

# Sources of organic fertilizers and amendment assignment



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Sources of Organic Fertilizers and Amendment Abstract: Fertilizer is one of the most important things for agriculture & crop production. But here we go to discuss about the sources of organic fertilizers. Here we try to inform about different types of organic fertilizer and sources. We also like to discuss here about different structures and functions of organic fertilizer and soil amendment. We show a guide line; by that our farmer can improve production system through organic fertilizers. Introduction about Fertilizer and Organic Fertilizer

Definition of Fertilizer: Fertilizer (or fertilizer) is any organic or inorganic material of natural or synthetic origin (other than liming materials) that is added to a soil to supply one or more plant nutrients essential to the growth of plants. A recent assessment found that about 40 to 60% of crop yields are attributable to commercial fertilizer use. Mined inorganic fertilizers have been used for many centuries, whereas chemically synthesized inorganic fertilizers were only widely developed during the industrial revolution.

Increased understanding and use of fertilizers were important parts of the pre-industrial British Agricultural Revolution and the industrial Green Revolution of the 20th century. Inorganic fertilizer use has also significantly supported global population growth — it has been estimated that almost half the people on the Earth are currently fed as a result of synthetic nitrogen fertilizer use. Proportions of Fertilizers: Fertilizers typically provide, in varying proportions: ix macronutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S); seven micronutrients: boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), and zinc (Zn). Definition of Organic Fertilizer: An organic fertilizer refers to a <https://assignbuster.com/sources-of-organic-fertilizers-and-amendment-assignment/>

soil amendment derived from natural sources that guarantees, at least, the minimum percentages of nitrogen, phosphate, and potash. Examples include plant and animal by-products, rock powders, seaweed, inoculants, and conditioners. These are often available at garden centers and through horticultural supply companies.

These should not be confused with substances approved for use with the USDA National Organic Program (NOP). The USDA NOP, with its “USDA Organic” label, allows for the use of only certain substances. The Organic Materials Review Institute (OMRI) approves brand name products made with ingredients from the “National List” for use with the NOP. Many of the organic fertilizers listed here will meet NOP standards (based on the National List). Growers participating in the NOP should consult with their certifier to ensure compliance for organic certification.

**Soil Amendment:** The terms soil amendment refers to any material mixed into a soil. Mulch refers to a material placed on the soil surface. By legal definition, soil amendments make no legal claims about nutrient content or other helpful (or harmful) affects it will have on the soil and plant growth. In Colorado, the term compost is also unregulated, and could refer to any soil amendment regardless of active microorganism activity. Purpose of Soil Amendment The type of conditioner added depends on the current soil composition, climate, and the type of plant.

Some soils lack nutrients necessary for proper plant growth. Some hold too much or too little water, with water conservation aided in the latter. They can be incorporated into the soil or applied to the surface. Materials of Soil

Amendment Lime is used to make soil less acidic, as is lime-containing crushed stone. Fertilizers, such as manure, anaerobic digestate or compost add depleted plant nutrients. Materials such as peat, diatomaceous earth, clay, vermiculite, hydrogel, and shredded bark will make soil hold more water. Gypsum releases nutrients and improves soil structure.

Sometimes a soil inoculants is added for legumes. Unless clay is incorporated into a healthy crumb structure, water may bond to it too strongly to be available to plant roots or run off before penetrating the surface. Mulching is one technique to correct this. Objectives of Module: ? To inform our farmers & participants of project about Sources of organic fertilizers and amendment. ? To inform our farmers about types of organic fertilizer and uses in crop land in a proper way. ? To inform them about organic fertilizer quality, structure, and properties for better & higher productivity of crops. We also discuss here about organic fertilizer and its properties and uses in crops-land. ? To inform our countries farmer about organic farming system by proper use of fertilizers in croplands. Duration of Module: 1. 55 minute So the following discussion and explanation about sources of organic fertilizers is done under 1 hour 55 minutes time. Types of Fertilizer: Soil amendments are made by adding fertilizer to the soil but there are different types of fertilizers. There is bulky organic fertilizer such as cow manure, bat guano, bone meal, organic compost and green manure crops.

And then there is also chemical fertilizer which is also referred to as inorganic fertilizer and is made up with different formulations to suit a variety of specified uses. Though many governments and agricultural departments go to great lengths to increase the supply of organic fertilizers, <https://assignbuster.com/sources-of-organic-fertilizers-and-amendment-assignment/>

such as bulky organic manures and composting materials, there is just not enough of these fertilizers available to meet the existing and future fertilizer needs. Compared to organic compost, chemical or inorganic fertilizers also have the added advantage of being less bulky.

Being less bulky makes chemical fertilizer easier to transport, both overland and from the soil into the plants itself, because they get to be available to the plant relatively quickly when incorporated as part of the plant-food constituents. Chemical fertilizer usually comes in either granular or powder form in bags and boxes, or in liquid formulations in bottles. The different types of chemical fertilizers are usually classified according to the three principal elements, namely Nitrogen (N), Phosphorous (P) and Potassium (K), and may, therefore, be included in more than one group.

This type of fertilizer is divided into different groups according to the manner in which the Nitrogen combines with other elements. These groups are:

- Sodium Nitrates, •Ammonium Sulphate and ammonium salts, •Chemical compounds that contains Nitrogen in amide form, and •Animal and plant by products.

? Sodium Nitrates Sodium Nitrates are also known as Chilates or Chilean nitrate. The Nitrogen contained in Sodium Nitrate is refined and amounts to 16%. This means that the Nitrogen is immediately available to plants and as such is a valuable source of Nitrogen in a type of fertilizer.

When one makes a soil amendment using Sodium Nitrates as a type of fertilizer in the garden, it is usually as a top- and side-dressing. Particularly when nursing young plants and garden vegetables. In soil that is acidic Sodium Nitrate is quite useful as a type of fertilizer. However, the excess use

of Sodium Nitrate may cause deflocculating. ? Ammonium Sulphate This fertilizer type comes in a white crystalline salt form, containing 20 to 21% ammonia cal nitrogen. It is easy to handle and it stores well under dry conditions. However, during the rainy season, it sometimes, forms lumps.

Though this fertilizer type is soluble in water, its nitrogen is not readily lost in drainage, because the ammonium ion is retained by the soil particles. A note of caution: Ammonium sulphate may have an acid effect on garden soil. Over time, the long-continued use of this type of fertilizer will increase soil acidity and thus lower the yield. The application of Ammonium sulphate fertilizer can be done before sowing, at sowing time, or even as a top-dressing to the growing crop. Do however take care NOT to apply it along with, or too close to, the seed, because in concentrated form, it affects seed germination very adversely. Ammonium Nitrate This fertilizer type also comes in white crystalline salts. Ammonium Nitrate salts contains 33 to 35% nitrogen, of which half is nitrate nitrogen and the other half in the ammonium form. As part of the ammonium form, this type of fertilizer cannot be easily leached from the soil. This fertilizer is quick-acting, but highly hygroscopic thus making it unfit for storage. On a note of caution: Ammonium Nitrate also has an acid effect on the soil, in addition this type of fertilizer can be explosive under certain conditions, and, should thus be handled with care. Nitro Chalk' is the trade name of a product formed by mixing ammonium nitrate with about 40% lime-stone or dolomite. This fertilizer is granulated, non-hazardous and less hygroscopic. The lime content of this fertilizer type makes it useful for application to acidic garden soils. ? Ammonium Sulphate Nitrate This fertilizer type is available as a mixture of ammonium nitrate and

ammonium sulphate and is recognizable as a white crystal or as dirty-white granules. This fertilizer contains 26% nitrogen, three-fourths of it in the ammoniac form and the remainder as nitrate nitrogen.

Ammonium Sulphate Nitrate is non-explosive, readily soluble in water and is very quick-acting. Because this type of fertilizer keeps well, it is very useful for all crops. Though it can also render garden soil acidic, the acidifying effects is only one-half of that of ammonium sulphate on garden soil.

Application of this fertilizer type can be done before sowing, at sowing time or as a top-dressing, but it should not be applied along the seed. ?

Ammonium Chloride This fertilizer type comes in a white crystalline compound, which contains a good physical condition and 26% ammoniac nitrogen.

In general, Ammonium Chloride is similar to ammonium sulphate in action. ?

Urea This type of fertilizer usually is available to the public in a white, crystalline, organic form. It is a highly concentrated nitrogenous fertilizer and fairly hygroscopic. This also means that this fertilizer can be quite difficult to apply. Urea is also produced in granular or pellet forms and is coated with a non-hygroscopic inert material. It is highly soluble in water and therefore, subject to rapid leaching. It is, however, quick-acting and produces quick results. When applied to the soil, its nitrogen is rapidly changed into ammonia.

Similar to ammonium nitrate, urea supplies nothing but nitrogen and the application of Urea as fertilizer can be done at sowing time or as a top-dressing, but should not be allowed to come into contact with the seed. ?

Ammonia This fertilizer type is a gas that is made up of about 80% of nitrogen and comes in a liquid form as well because under the right conditions regarding temperature and pressure, Ammonia becomes liquid (anhydrous ammonia). Another form, 'aqueous ammonia', results from the absorption of Ammonia gas into water, in which it is soluble.

Ammonia is used as a fertilizer in both these forms. The anhydrous liquid form of Ammonia can be applied by introducing it into irrigation water, or directly into the soil from special containers. Not really suitable for the home gardener as this renders the use of ammonia as a fertilizer very expensive.

Organic Nitrogenous Fertilizers Organic Nitrogenous fertilizer is the type of fertilizer that includes plant and animal by-products. These by-products can be anything from oil cakes, to fish manure and even to dried blood.

The Nitrogen available in organic nitrogenous fertilizer types first has to be converted before the plants can use it. This conversion occurs through bacterial action and is thus a slow process. The upside of this situation is that the supply of available nitrogen lasts so much longer AND the amounts of this type of fertilizer may contain small amounts of organic stimulants that contain other minor elements that might also be needed by the plants that are being fertilized. Furthermore, they may also contain small amounts of organic stimulants that they may contain, or of some of the minor elements needed by plant.

Oil-cakes contain not only nitrogen but also some phosphoric and potash, besides a large quantity of organic matter. This type of fertilizer is used in conjunction with quicker-acting chemical fertilizers. Then there is also blood



meal which contains 10 to 12% highly available Nitrogen as well as 1 to 2% Phosphoric acid. Blood meal, used in much the same way as oilcakes, makes for a quick remedy and can effectively be used on all types of soil as a type of fertilizer. Fish meal which can be dried fish, fish-meal or even powder is extracted in areas where fish oil is extracted.

The resulting residue is used as a fertilizer type. Obviously depending on the type of fish used, the available Nitrogen can be between 5 and 8% and the Phosphoric content can be from 4 to 6%. Fish meal also constitutes a fast-acting fertilizer type which is suitable for most soil types and crops. ORGANIC AND INORGANIC CHEMICAL PHOSPHATE FERTILIZER TYPES The Phosphate fertilizers are categorized as natural phosphates, either treated or processed, and also by products of phosphates and chemical phosphates. ? Rock Phosphate As a type of fertilizer, rock phosphate occurs as natural deposits in some countries.

This fertilizer type has its advantages and disadvantages. The advantage is that with adequate rainfall this fertilizer results in a long growing period which can enhance crops. Powdered phosphate fertilizer is an excellent remedy for soils that are acidic and has a phosphorous deficiency and requires soil amendments. However, the disadvantage is that although phosphate fertilizer such as rock phosphate contains 25 to 35% phosphoric acid, the phosphorous is insoluble in water. It has to be pulverized to be used as a type of fertilizer before rendering satisfactory results in garden soil.

Thus it is not surprising that Rock Phosphate is used to manufacture superphosphate which makes the Phosphoric acid water soluble. ?

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Superphosphate Superphosphate is a fertilizer type that most gardeners are familiar with. As a fertilizer type one can get superphosphate in three different grades, depending on the manufacturing process. The following is a short description of the different superphosphate fertilizer grades: •Single superphosphate containing 16 to 20% phosphoric acid; •Dicalcium phosphate containing 35 to 38% phosphoric acid; and •Triple superphosphate containing 44 to 49% phosphoric acid.

Triple superphosphate is used mostly in the manufacture of concentrated mixed fertilizer types. The greatest advantage to be had of using Superphosphate as a fertilizer is that the phosphoric acid is fully water soluble, but when Superphosphate is applied to the soil, it is converted into soluble phosphate. This is due to precipitation as calcium, iron or aluminum phosphate, which is dependent on the soil type to which the fertilizer is added, be it alkaline or acidic garden soil. All garden soil types can benefit from the application of Superphosphate as a fertilizer.

Used in conjunction with an organic fertilizer, it should be applied at sowing or transplant time. ? Slag Basic slag is a by-product of steel mills and is used as a fertilizer to a lesser extent than Superphosphate. Slag is an excellent fertilizer that can be used to amend soils that are acidic because of its alkaline reaction. For slag application to be an effective fertilizer it has to be pulverized first. ? Bone meal Bone meal as a fertilizer type needs no introduction. Bone-meal is used as a phosphate fertilizer type and is available in two types: raw and steamed.

The raw bone-meal contains 4% organic Nitrogen that is slow acting, and 20 to 25% phosphoric acid that is not soluble in water. The steamed bone-meal on the other hand has all the fats, greases, nitrogen and glue-making substances removed as a result of high pressure steaming. But it is more brittle and can be ground into a powder form. In powder form this fertilizer is of great advantage to the gardener in that the rate of availability of the phosphoric acid depends on its pulverization. This fertilizer is particularly suitable as a soil amendment for acid soil and should be applied either at sowing time or even a few days prior to sowing.

Sources of Organic Fertilizers and Amendment: Plant by-products ? Alfalfa meal or pellets Alfalfa meal or pellets are often used as animal feed.

Primarily they are used to increase organic matter in the soil but do offer nutrients and a high availability of trace minerals. They contain train control, a natural fatty-acid growth stimulant. Alfalfa meal or pellets Typical NPK analysis 2-1-2 Release time 1-4 months Pros Available at feed stores Cons May contain seeds Application Till in 2-5 pounds per 100 square feet ? Corn gluten meal Corn gluten meal materials have a high percentage of nitrogen.

It carries a warning to allow 1 to 4 months of decomposition in the soil prior to seeding. Allelopathic properties will inhibit the germination of seeds.

However, there is no danger to established or transplanted plants. This product is also marketed as a pre-emergent weed control for annual grasses in bluegrass lawns. Corn gluten meal Typical NPK analysis 9-0-0 Release time 1-4 months Pros Very high nitrogen Cons Germination inhibitor, some are GMOs Application Till in 20-40 pounds per 1000 square feet ? Cottonseed meal Cottonseed meal is a rich source of nitrogen.

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Buyers should be aware that many pesticides are applied to cotton crops and residues tend to remain in the seeds. Pesticide-free cottonseed meal is available. Cottonseed meal Typical NPK analysis 6-0. 4-1. 5 Release time 1-4 months Pros High nitrogen Cons Pesticide residues, most are GMOs

Application Till in 10 pounds per 100 square feet ? Soybean Meal Used primarily as an animal feed product. Available bagged at many feed stores. Soybean meal Typical NPK analysis 7-2-1 Release time 1-4 months Pros High nitrogen, available at feed stores Cons Almost half of the conventionally grown soy is GMO

Application 8 pounds per 100 square feet Animal by-products ? Bat guano – high N Bat guano (feces) harvested from caves is powdered. It can be applied directly to the soil or made into a tea and applied as a foliar spray or injected into an irrigation system. Bat guano – high N Typical NPK analysis 10-3-1 Release time 4+ months Pros Stimulates soil microbes Cons Cost Application Till in 5 pounds per 100 square feet or as a tea at 3 teaspoons per gallon of water ? Bat guano – high P See the description above.

Difference is that it is processed for high phosphorus content.

Bat guano – high P Typical NPK analysis 3-10-1 Release time 4+ months Pros Stimulates soil microbes Cons Cost Application Till in 5 pounds per 100 square feet or as tea at 3 Teaspoons per gallon of water ? Blood meal Blood meal, made from dried slaughterhouse waste, is one of the highest nonsynthetic sources of nitrogen. If over-applied it can burn plants with excessive ammonia. Blood meal Typical NPK analysis 12-0-0 Release time 1-4 months Pros Available at feed stores Cons can burn. Expensive at garden

centers Application Till in 5-10 pounds per 100 square feet ? Bone meal <https://assignbuster.com/sources-of-organic-fertilizers-and-amendment-assignment/>

A well-known source of phosphorus, bone meal is steam processed and widely available at feed stores and in garden centers. If purchased at feed stores, P is expressed on the label as elemental phosphorus and is 2.3 times higher than numbers shown on garden center labels for phosphate (i. e. - 12% phosphate is the same as 27% phosphorus). However, recent CSU research has shown that P from bone meal is only available to plants in soils that have a pH below 7.0. Bone meal Typical NPK analysis 3-15-0 Release time 1-4 months Pros highly plant available form of phosphorus Cons Cost

Application Till in 10 pounds per 100 square feet ? Feather meal Sourced from poultry slaughter, feather meal has fairly high nitrogen levels but is slow to release the N. Feather meal Typical NPK analysis N varies 7 - 12% on process Release time 4+ months Pros Long term fertilizer Cons Cost versus speed of N release Application Till in 2.5-5 pounds per 100 square feet ? Fish emulsion Infamous for its foul smell, emulsions are soluble, liquid fertilizers that have been heat and acid processed from fish waste. Fish emulsion Typical NPK analysis 5-2-2 Release time 1 - 4 months

Pros Adds needed micronutrients Cons some have foul smell Application Mix 6 tablespoons per gallon of water ? Enzymatically digested hydrolyzed liquid fish Enzymatically digested hydrolyzed liquid fish may be using enzymes to digest the nutrients from fish wastes instead of using heat and acids. This retains more of the proteins, enzymes, vitamins and micronutrients than emulsions. Enzymatically digested hydrolyzed liquid fish Typical NPK analysis 4-2-2 Release time 1 - 4 months Pros More nutrients than emulsions Cons

More expensive than emulsions Application Mix 5 tablespoons per gallon of water Fish meal Fish meal is ground and heat dried fish waste. Fish meal <https://assignbuster.com/sources-of-organic-fertilizers-and-amendment-assignment/>

Typical NPK analysis 10-6-2 Release time 1 - 4 months Pros N and P source

Cons Heat processed Application Till in 5-10 pounds per 100 square feet ?

Fish powder Fish power is dried with heat and turned into water-soluble

powder. It is a high source of nitrogen. Many can be mixed into solution and

injected into an irrigation system. Fish powder Typical NPK analysis 12-0. 25-

1 Release time Immediate to 1 month Pros Adds micro-nutrients Cons Heat

processed Application Till in 1-2 oz. Per 100 square feet OR Mix at 1

Tablespoon per gallon of water ? Rock powders Rock powders relevant for

use in Colorado soils are those that supply phosphorus. Those that serve as a

potassium source (greensand, feldspar, potassium sulfate, biotite, etc. ) are

not necessary as Colorado soils are naturally high in potassium. Similarly, it

is not necessary to add calcium (gypsum, lime, etc. ) due to naturally high

calcium levels in Colorado soils and arid conditions. If you are making annual

applications of manure and/or compost to your garden to add nitrogen, you

should have sufficient levels of phosphorus in your soil.

If you are applying manure or compost to your garden based on P needs, you

might have an excess N supply. Excess N can lead to poor flower/fruit

development and increases water pollution potential from N leaching from

the soil. Generally, plant or animal sources are the best value for phosphorus

in the home garden. Recent CSU research results concluded that no rock P

(regardless of mesh size) is available for plant use unless the soil pH is below

7. 0. ? Colloidal phosphate - a. k. a. soft rock phosphate This product is made

by surrounding clay particles with natural phosphate.

Total phosphate is about 20% while available phosphate is about 2-3%. This is why you can apply large amounts of colloidal phosphate, as it will release slowly over the years (usually more available the second year than the first). For home gardeners the cost/return is adequate to apply colloidal phosphate at rates to supply phosphorus for this season's crops. This product also adds micronutrients to soil. Micronized (passing through 1000 mesh screen [1000 wires per square inch]) sources may be more available than regular soft rock grinds in soils with a pH below 7.0. Seaweed Kelp is the most common form and is valued not for its macronutrient (N, P, and K) contributions but for micronutrients, trace minerals, amino acids and vitamins plus growth hormones that stimulate plant cell division. Kelp is often mixed with fish products to enhance growth. Three processes are available: extracts (as kelp meal or powder), cold-processed (usually liquid) and enzymatically digested (liquid). Ranked in quality of content and plant availability they are (highest to lowest) 1) enzymatically digested, 2) cold-processed and 3) extracts. ?

#### Kelp meal

Kelp meal, a product of the ocean, is used primarily as a trace mineral source. It is often combined with fish meal to add N-P-K value. Kelp meal  
Typical NPK analysis negligible Release time 4+ months Pros Adds micronutrients Cons Insignificant NPK value Application Till in 1 pound per 100 square feet ? Kelp powder Kelp powder is similar to kelp meal but ground fine enough to put into solution and applied as a foliar spray or injected into an irrigation system. Kelp powder Typical NPK analysis 1-0-4 Release time Immediate - 1 month Pros Adds micronutrients Cons Insignificant NPK value

Application Mix ? to ? teaspoon/gallon of water ? Liquid kelp Usually cold processed, liquid kelp will have higher levels of growth hormones than extracts. Some may also be enzymatically digested, making the growth hormones even more available to the plants. Liquid kelp Typical NPK analysis Negligible Release time Immediate - 1 month Pros Adds micronutrients plus helps plant with stress Cons Insignificant NPK value Application Mix 1 - 2 TBS/gal of water for foliar or Mix at ? - 1? tsp/gal/100 ft<sup>2</sup> and inject into an irrigation system Results and Findings: Advantages of Organic Fertilizer Mobilizing existing soil nutrients, so that good growth is achieved with lower nutrient densities while wasting less ? Releasing nutrients at a slower, more consistent rate, helping to avoid a boom-and-bust pattern ? Helping to retain soil moisture, reducing the stress due to temporary moisture stress ? Improving the ? Helping to prevent topsoil ? Organic fertilizers also have the advantage of avoiding certain problems associated with the regular heavy use of artificial fertilizers: ? The necessity of reapplying artificial fertilizers regularly (and perhaps in increasing quantities) to maintain fertility ?

Extensive runoff of soluble nitrogen and phosphorus, leading to eutrophication of bodies of water ? Costs are lower for if fertilizer is locally available Disadvantages of Organic Fertilizer oAs a dilute source of nutrients when compared to inorganic fertilizers, transporting large amount of fertilizer incurs higher costs, especially with slurry and manure. oThe composition of organic fertilizers tends to be more complex and variable than a standardized inorganic product. oImproperly-processed organic fertilizers may contain pathogens from plant or animal matter that are harmful to humans or plants.



However, proper composting should remove them. More labor is needed to compost organic fertilizer, increasing labor costs. Some of this cost is offset by reduced cash purchase Course Evaluation: ? After Complete this Assignment we evaluate the farmers and Participants through Question-Answering Session. Summary: There are many organic fertilizers to satisfy any organic recommendation. While organic fertilizer sources are closely associated with livestock operations or with proximity to major metropolitan areas, inorganic commercial fertilizers are widely available for all.

Inorganic fertilizers have evolved over the last several decades into a refined, predictable product. There should be no differences in organic fertilizer sources as long as nutrient analysis differences are taken into account. Certain situations have provided certain instances where one product or the other was superior. However, phosphorus fertilizer recommendations are the same regardless of the phosphate fertilizer source.

References: ? [www.wikipedia.org](http://www.wikipedia.org) ? [http://www.aboutorganics.co.uk/organic\\_gardening/organic\\_soil.htm](http://www.aboutorganics.co.uk/organic_gardening/organic_soil.htm) ? <http://www.wisegeek.com> ?

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