



Manufactured vs. Natural Fertilizers

by

Kevin Schoessow¹
Area Agricultural Development Agent
Burnett, Sawyer, & Washburn Counties

Recent interest in sustainable or organic gardening has stimulated questions about the use of organic or natural fertilizers for home garden use. This interest has spurred the debate on the qualities of natural vs. manufactured materials. Unfortunately, misconceptions confuse the issues for people selecting fertilizers.

Keep Things in Perspective

In order to make the best decision on which fertilizer to apply, there are some basic plant nutritional concepts that need to be understood. Through photosynthesis and other plant metabolic processes, plants manufacture the complex structures they need to grow and reproduce. They do not require vitamins, minerals, or other complex compounds; they only need four basic requirements to grow. They need water, air, sunlight and thirteen essential elements. How they obtain these basic requirements is dependant on the environment and the growth media in which they live. For most home gardeners, this growth media is soil.

Soil is a living entity teeming with life. In ideal situations the soil and its associated microbial communities provide all the essential nutrients needed for healthy plant growth. Often times a soil's natural fertility is not sustainable under intensive gardening practices and additions must be made to the soil. The basic objective of soil fertility management is to feed the soil, not necessarily the plant.

Avoid the 'Quick-Fix' mentality

Too often we search for a quick fix to our plant nutritional needs. There are literally hundreds of fertilizers we can add to the soil that claim they will improve our soil and make our plants more healthy, vibrant, and productive. Advertising and sales techniques readily exploit this trait in many of the promotional materials used to sell their natural products. It should be remembered, however, that natural processes have their own rhythm, one usually much slower than we might like.

Ultimately, the effectiveness of any soil fertilizer depends far more on the soil and the gardening system than it depends on the fertilizer itself. Put another way--if a soil is excessively acid and poorly drained it doesn't matter how much fertilizer (manufactured or natural) is applied; yields will be disappointing at best.

Primary considerations in selecting a garden fertilizer should include release rate and cost. Fertilizers with fast release rates will stimulate quick growth, particularly in cool soils, and are also more prone to leaching of the nitrates into the groundwater and burning when over applied.

There are many kinds of fertilizers available for homeowners. For comparison purposes, the products will be grouped according to their source. There are "natural organic" fertilizers, manufactured organic fertilizers, and manufactured inorganic fertilizers.

Natural Organic Fertilizers

Natural organic fertilizers are commonly made from waste products of various sources ranging from chicken feathers and manures to treated sewage sludge. These materials have very slow release rates, requiring soil bacterial action to convert the organic matter into forms usable by plants. Nutrients released will be excessively slow when cool soil temperatures reduce bacterial activity. Higher application rates may be applied and the fertilizer will last over a longer period of time.

Natural organic fertilizers, being comparatively low in nutrient content and light weight per volume, will require significantly larger volumes in application. Problems associated with their use include slow response, particularly in cool soils, and homeowners misjudge application rates due to the larger volume of material needed. Cost are comparatively high. Natural fertilizers may also contain other nonessential elements not required by the plant. Some examples are cottonseed meal, soybean meal, blood meal, bone meal, fish meal, seaweed, and composted manures.

Manufactured Organic Fertilizers

In the manufacturing of organic fertilizers, carbon is the building blocks that contain other plant nutrients. Manufactured organic fertilizers vary in release rate depending on the product. Urea is the most common manufactured organic fertilizer and is moderately fast in release, while sulfur coated urea is relatively slow release. Costs range from inexpensive to moderate.

Manufactured Inorganic Fertilizers

Manufactured inorganic fertilizer are chemically simply compared to organic fertilizers. Nitrogen fertilizers are normally made from petroleum or natural gas. Being relatively high in nutrient content, small volumes are required, and the fertilizer can burn if over applied. Phosphorus, potassium and other trace element fertilizers are often mined from the earth. Manufactured inorganic fertilizers include common products like ammonium nitrate, ammonium sulfate, triple superphosphate, potassium chloride (potash) and magnesium sulfate (Epsom salt). Since they do not require microbial action to make them available to plants, these products are quick acting even in cool soils and they are inexpensive. Being prone to leaching, application rates on sandy soil must be very light and more frequent, thus they have a disadvantage on sandy soil.

Nutrient composition of various fertilizer materials

| Material | Composition | N | P ₂ O ₅ | K ₂ O |
|--------------------------------|--|---------|-------------------------------|------------------|
| Urea | (NH ₂) ₂ CO | 45 | 0 | 0 |
| Ammonium nitrate | NH ₄ NO ₃ | 33 | 0 | 0 |
| Potassium nitrate (salt peter) | KNO ₃ | 11 | 0 | 44 |
| Triple superphosphate | Ca(H ₂ PO ₄) ₂ | 0 | 46 | 0 |
| Muriate of potash | KCl | 0 | 0 | 60 |
| Potassium sulfate | K ₂ SO ₄ | 0 | 0 | 50 |
| Epsom salt | MgSO ₄ -H ₂ O | | | 9, 13 |
| Gypsum | Ca SO ₄ -2H ₂ O | | | 21 |
| Activated sludge | | 5 | 3 | 0 |
| Blood Meal | | 15 | 1.3 | 0.7 |
| Cow manure | | 0.3 | 0.1 | 0.4 |
| Horse manure | | 0.6 | 0.3 | 0.5 |
| Chicken manure | | 1 | .5 | 0.5 |
| Coffee grounds | | 0.9 | 0.3 | 0.6 |
| Granite dust | | 0 | 0 | 5 |
| Seaweed | | 1.6 | .7 | 5 |
| Wood ashes | | 0 | 1.5 | 7 |
| Compost | nutrient content varies | 0.5-3.5 | 0.5-1.0 | 1-2 |

¹Kevin Schoessow, Instructor, University of Wisconsin Cooperative Extension, Burnett, Washburn, and Sawyer Counties; Spooner Ag Research Station, W6646 Hwy. 70, Spooner Wis. 54801; 635-3506 or 1-800-528-1914.