

## Understanding Your Soil Analysis Report

Below you will see answers to most FAQs regarding our soil analysis reports. Our goal is to help you understand your analysis results and to guide you to make sound agronomic decisions regarding your planned crop. As always, you can contact the laboratory if you need additional guidance.

### **Primary Nutrients**

**Phosphorus** is utilized in the formation of nucleic acids and other chemicals which help in the development of healthy root systems, early growth, early maturity and seed production.

**Potassium** is similar to phosphorus for root formation and also appears to promote disease resistance. It increases the size and quality of fruits.

### **Secondary Nutrients**

**Sulfur** is sometimes referred to as the "4<sup>th</sup> primary nutrient" since it must be present to form a protein.

**Calcium** is used in root system and leaf development and is combined with other elements to form cell walls. It also helps by activating other enzyme systems.

**Magnesium** is the central atom of the chlorophyll molecule which makes it absolutely necessary to photosynthesis. It also plays a role in phosphate metabolism, plant respiration and enzyme systems.

### **Micro Nutrients**

**Copper** is necessary for chlorophyll formation and also acts as a catalyst for other plant reactions.

**Iron** acts as a catalyst for chlorophyll formation and also carries oxygen. In addition, it helps form certain respiratory enzyme systems. These functions make it critical to photosynthesis.

**Manganese** activates many metabolic reactions in plants and is directly involved in photosynthesis. It accelerates germination and maturity and increases the availability of phosphorus and calcium.

**Molybdenum** facilitates a plant's proper use of nitrogen. It is also used to convert inorganic phosphorus to organic forms.

**Zinc** is necessary for the production of chlorophyll and carbohydrates and aids in the creation of plant growth substances, enzymes systems, and metabolic reactions.

**Boron** is essential for germination of pollen grains and growth of pollen tubes and for seed and cell wall formation. Other functions aid in protein formation.

**Chlorine** is used in photosynthesis and helps promote a more disease resistant plant.

**Soil pH** measures the acidity or alkalinity in soil. A target pH between 6.0 and 6.5 is recommended for most crops.

**Buffer pH** is an indication of the soils ability to resist a pH change. The higher the buffer pH reading, the smaller amount of lime is required to raise the soil pH and vice versa. As the buffer pH increases, lime recommendations decrease.

**Cation Exchange Capacity (CEC)** is an indication of the soils ability to hold or absorb the cations or fertilizer that is applied. The higher the CEC, the more nutrients the soil will hold.

**Base Saturation** is defined as the total CEC occupied by such cations as potassium, magnesium and calcium.

### Soil Extractions

#### **Mehlich I or Mehlich III?**

Waters Agricultural Laboratories, Inc. routinely uses two types of soil extraction solutions, Mehlich I and Mehlich III. The variability in soil characteristics determine the extraction method which should be used for determining nutrient levels.

Mehlich I soil extraction was developed for low CEC, low organic matter soils with acidic to neutral pH levels. The Mehlich III is ideally used on soils with higher CEC and organic matter values. The purpose behind using the two solutions is to match the extraction solution with the soil characteristics to extract the most accurate plant available nutrients.

**Mehlich I Soil Extraction Parameters**

Element	Low	Moderate	Adequate	High	Very High
Phosphorus	<40.0	41-80	81-120	121-150	>150
Potassium	<70.0	71-150	151-250	251-325	>325
Magnesium	<80.0	81-120	121-170	171-200	>200
Calcium	<400.0	401-700	701-900	901-1200	>1200
Sulfur	<25	25-50	51-70	71-100	>100
Boron	<0.5	0.6-1.0	1.1-1.5	1.6-2.0	>2.0
Zinc	<3.0	3.1-5.0	5.1-8.0	8.1-10.0	>10.0
Manganese	<20.0	21-30	31-40	41-50	>50
Iron	<8.0	9-11	12-24	25-30	>30
Copper	<0.8	0.9-1.2	1.3-1.6	1.7-2.7	>2.7

**Mehlich III Soil Extraction Parameters**

Element	Low	Moderate	Adequate	High	Very High
Phosphorus	<40	41-100	101-150	151-200	201+
Potassium	<125	126-225	226-325	326-425	426+
Magnesium	<100	101-150	151-250	251-300	301+
Calcium	<600	601-1000	1001-1400	1401-1800	1801+
Sulfur	<25	26-50	51-75	76-100	101+
Boron	<1.0	1.0-1.5	1.6-2.0	2.1-2.5	2.6+
Zinc	<4.0	4.0-6.0	6.1-10.0	10.1-14.0	14.0+
Manganese	<30	31-60	61-200	201-400	401+
Iron	<50	51-100	100-200	201-400	401+
Copper	<1.50	1.6-3.0	3.1-6.0	6.1-12.0	12.1+