International Journal of Life science & Pharma Research

PRODUCTION AND UTILIZATION STRATEGIES OF ORGANIC FERTILIZERS FOR ORGANIC FARMING: AN ECO-FRIENDLY APPROACH

MD.SADIQUE SHAIKH[1] AND MADHURI A. PATIL[2]

[1] Department of Computer Science, Arts and Science College, Bhalod, India
[2] Department of Botany, D.D.N.B.College, Bhusawal, India

ABSTRACT

Todays world already suffering with lot of newer and newer problems related to water, petroleum's, climate change, CHG and Global Warming, air pollution, water pollution, carbon and toxic gases emission, foods and grains, energy secrecy and so on. And with inclusion in those " Soil pollution due artificial chemical fertilizers" which may increase crops, seeds & nuts, fruits, flowers, grains, cotton production, but in each farming attempt damaged soil in percent and responsible to change agricultural area into "non agricultural area".Hence one of the excellent practices is need to find out new strategies of "production and utilization of organic fertilizers for organic farming" .Fertilizer products supplement the nutrients already in the soil. Man-made (non-organic) fertilizers are concentrated and quick acting. Organic fertilizers release nutrients slowly and usually contain many trace elements your plants need that are not found in most chemical formulations. Not all organic fertilizers are useful to plants immediately. The soil must be warm enough for organic fertilizers to break down and nutrients to be released. For a quick response, try fish emulsion or seaweed extracts. These are water soluble and instantly available to plants. For early season feeding use foliar sprays. Too much fertilizer can burn plants and leach into the groundwater, causing pollution problems. Organic fertilizers are safer to use because they are not as concentrated as chemical fertilizers. This paper we prepared with the intention to permute organic fertilizers for organic farming and to save agriculture land for long time[1,3,7].

Keywords: Organic Fertilizers, Chemical Fertilizers and Pesticides, Organic Farming, Soil Pollution, Eco-friendly strategies.

INTRODUCTION

Organic farming relies primarily on the cycling of organic matter to maintain soil fertility. Themaxim to 'feed the soil to feed the plant' summarizes the organic approach. Compost, cover crops, plant by-products, animal manure, and other biological materials form the bulk of what is applied to organic fields for fertility. Organic farmers are also permitted to supplement the addition of organic matter with the use of other natural products, such as mined minerals.The standard requires organic producers to manage soil fertility and crop nutrients in a way that maintains or improves soil organic matter content. This objective is achievedthrough crop rotations, growing cover crops and the application of plant and animal materials. Nutrients harvested are expected to be replaced by the recycling of organic matter. However, the applications must be made in a way that does not result in the contamination of crops, soil or water by plants, nutrients, heavy metals, or materials that are otherwise prohibited for organic

production. Any fertilizer or soil amendment to be used on certified organic land must be included in the Organic System PlanAnimal manure that is composted or otherwise effectively treated to reduce pathogens may be applied without restriction to crops grown for human consumption. Raw animal manure issubject to an interval between application and harvest of crops for human consumption. Crops that are in contact with the soil, such as carrots, potatoes, spinach and lettuce are subject to an interval of 120 days. Crops not in contact with the soil, such as corn, beans, and fruit, are subject to an interval of 90 days. Composting is defined in the regulation based on the carbon-to-nitrogen (C:N) ratio, temperatures reached, and duration. The initial C:N ratio must be between 25:1 and 40:1. Temperatures must reach between 131°F (55°C) and 170°F (77°C). In an in-vessel or static aerated pile system, these temperatures must be maintained for at least three days. Windrow systems must meet these requirements for 15 days and the piles must be turned a minimum of five times[1,2,10].

STANDARD METHOD (ADAPTED BY SOURCE:BRIAN BAKER)

Because organic fertilizers are comprised mainly of plant and animal materials, they will have relatively small amounts of the macronutrients, nitrogen (N), phosphorous (P) and potassium (K). Guaranteed analyses of fertilizers are often calculated on the phosphate (P2O5) and potash(K2O) that is immediately soluble or plant available, rather than the total amount that is in the product. The guarantees on the label, actual values determined by analysis and the contribution of nutrients by each of the ingredients all need to be consistent. Fertilizer fraud is a potential problem. Nitrogen is often seen as the first limiting nutrient in organic production and therefore of greatest concern for willful product misrepresentation. Most organic sources of nitrogen are in the form of protein and are not water soluble. Proteins would tend to be in solid form and filtration to remove particles above a size that can pass through emitters would also remove a significant amount of the nitrogen. Protein nitrogen is slowly released in a plant-available form from organic matter. Therefore, the adulteration of fertilizers claimed to be NOP compliant with synthetic soluble nitrogen is a risk, especially with liquid products. By knowing the approximate contribution of each ingredient for each nutrient, one can estimate whether the reported formulation is consistent with the label guarantee and final analysis. If the nutrients are concentrated in the fertilizer then the waste product from manufacturing thefertilizer must be more dilute. [1,6,9] If Fi the percentage of the ingredient reported in the formulation divided by 100 and the concentration in the ingredient of the nutrient in question is Ci, then the predicted value of the nutrient in the fertilizer should approximate the guarantee, Gj according to this formula:

$$\sum_{i=1}^{n} FiCi \approx Gj$$

In most cases, Gj={N, P2O5, K2O}. Nitrogen can be partitioned into nitrate (NO3-N), ammonia (NH4-N), and organic soluble and organic insoluble. Phosphate can be partitioned into available (weak) and total (strong). The secondary nutrients calcium, magnesium and sulfur may also be indicators. In some cases, deficiencies of secondary minerals and carbon can be indicators of adulteration of synthetic high-nitrogen materials[4,5,10,11].

MAJOR ELEMENTS

Nitrogen (N) encourages leaf and shoots growth. A component of chlorophyll, it gives plants their greenness. If there is too little nitrogen, plants will be stunted and pale. If overdosed with it, they will grow too fast and become soft and sappy – an invitation to pests.

Phosphorus (P), or phosphate, encourages healthy growth throughout the plant including the roots.

Only small quantities are needed. A deficiency shows as stunted growth.

Potassium (K) or potash is associated with the size and quality of fruit and flowers. It toughens up plants which protects them from pests and disease. A deficiency shows as small flowers and fruit and yellowing or browning of the leaves.

Magnesium (Mg) is another greening agent. A deficiency which show as chlorosis, a yellowing of the leaves starting between the veins. It is easily remedied by adding organic matter to the soil.

Calcium (Ca) helps to manufacture protein.

Sulphur (S) is part of plant protein and also helps to form chlorophyll. A lack is unusual where the soil is rich in organic matter.

TRACE ELEMENTS

Manganese (Mn) makes chlorophyll and protein. A deficiency shows as stunting and yellowing of new leaves.

Iron (Fe) is similar to magnesium. Only the tiniest quantities are needed. Iron deficiencies aremost likely on chalky soils. Symptoms of a lack are pale leaves with brown edges on the margins.

Copper (Cu) and zinc (Zn) activate enzymes.

Boron (B) is an important element for growing tissue. A lack can cause 'corkiness' in fruit and vegetables.

Molybdenum (Mb) helps to produce protein.

Oxygen, carbon and **hydrogen** are taken up from sunlight, air and water.

SOME USEFUL ORGANIC FERTILIZERS

Bone Meal: Bone meal decomposes slowly and releases phosphorus gradually. Bone meal is good for bulbs that don't sprout for several months after they're planted and for alkaline-loving plants such as clematis, lilac and hydrangea.

Cottonseed meal: In warm soils this fertilizer is readily available with little danger of over-fertilizing. Use for acid-loving plants such as rhododendrons, blueberries and azaleas.

Blood meal: This dried blood from cattle slaughterhouses is a rich source of nitrogen. Do not apply at more than recommended rates because it is concentrated enough to harm plants.

Fish emulsion: This well-rounded fertilizer consists of partly decomposed ground fish. The smell is strong but will dissipate in a day or two, and can deter pests that don't like the fish smell. It has a high concentration of nitrogen and can burn plants if over-used (especially container plants).

Manures: Nutrient concentrations in manures vary widely with the kind of animal they're from. Fresh manure has the highest concentration and can burn tender roots easily. Composted manure is less harsh. Although the concentration of nutrients is lower in manure than in man-made fertilizers, manure improves soil structure and increases its water holding capacity.

Seaweed extract: Seaweed is a good source of trace metals. It doesn't smell as much as a fish emulsion but is more expensive.

Epsom salts:are a soluble form of magnesium.

Hoof and Horn: is rich in nitrogen. It works on slow release so apply a week before planting.

Rock phosphate: promotes rooting and is a good alternative to bone meal for dog owners.

Rock potash: is a useful source of pure potash. It works on slow release and is a good fertilizer for vegetables.

Wood ash: from the bonfire is high in potassium and some phosphate – the quantities depend on the wood[1,8].

LIQUID FERTILIZERS

You can make very good fertilizers from the leaves of comfrey or nettles. Tie up a bunch of leaves in a hessian sack and leave them to steep in a bucket of water for a week or two. Comfrey is a superb all round fertilizer though not for alkaline soils. Apart from making liquid fertilizers you can throw the leaves into the potato trench or lay them onthe ground as a mulch. You can also buy comfrey in pellet form*. Nettles (also alkaline) are best gathered in spring when at their most potent for fertilizer. You can also make effective liquid fertilizers by soaking manures and compost in the same way. Measurements are guesses. Normally, dilute 10:1 for spraying[12].

Plant food concentrate (Chase Organics) contains lucern, vinasse, rock phosphate, molasses and sugars.

Chase tomato feed contains amino acids, seaweed and vinasse to provide the potash needed by tomatoes, peppers and aubergines.

SM3 Seaweed (originally Chase sea magic) is excellent for the all round health of plants.

Additional Fertilizers:

Seaweed plus Iron for specific iron deficiencies which can occur on chalky soils.

Chase Organic Fertilizer is a crumbly balanced organic fertilizer. It contains dried blood, feather meal, cocoa shells*, manure, seaweed meal and vinasse.

Chase Animal-free Fertilizer is soya-based with high nitrogen for green crops.

Natural Gardening All purpose Fertilizer has been developed for hardy root development. It contains rapeseed, soybean meal, kelp meat, lignite, phosphate and sylvinite.

Organic Wormcasts contain nitrogen, phosphates, potash, trace elements, live bacteria, fungi and microbes. It is a good soil improver and potting compost.

Earth Cycle Mulch for heavy soils. It helps aerate the soil. No animal ingredients. Made from green waste and woody plant materials with slow release nutrients.

Strultch is mineralized straw mulch and is an environmentally friendly alternative to peat. Itcan be used as a base material for home made composts or as a mulch.

Cocoa Shell Mulch is an organic fertilizer and soil conditioner as well as mulch. As it's scratchy it is said to deter slugs and cats.

Lakeland Gold is a high potash soil conditioner. It is produced sustainably and is composed of bracken and stable manure. It is composted and the result is rich humus with slow release nutrients. It provides food for the worms and helps water retention.

Greenvale Organic Plant Food is a mix of pelleted chicken manure (from free range hens) and seaweed.

Comfrey Pellets saves the bother of harvesting your own and spares you the extremely unpleasant smell[1,2,8,13].

Product	% Nitrogen (N)	% Phosphorus (P)	% Potassium (K)	Suggested amounts of material (lbs per 100 sq feet of garden area)
Dried Blood Meal	12	0	0	3
Bone Meal	6	12	0	6
Cotton Seed Meal	7	3	2	0.2-0.5
Fish emulsion	5	1	1	1 Tbsp./gallon water
Seaweed extracts	9	2	7	varies
Chicken manure, dry	2 to 4.5	4.6 to 6.0	1.2 to 2.4	12.5
Steer manure, dry	1 to 2.5	0.9 to 1.6	2.4 to 3.6	45
Dairy manure, dry	0.6 to 2.1	0.7 to 1.1	2.4 to 3.6	60
Calcium nitrate (15.5-0-0)	15.5	0	0	1.6 to 2.5
Ortho Natural Fish Fertilizer	5	1	1	1 Tbsp./gallon water Water generously.
Ammonium sulfate (21-0-0)	21	0	0	1.2 to 1.9
Ammonium nitrate (33.5-0-0)	33.5	0	0	0.7 to 1.2
Urea (46-0-0)	46	0	0	0.5 to 0.9
5-10-10	5	10	10	3 to 4
16-20-0	16	20	0	1.6 to 2.5
16-16-16	16	16	16	1.5 to 2.5

Compiled by Tonie Fitzgerald. For more information, contact Master Gardeners at (509) 477-2181.
Revised January 2009

CONCLUSION

Organic fertilizers may be natural or synthetic and inorganic fertilizers may be natural or synthetic. The difference is the carbon, and more specifically the carbon hydrogen, linkage in organic fertilizers, which slows the release of the nutrient ions. A slower nutrient release results in more sustained availability of the nutrients, and a lower "burn" and leach potential compared to their inorganic counterparts. In addition organic fertilizers may act as an energy source for microorganisms in the soil, which can improve soil structure and plant growth. Organic fertilizers protect agricultural land for faming for long time with saving side effects of inorganic fertilizers which leads to cause of soil damage and pollution.

REFERENCES

1. http://eorganic.info/sites/eorganic.info/files/u461/All%20eOrganic%20Publications%20List%20September%202012_0.pdf accessed on 15 sept. 2012.
2. http://www.toronto.ca/health/pesticides/pdf/interim_evaluation_report_02262007.pdf accessed on 17 sept. 2012
3. http://environmentalhorticulture.umd.edu/ProductionInformation/Organics.pdf accessed on 15 sept. 2012
4. http://en.wikipedia.org/wiki/Organic_fertilizer (http://en.wikipedia.org/wiki/Green_manure http://en.wikipedia.org/wiki/Organic_compound http://en.wikipedia.org/wiki/Compost http://en.wikipedia.org/wiki/Composting#Urine) accessed on 15 sept. 2012
5. http://www.the-organic-gardener.com/fish-emulsion.html accessed on 20 sept. 2012
6. http://www.schulzorganicfertilizer.com/contact.html accessed on 15 sept. 2012
7. http://www.chesapeakebay.net/pubs/doc-fertilizeruse.pdf accessed on 17 sept. 2012
8. http://extension.usu.edu/files/publications/factsheet/HG-510.pdf accessed on 17 sept. 2012
9. http://www.cals.wisc.edu/ars/spooner/factsheets/fertilizers.pdf accessed on 15 sept. 2012
10. http://ejournal.icrisat.org/agroecosystem/v2i1/v2i1vermi.pdf accessed on 19 sept. 2012
11. http://smallfarms.oregonstate.edu/sites/default/files/em8936-e_med_res_0.pdf accessed on 15 sept. 2012
12. http://www.uky.edu/Ag/Horticulture/anderson/orgfert3.pdf accessed on 15 sept. 2012