \pm 0.20 or 95% CL
P	Median \pm 95 % CL
K	Median \pm 95% CL

¹ Modus Methods: S-pH-1:1.02.07, S-pH-1:1.02.08, S-P-P1-1:10.01.03, S-P-M3.01.03, S-P-M3.04, S-K-NH4AC.05, S-K-M3.05, Data collected on Sikora Buf pH, M3-Ca, M3-Mg, DTPA-Zn and SOM-LOI.

¹ ALTA-SAC method certification requirements set by SAC board.



ALTA-SAC median and confidence limits (CL)

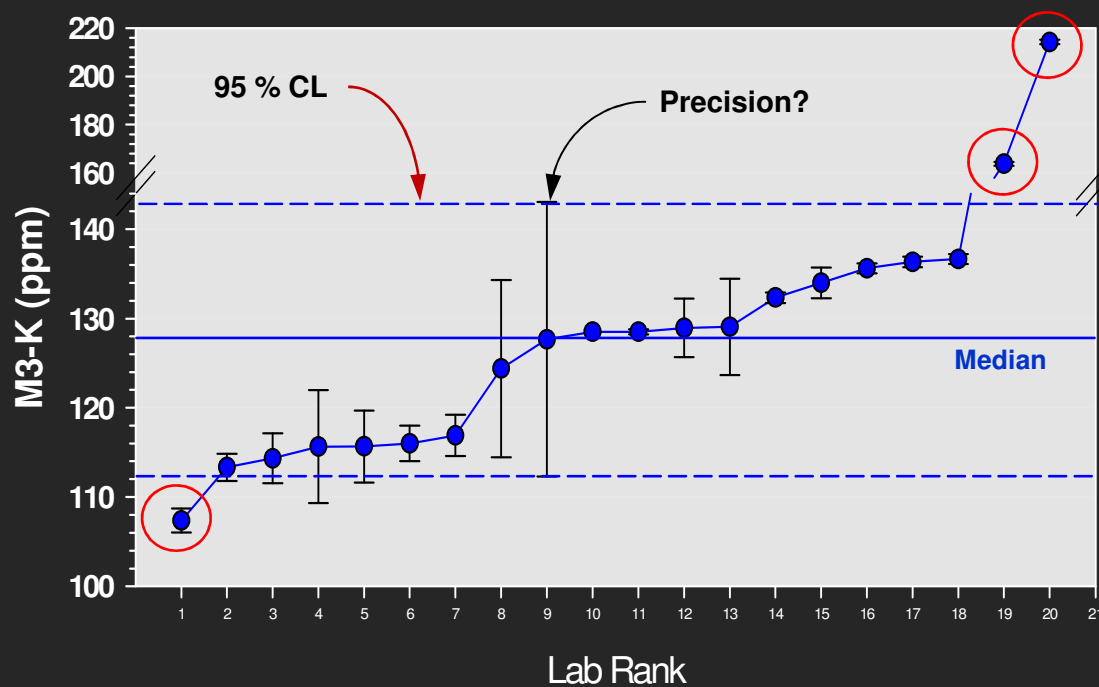


Data from ALTA-SAC participants sorted low to high, median and 95%CL determined.

Example: SRS-1712, median M3-K of 128 ppm and 95% CL of ± 16 ppm.

M3-K method warnings (labs value exceeds 95% CL) three labs; four with precision failures.

Soil ID SRS-1712 ¹



¹ ALTA, cycle 34, 60 M3-K laboratory soil results.



ALTA-SAC definitions



Method Warning:

A single lab soil result exceeds the ALTA-SAC ¹ median 95% CL for a test method in a PT cycle.

Soil	2001	2002	2003	2004	2005
pH	✓	✗	✓	✓	✓

Method Failure:

Multiple (> 1) method warnings of a test method across five PT soils in a cycle. **Passing - 80%.**

Soil	2001	2002	2003	2004	2005
pH	✓	✗	✗	✓	✓

Precision Failure:

Intra-lab method repeatability exceeds ALTA-SAC inter-lab precision for any soil.

Soil	2001	2002	2003	2004	2005
pH	P	F	P	P	P

¹ ALTA-SAC certification rules set by ALTA board.



ALTA-SAC participants¹ 2012 - 2020



A & L Great Lakes Laboratories, Inc
AgSource Cooperative Services – WI
Black Log Ag Services
Brookside Laboratory
Charter Soil Service
GMS Laboratories, Inc.
Ingram's Soil Testing Center
Key Agricultural Service
KSI Laboratory
Midwest Laboratories
MSE Laboratories
Precision Soil Labs
Pro Ag Consulting
Rock River Laboratory, Inc.
SGS North America, Toulon

SGS Alvey Testing - Belleville
SGS Testing – Hamel
Soiltech, Inc.
Solum Laboratory - IA
Southern Illinois Ag Solutions Inc.
Southern Illinois Soil Laboratory
Spectrum Analytic
Sure-Tech Labs
The Farm Clinic Inc.
United Soils Inc.
Waters Agricultural Laboratory – KY
Way Point Analytical – Atlantic, IA
Way Point Analytical – Memphis, TN
Way Point Analytical – Champaign, IL

¹ Labs serving the Midwest, high lighted labs no longer providing services.

ALTA-SAC method failures 2018-2020



Bray P and M3-P ICP had the highest number of labs with method failures over nine PT cycles, 2018-2021.

Across methods, > 50% of all 69 method failures are associated with 6 labs.

Soil Test Method ¹	Number of labs x cycles	Number lab method failures
pH 1:1 _{H2O}	166	14
pH (1:1) _{Salt}	70	7
Bray P	105	17
M3-P Spec	20	0
M3-P ICP	146	13
Amm - K	66	5
M3-K	161	13

¹ Lab performance failures, <80% score over 9 PT cycles, 2018-2021.

ALTA-SAC lab performance – two labs



ALTA-LAP lab performance¹, nine PT cycles.

Lab XX20

Year ¹	2018			2019			2020		
Cycle	35	36	37	38	39	40	41	42	43
pH 1:1	-	-	-	W	-	-	F	F	F
M3-P ICP	F	-	-	W	-	W	W	W	F
M3-K	F	W	-	F	-	-	-	-	F

Lab XX91

pH 1:1	-	-	-	-	W	-	-	-	-
M3-P ICP	-	W	W	-	W	-	-	-	W
M3-K	-	-	F	W	-	W	-	W	-

¹ Method performance, three methods.



SAC performance 2018 - 2020



Method failures cycles 35 - 43

Over nine PT cycles for soil pH (1:1)_{H2O} there were 14 method failures across 22 labs. Three labs constitute 43% of method failures.

M3-P ICP had 13 method failures and M3-K 13 across 20 labs. Four labs constituted 69% of M3-P method failures and three labs 54% of the M3-K failures.

pH 1:1 H ₂ O	
Lab ID	# Cycle Failures
XX04	1
XX22	2
XX33	1
XX74	1
XX23	1
XX35	1
XX15	1
XX20	2
XX29	1
XX67	2
XX76	1
Total	14

M3-P ICP ¹	
Lab ID	# Cycle Failures
XX04	1
XX22	2
XX18	2
XX33	1
XX23	1
XX35	1
XX20	3
XX76	2
Total	13

M3-K	
Lab ID	# Cycle Failures
XX04	1
XX22	1
XX33	2
XX91	2
XX74	1
XX23	1
XX02	1
XX20	3
XX67	1
Total	13

¹ ALP cycles 35-43, only labs with method failures shown.



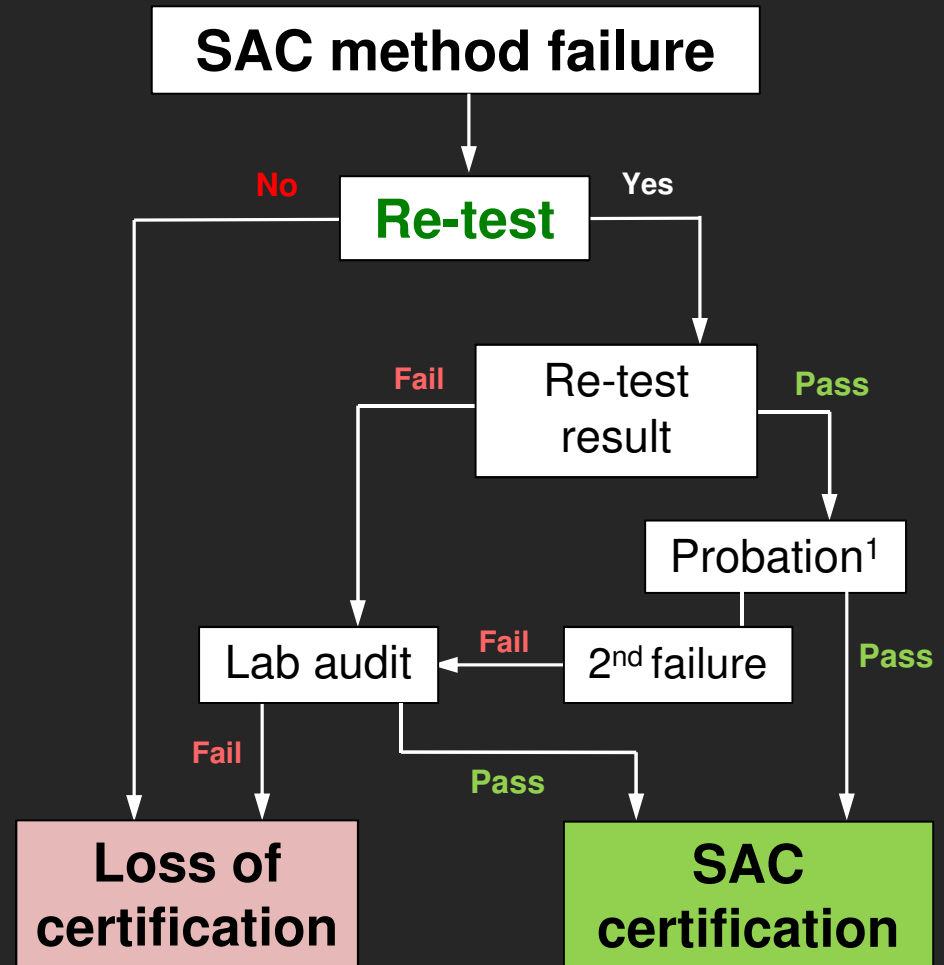
SAC program performance



A soil method failure, optional retest, and with passing retest, probation designation for two subsequent SAC PT cycles. A 2nd method failure requires external lab audit. Forgo lab audit, loss of certification.

The SAC program provides 3 opportunities for a lab to meet the certification standard:

- 1 - 80% PT score
- 2 - Pass re-test, 80%
- 3 - Method audit



¹ SAC probation two successive PT cycles.



SAC program observations



- Of 29 labs enrolled in ALTA (ISTA) since 2012, seven ended operations.
- 23% (5) of labs enrolled have never been certified.
- 77% of labs (19) certified, two with have pending test/updates.
- 3% (1) has completed an audit.

Note: 6 labs require specific method re-test/audits to maintain certification for specific method failures (i.e. pass Bray-P but have M3-P ICP failure).



ALTA-SAC changes 2021



- Laboratory failing SAC re-test, opt for in person or virtual retest. Virtual re-test, 2nd set of retest samples, assessor review via Zoom or Face Time.
- Proposed changes to SAC. Multiple soil test methods (pH, P and K) , required to pass for all reported methods. (i.e. failure on Bray P1, but pass on M3-P, results in P method failure, loss of certification).
- Addition of Sikora Buffer pH and SOM-LOI to SAC certification.



ALTA-PAC Program 2021



Plant Analysis Certification program has initiated

Certification is based on 2020 ALP plant analysis PT data, total 12 samples. PAC passing score 10 of 12 correct.

Certification three classifications:

Macro nutrients: N, P, K, S, Ca, Mg

Micro nutrients: Zn, B, Fe, Mn, Cu, Cl

Extractable: $\text{NO}_3\text{-N}$, $\text{PO}_4\text{-P}$, $\text{SO}_4\text{-S}$, $\text{NH}_4\text{-N}$

PAC method failure, re-test option and lab method audit.

Program Cost \$350/yr.

Thank you for your time and attention

Thanks to ALTA participants for supporting Soil Analysis Certification



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