

MT-Series Case Study #01

Agriculture – pH and Conductivity in Soils

In the last half century, the agricultural industry has undergone a significant transformation to meet the ever-growing demands of today's society. Earth's population has more than doubled in that period, and the amount of land available for agriculture is only decreasing, driving a revolution in food production that has allowed farmers to keep up with demand. There are many practices available for boosting food production, but one of the oldest and most widely-used methods is simply optimizing soil quality based on crop selection. Since each region of the globe has differing soil and climate conditions, there have been a great number of methods developed to test soils and determine quality. While some of these tests are available for farmers to perform on-site, most farmers send soil samples out to analysis laboratories. As awareness of, and adherence to these practices increases, the demand for soil analyses in contract laboratories also increases. Therefore, there is a need for equipment that can automate soil analyses to meet growing demands. By automating soil analysis, contract laboratories can analyze more samples in less time, allowing faster reporting to farmers.



Figure 1: Agricultural fields



Figure 2: MANTECH MT-30 Soil Analysis System

Terralink Horticulture is a Canadian agricultural supply company that offers environmental testing for water and soil samples. It has recently seen a significant increase in requests for soil pH and Conductivity analysis. Rather than hiring more laboratory technicians to meet demands, Terralink invested in a MANTECH MT-30 Soil Analysis System to automate their testing for pH and Conductivity in agricultural soils. In addition to these tests, Terralink performs a Mehlich III Extraction on their samples which requires a pH measurement before and after addition of an extracting solution. The MANTECH system automates the addition of all reagents, measurements from probes, stirring for specified times, and performs dynamic rinsing in between each sample analysis. MANTECH uses a

proprietary IntelliRinse® system to monitor the quality of the rinse water, ensuring accurate results each time with no possibility of carryover. The implementation of the MANTECH system has transformed the laboratory's operations from a full day of labor-intensive sample preparation and measurement to a simple set-up of the samples on the MANTECH system. Once the laboratory technician loads the autosampler tray and clicks Start, they are free to perform the rest of their daily duties while the MT-30 system performs unattended sample analysis. The MANTECH system also has capabilities to automatically export results to the laboratory's LIMS system for data management. In addition, the system performs automated calibrations and quality control checks to ensure a valid analysis. To reduce the environmental impact of the system, it uses low-cost, recyclable plastic cups that can be found in many local supermarkets. The implementation of the MANTECH Soil Analysis system has not only allowed the laboratory to easily meet their growing demands, but also given them the confidence to continue expanding their operations and finding new customers.

Order Number		TerraLink Horticulture							Report Date: 07/05/2018 : 1:43 PM
20180131-2		Soil Analysis Historical Data Report							
Schedule Name	SampleID	RunDate	RunTime	Temp	Conductivity (dS/m)	pH Before Buffer	pH after buffer		
COND-PH	42631	01/31/2018	12:34 PM	16.82	.06	6.29	-1.00		
COND-PH	42632	01/31/2018	12:39 PM	16.66	.08	6.25	-1.00		
COND-PH	42633	01/31/2018	12:47 PM	15.90	.08	6.31	-1.00		
COND-PH	42634	01/31/2018	12:52 PM	16.01	.08	6.34	-1.00		
COND-PH	42635	01/31/2018	12:58 PM	16.28	.07	6.44	-1.00		
COND-PH	42636	01/31/2018	1:04 PM	16.36	.06	6.28	-1.00		
COND-PH W BUFFER	42637	01/31/2018	1:16 PM	16.91	.06	6.29	5.83		
COND-PH	42638	01/31/2018	1:21 PM	16.48	.07	6.50	-1.00		
COND-PH	42639	01/31/2018	1:27 PM	16.88	.08	6.25	-1.00		
COND-PH W BUFFER	42640	01/31/2018	1:38 PM	17.22	1.43	7.39	6.43		
COND-PH W BUFFER	42641	01/31/2018	1:49 PM	17.48	.65	7.74	6.45		
COND	pH 4 Buffer	01/31/2018	6:19 PM	-1.00	4.64	-1.00	-1.00		
COND-PH W BUFFER	42642	02/01/2018	12:23 PM	19.32	.03	5.54	5.67		
COND-PH W BUFFER	42643	02/01/2018	12:34 PM	19.09	.05	5.56	5.70		
COND-PH W BUFFER	42644	02/01/2018	12:45 PM	19.14	.09	6.09	5.81		
COND-PH W BUFFER	42645	02/01/2018	12:57 PM	18.88	.10	5.40	5.54		
COND-PH W BUFFER	42646	02/01/2018	1:08 PM	18.76	.00	6.00	6.80		

Figure 3: Customizable MANTECH report

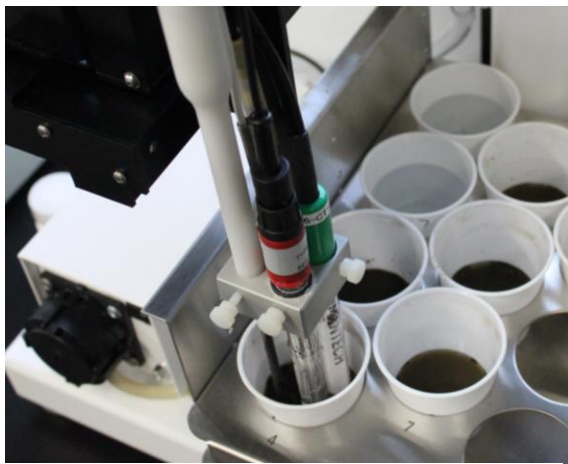


Figure 4: pH and Conductivity Analysis on Soil/Water Mixture

The MANTECH MT-30 Soil Analysis system is the ideal solution for agricultural applications for the following reasons:

- Easily adaptable methods can be customized to meet any soil application
- Intuitive software allows for common sample sets to be saved as templates, then loaded or linked to an 'Autorun' button for one-click start up
- Autosamplers ranging from 30 – 400 sample positions, single, dual, and quadra probe options can meet the needs of any size laboratory
- MANTECH offers customized sample racks to allow for use of a wide variety of sample vessels
- Systems can perform automated sample preparation, including addition of reagents, specified stir and wait times, and pH adjustment
- Automated calibrations and quality control checks can be set up to run in the morning before technicians arrive, thus sampling can begin immediately, or incorporated into a sample run