Organic and Inorganic Fertilizers and Materials for the Home Gardener

Home gardeners today have many choices when considering how to improve the soil and add nutrients. With the renewed interest in gardening practices that emphasize conservation and sustainability of our natural resources, many people have an interest in using organics to build the soil and supply needed nutrients.

Applying fertilizers and adding soil amendments can impact the pH of the soil. Speed and duration of the reaction depend somewhat on soil type, organic matter, temperature, available moisture, or fertilizer solubility in water. Soil pH is a measure of the acidity or alkalinity of the soil.

Managing soil pH is important for gardeners because plants grow best in certain pH ranges. Plants may also exhibit nutrient deficiency or toxicity symptoms as a result of soil pH. Correct soil pH only when it is substantially higher or lower than required by the plants you are growing. Select plants that will grow in the natural pH of your soil rather than changing the pH, as long as the existing pH range provides good nutrient availability. Refer to Extension Publication 2571 *Soil pH for Landscape Plants* for more information on pH and the optimum pH ranges for common landscape plants.

This publication lists selected organic and inorganic fertilizers and amendments, their speed of reaction (nutrient availability), and effect on pH so homeowners and gardeners can develop strategies for better management of plant growth and soil productivity. This information is intended as a reference only and should not take the place of a soil test.

Improper use of fertilizers can contribute to water quality problems, so always follow recommendations of a soil test to make sure you are applying only what is needed for healthy plant growth.

Approximate Nutrient Value of Some Organic* Materials

Organic Material	Nitrogen (N) %	Phosphorus (P_2O_5) %	Potassium (K_2O) %	Relative Speed of Reaction	pH Effect
Alfalfa Meal	4	1	1	Slow	Acid
Bone Meal (steamed)	1 to 4	15	0	Slow	Acid
Cocoa shell meal	2.5	1	2.5	Slow	Neutral
Compost	1.5 to 3.5	0.5 to 1.0	1.0 to 2.0	Slow	Neutral
Cottonseed Meal	7	3	2	Slow	Acid
Crushed Granite	0	0	5	Very Slow	Neutral
Dried Blood (Blood Meal)	13	1 to 2	1	Rapid	Acid
Feather Meal	12	0	0	Slow	Acid
Fish Meal	10 to 11	6	0 to 2	Slow	Acid
Hoof and Horn Meal	12 to 14	2	0	Medium	Neutral
Kelp Meal (Seaweed)	1	0 to 0.5	4 to13	Slow	Neutral
Linseed Meal	5	1	1	Slow	Acid
Manure, dairy	0.6 to 2.1	0.7 to 1.1	2.4 to 3.6	**	**
Manure, duck	0.6	1.4	0.5	**	**
Manure, feedlot	1.0 to 2.5	0.9 to 1.6	2.4 to 3.6	**	**
Manure, horse	1.7 to 3.0	0.7 to 1.2	1.2 to 2.2	**	**
Manure, poultry	2.0 to 4.5	4.5 to 6.0	2.1 to 2.4	**	**
Manure, rabbit	2.4	1.4	0.6	**	**
Manure, sheep	3.0 to 4.0	1.2 to 1.6	3.0 to 4.0	**	**
Manure, swine	3.0 to 4.0	0.4 to 0.6	0.5 to 1.0	**	**
Peanut meal	7	1.5	1.2	Slow	Neutral
Pelleted Chicken Manure	2 to 5	1.5 to 3.0	1.5 to 3.0	Slow/Medium	Neutral
Processed Liquid Fish Residue	4	2	2	Medium	Acid
Seabird/Bat Guano	9 to 12	3 to 8	1 to 2	Medium	Acid
Soybean Meal	6	0	0	Slow	Neutral
Wood Ashes	0	2	4 to10	Fast	Basic

*Organic fertilizer is defined as a material containing carbon and one or more elements other than hydrogen and oxygen that are essential for plant growth. These organic materials also supply various secondary (sulfur, magnesium, calcium) and/or trace elements (boron, manganese, zinc, copper, iron, and molybdenum).

**The speed of reaction and effect on pH depend on how the manure is stored, the moisture content, and how it is handled before application.

Nutrient Value* of Some Inorganic Fertilizers

	Primary (%)			Secondary (%)			Trace (%)				
Inorganic Material	Nitrogen (N)	Phosphorus (P_2O_5)	Potassium (K_2O)	Sulfur (S)	Magnesium (Mg)	Calcium (Ca)	Boron (B)	Zinc (Zn)	Iron (Fe)	Speed of Reaction**	pH Effect
Ammonium Sulfate	20	0	0	24	0	0	0	0	0	Rapid	Very Acid
Borax	0	0	0	0	0	0	11	0	0	—	—
Calcium Nitrate	15	0	0	0	0	21	0	0	0	Rapid	Basic
Chelated Iron	0	0	0	0	0	0	0	0	5-12	—	—
Di-ammonium Phosphate	18	46	0	0	0	0	0	0	0	Rapid	Acid
Epsom Salts (magnesium sulfate)	0	0	0	13	10	0	0	0	0	Rapid	Neutral
Iron Sulfate	0	0	0	7	0	0	0	0	12	—	—
Magnesium Ammonium Phosphate	7	40	6	0	15	0	0	0	0	Slow	Neutral
Mono-ammonium Phosphate	11	48	0	0	0	0	0	0	0	Rapid	Acid
Potassium Chloride	0	0	60	0	0	0	0	0	0	Rapid	Neutral
Potassium Magnesium Sulfate	0	0	22	23	11	0	0	0	0	Very slow	Basic
Potassium Nitrate	13	0	44	0	0	0	0	0	0	Rapid	Neutral
Potassium Sulfate	0	0	50	16	0	0	0	0	0	Rapid	Neutral
Sodium Nitrate	15	0	0	0	0	0	0	0	0	Rapid	Basic
Superphosphate	0	20	0	11	0	21	0	0	0	Medium	Neutral
Triple Superphosphate	0	46	0	0	0	0	0	0	0	Medium	Neutral
Urea	46	0	0	0	0	0	0	0	0	Rapid	Sl. Acid
Urea Formaldehyde	38	0	0	0	0	0	0	0	0	Slow	Sl. Acid
Zinc Sulfate	0	0	0	16	0	0	0	35	0	—	—

*The nutrient content may vary from what is listed, depending on the manufacturer or purity of the product or other materials blended with the product.
** Soil type, organic matter, moisture, temperature, and water solubility of fertilizer used affect the reaction speed.

Rock Minerals or Rock Dust Used as Organic Fertilizers/Amendments

Rock Material	Nitrogen (N)	Phosphorus (P_2O_5) %	Potassium (K_2O) %	Relative Speed of Reaction*	pH Effect
Granite Meal/Dust	0	0	3 to 5	Very slow	Neutral
Greensand	0	1	6	Very slow	Neutral
Ground Limestone	0	0	0	Slow	Basic
Gypsum (calcium sulfate)	0	0	0	Medium	Neutral
Hydrated Lime	0	0	0	Rapid	Basic
Rock Phosphate	0	3 to 8 available	0	Rapid	Acid
Soft Rock Phosphate	0	3 to 8 available	0	Rapid	Basic
Sulfur, elemental	0	0	0	Slow	Acid

* Soil type, organic matter, moisture, temperature, and water solubility of organic material used affect the reaction speed.

Other Mississippi State University Extension Service sources of information:

http://msucares.com/crops/comhort/organicsuppliers.pdf
Suppliers of Organic Fertilizers, Rock Minerals, Composts, and Pelletized Poultry Litter in the Deep South by Steve Diver, NCAT Agriculture Specialist National Center for AppropriateTechnology - Arkansas office

http://msucares.com/lawn/garden/vegetables/soil/ph.html
Test soil to find its pH value.

http://msucares.com/lawn/garden/vegetables/organic/index.html
Gardening vegetables: organic gardening.

http://msucares.com/crops/comhort/organic_veg_fruit.html
Organic crops geared more toward commercial organic crop producers.

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