

ORGANIC AND INORGANIC FERTILIZERS

The title *organic fertilizer* refers to materials used as fertilizer that occur regularly in nature, usually as a byproduct or end product of a naturally occurring process. Inorganic or synthetic fertilizers are produced artificially in a chemical refinery. Organic fertilizers such as manure have been used in agriculture for thousands of years; ancient farmers did not understand the chemistry involved, but they did recognize the benefit of providing their crops with organic material. Only within the past 100 years have fertilizers containing essential micro and macronutrients been synthesized in the laboratory. Mass production of synthetic fertilizers has greatly increased crop yields and made the green industry more cost efficient. However, within the past 10-20 years negative effects of fertilizer runoff on the environment have been identified, and there is a renewed interest in organic fertilizers as an environmentally friendly alternative to artificially synthesized chemicals.

What, exactly, goes into an organic fertilizer? Like any fertilizer, organic fertilizers typically provide the three major macronutrients required by plants: nitrogen, phosphorus, and potassium.

These nutrients originate from the sources listed below.

Common Components of Organic Fertilizer

- Bone meal—slow release fertilizer high in phosphorus and calcium
- Bat guano—contains all three major macronutrients
- Poultry humus—waste products from the chicken industry contain all three macronutrients and are used locally in Maryland
- Fish emulsion—high in nitrogen, phosphorus, and trace elements
- Fish meal—traditionally used as fertilizer prior to advent of synthetic sources, provides high nitrogen and phosphorus
- Cotton seed meal—high in nitrogen
- Seaweed (kelp) meal—high in micronutrients

Some fertilizers may also incorporate materials that do not derive from a living organism, but are still accepted for use in organic fertilizers. Examples include limestone, rock phosphate, and Chilean saltpeter. Organic fertilizers on the market in the U.S. are certified through the National Organics Program, which

restricts the use of the word 'organic' to certified producers. Certification is handled by state and local agencies approved by the USDA.

Certification may guarantee that a fertilizer on the market does not have any synthetic chemical input, but does it guarantee a benefit to the environment? Advantages and disadvantages of organic fertilizer, including environmental benefits, are discussed below.

Advantages of Organic Fertilizer

- Made from naturally occurring sources, therefore limited amounts of fossil fuels are used in production, potentially lowering the amount of greenhouse gas that is released into the atmosphere.
- Nutrients are released only when media is warm and moist, coinciding with times of greatest need in lawn care and agriculture (although this may not be an issue for greenhouse/nursery plants, which are always kept under optimum growing conditions). The slow-release nature of most organic fertilizers may slightly decrease the runoff of nutrients into local water systems when compared to some quick-release synthetic sources that release nutrients regardless of media conditions. It is important to note that slow-release synthetic sources may offer similar benefits.
- In terms of the end product, such as the quality of plant produced by a commercial greenhouse, organic fertilizers can be quite competitive with traditional synthetic sources (see <http://environmentalhorticulture.umd.edu> for a detailed study comparing products of organic and inorganic fertilizers).
- When used over a long period of time during in-ground production, organic

fertilizers may increase the quality of the soil, including an increase in the efficiency of nutrient utilization.

Disadvantages of Organic Fertilizer

- Generally costs significantly more than synthetic fertilizer.
- Organic certification requires documentation and regular inspections.
- Organic fertilizers, despite the advantages discussed above, still release nutrients into their surroundings; these nutrients can find their way into local streams, rivers, and estuaries just as nutrients from synthetic sources do.

Motivations for using organic fertilizer vary from user to user—businesses may want to go organic in order to sell product, and members of the general public might be interested in organic fertilizer for home use because of environmental concerns. Whatever the motivation, and whatever the fertilizer source, proper fertilization procedures will save money and benefit the environment. Soil testing prior to fertilizer application identifies nutrient needs and prevents excess fertilizer from being applied. This prevents waste of money and excess runoff into local waterways. Fertilizer should be applied at the right time; for lawn use, fertilization in early fall is generally recommended. Finally, use common sense to prevent waste; do not fertilize if a heavy rain is forecast! See <http://www.chesapeakebay.net/pubs/doc-fertilizeruse.pdf> for more tips on proper fertilizer use.

References

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<http://www.cleanairgardening.com/fertilizerguide.html>
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