A Comparison of Three Garden Soil Test Kits and a Certified Soil Testing Lab

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Introduction

Soil testing is important for fertility management. When soil tests are paired with fertilizer guidelines, good plant growth can be achieved while limiting the chance of creating a non-point source pollution issue. Whereas, fertilizing without a soil test may cause fertilizer being over applied and can cause adverse environmental issues; or fertilizer can be under applied which reduces plant growth.

Soil tests completed by a certified soil testing lab have undergone scrutiny by testing lab and university personnel. The certified lab tests are based on research that shows the most consistent and reliable results to a specific region. Many garden retailers offer soil test kits that offer fast results. However, the soil testing kits have not undergone the scrutiny that certified lab tests have.

This project compares the test results of three different soil test kits with a certified soil testing lab.

Materials and Methods

Soil test results from the North Dakota State University Soil Testing Lab (NDSU STL), a certified commercial soil testing lab were compared with the LaMotte¹ complete soil test kit (LaMotte), Luster leaf rapitest soil test kit² (Rapitest), and Luster leaf rapitest 4-way Analyzer³ (4-way Analyzer). Sixteen different soils were tested. Soil series were collected based on location, taxonomy, and prevalence in North Dakota (Figure 1). Store bought compost⁴ and potting soil⁵ were also tested. Soils were collected by shovel at the 0-6 inch depth and stored in soil testing bags. Soils were dried, ground, homogenized, and divided into six separate soil testing bags. Three bags were randomly selected and analyzed by the NDSU STL. The other soil bags were kept for garden soil test kit analysis.



Figure 1. Location and soil series of tested soils.

Soil pH, nitrate, phosphorus, and potassium levels were determined. Instructions were followed by the respective soil test kits. Distilled water was used when soil test kit instructions required water. Soil test kit components were washed with distilled water. A 2:1 (soil:distilled water) mixture was created for the 4-way Analyzer. The mixture was allowed to equilibrate for

an hour before testing. Soil test levels were statistically analyzed by Student's T-test procedure and compared only with the NDSU STL results (Table 1).

Results and Discussion

The LaMotte pH, nitrate, and phosphorus soil tests were similar to the NDSU STL (Table 1). The Rapitest soil pH and nitrate were similar to the NDSU STL results. The 4-way Analyzer soil tests were different from all NDSU STL soil tests (Table 1).

	pН	Nitrate	Phosphorus	Potassium
Soil Test		-lbs/ac-	ppm	
NDSU Soil Testing Lab	6.8	47.1	31.9	479.3
LaMotte Complete Soil Test Kit	6.9	32.8	40.6	64.7***
Luster leaf rapitest Soil Test Kit	6.8	49.9	14.8***	143.5***
³ Luster leaf rapitest 4-Way Analyzer	6.1***	9.0***	1.4***	23.4***
***Significantly different at the 99.9% confidence level				

Table 1. Average soil test results of the different soil tests.

Conclusions and Implications

In some instances, the soil garden test kits provided similar soil test results to the certified soil testing lab. However, garden soil test kits tended to measure less nutrients than the certified soil testing lab (Table 1).

North Dakota soils tend to have high levels of potassium. All garden soil test kits underestimated soil potassium levels (Table 1).

Using the garden soil test kits instead of a certified soil testing lab may cause over application of fertilizers. Unless, fertilizer recommendations are calibrated for the specific soil garden test kit.

Several other garden soil test kits are available. Many of the untested kits have similar extraction solutions as the ones tested. If using an untested kit, the extraction solutions should be noted by the user to determine if the kit is comparable to a certified testing lab.

References

¹LaMotte COMPANY. 2019. LaMotte complete soil test kit. Chestertown, MD.

²Luster Leaf Products, Inc. 2019a. rapitest 4-Way Analyzer. Woodstock, IL.

³Luster Leaf Products, Inc. 2019b. rapitest Soil Test Kit. Woodstock, IL.

⁴Mountain West Products. 2019. Mountain magic compost and manure. Mountain West Products. 4212 South Highway 191, Rexburg, ID.

⁵Oldcastle Lawn & Garden Inc. 2019. Schultz premium potting soil plus. Old Castle Lawn & Garden Inc. PO Box 468567, Atlanta, GA.