



Soil Testing

What is soil pH and why do we worry about it so much? When we talk about testing our soil for pH, we are talking about measuring the alkalinity or acidity of soil. We do this by measuring the hydrogen ions present and comparing the reading to a scale that indicates the range from alkaline to acidic. Soil pH is important to gardeners because it can affect the availability of plant nutrients as well as the overall health of the soil and plants. In very acid or alkaline soils, plants can have problems absorbing the nutrients they need for healthy growth and fruit production. Soil that is high in all needed nutrients can still be poor soil if the pH is too high or low.

How do you test your soil's pH? We can test soil by taking a small sample, mixing it with distilled water and the capsules provided in a simple home test kit. You can also have more extensive tests done by a professional laboratory. For most home gardeners, a simple test kit is good enough. It is very important to use distilled water so that the pH of the water does not factor into the reading.

What are low, normal and high results? Soil pH is a measurement of the acidity or alkalinity of a soil. On the pH scale, 7.0 is neutral. Below 7.0 is acidic, and above 7.0 is basic or alkaline. *A pH range of 6.8 to 7.2 is termed near neutral.* A soil's pH is a product of the factors which formed the soil. This can include the water used to irrigate plants, natural conditions such as high clay content or environmental conditions such as acid rain.

How do you adjust your soil's pH? We can adjust soil pH by adding what are called *amendments* to soil in amounts that will change the pH in the desired direction. It is very important to test the soil first so you know what you need to change and how much. All packaged amendments will have suggested application rates on their packaging and it is very important to follow these directions. If you are using found amendments such as ashes or coffee grounds, it is important to research the application rates or to amend cautiously, testing both before and after amendments are added.

Elemental sulfur is one chemical that can be used to lower soil pH. The soil type, existing pH, and the desired pH are used to determine the amount of elemental sulfur needed. Incorporate sulfur to a depth of six inches. It may take several months to over a year to react with the soil, lowering the pH. Test soil pH again 3 to 4 months after initial application. If the soil pH is not in the desired range, reapply.

Lime is commonly sold to raise soil pH. It varies in how finely it has been ground. The finer the grind, the more rapidly it becomes effective in raising pH. **Calcitic lime** mostly contains calcium carbonate. **Dolomitic lime** contains both calcium carbonate and dolomite, providing a small boost in magnesium. On most soils, both are generally satisfactory.

What are the nutrients we also test for and why? Testing and amending your soil for nutrient levels is different than amending your soil to adjust the pH level. When you purchase fertilizers, you will see three numbers separated by dashes, 7-5-4, for example. These numbers indicate the levels of the primary nutrients plants need, nitrogen, phosphorus and potassium or N-P-K. They are always in that order. You may also find soil amendments that are for changing just one of the nutrient levels, for example bone meal to raise only phosphorus levels or fish fertilizer to raise only nitrogen levels.

The Montana State University Extension Service has many publications on these topics you can download or browse for free. We recommend their site to find very good information for home gardening. The following link will take you directly to the page for soil pH and nutrients.

<http://store.msuextension.org/search.aspx?keyword=soil+pH>

Some commonly grown vegetables and their pH & nutrient preferences: Many vegetables can grow fine in a wide range of soil pH. It is not a good idea to fixate on soil pH as the sole issue with garden problems although it is a very good place to start. Maintaining healthy soil with a near neutral pH is considered ideal for most gardens. Individual nutrient levels can be important for specific plants and you should make sure these are the numbers you pay the most attention to.

| Vegetable | pH | N | P | K |
|-----------------|---------|-------------|-------------|---------|
| Asparagus | 6.0-8.0 | Average | Ave to High | Average |
| Beans | 6.0-7.5 | Average | Average | Average |
| Beet | 6.0-7.5 | Average | Ave to High | Average |
| Broccoli | 6.0-7.0 | Average | Average | Average |
| Brussels Sprout | 6.0-7.5 | Average | Average | Average |
| Cabbage | 6.0-7.0 | Average | Average | Average |
| Carrot | 5.5-7.0 | Average | Ave to High | Average |
| Cauliflower | 5.5-7.5 | Average | Average | Average |
| Celery | 5.8-7.0 | Average | Average | Average |
| Chive | 6.0-7.0 | Ave to High | Average | Average |
| Cucumber | 5.5-7.0 | Average | Average | Average |
| Garlic | 5.5-8.0 | Average | Ave to High | Average |
| Kale | 6.0-7.5 | Ave to High | Average | Average |
| Lettuce | 6.0-7.0 | Ave to High | Average | Average |
| Peas | 6.0-7.5 | Average | Average | Average |
| Peppers | 5.5-7.0 | Average | Average | Average |
| Potato | 4.8-6.5 | Average | Ave to High | Average |
| Pumpkin | 5.5-7.5 | Average | Average | Average |
| Radish | 6.0-7.0 | Average | Ave to High | Average |
| Spinach | 6.0-7.5 | Ave to High | Average | Average |
| Squash Summer | 6.0-7.5 | Average | Average | Average |
| Squash Winter | 5.5-7.0 | Average | Average | Average |
| Tomato | 5.5-7.5 | Average | Average | Average |