

Pesticide Laws and Rules

Read and follow instructions on the label. It is a violation of federal and state law to use any pesticide inconsistent with the label or labeling materials. In Florida, pesticide laws and rules are administered by Florida Department of Agriculture and Consumer Services, Division of Environmental Services. Refer to Florida Statutes Chapter 487 and Florida Administrative Code Chapters 5E-2 and 5E-9, or check with your Extension agent. <http://www.flaes.org/index.html>

Average Nutrient Content of Common Animal Manures Used in Organic Production (lb/ton, wet weight basis)

Manures		N	P ₂ O ₅	K ₂ O	Other Nutrients
lb/ton wet basis					
Dairy	Fresh	10	5	8	4% Ca, 2% Mg, 1% S
	Paved surface	10	6	9	5% Ca, 2% Mg, 2% S
	Liquid"	23	14	21	10% Ca, 5% Mg, 3% S
Beef	Fresh	12	7	9	5% Ca, 2% Mg, 2% S
Broiler	House litter	72	78	46	41% Ca, 8% Mg, 15% S
	Stockpiled litter	36	80	34	54% Ca, 8% Mg, 12% S
Horse	Fresh	12	6	12	11% Ca, 2% Mg, 2% S
Layers	Fresh	26	22	11	41% Ca, 4% Mg, 4% S
	Undercage	28	31	20	43% Ca, 6% Mg, 7% S
	Deep pit	38	56	30	86% Ca, 8% Mg, 9% S
	Liquid"	62	59	37	35% Ca, 7% Mg, 8% S
Turkey	Fresh	27	25	12	27% Ca, 2% Mg
	House litter	52	64	37	35% Ca, 6% Mg, 9% S
	Stockpiled litter	36	72	33	42% Ca, 7% Mg, 10% S

"scraped surface "lb/1,000 lbs liquid

Adapted from Soil Facts: Nutrient Content of Fertilizer and Organic Materials, NCSU Coop Extension # AG-439-18 (1997) and Alternative Soil Amendments, NCAT/ATTRA # IP054 (2001).

Fertilizer Necessary to Provide 1 lb of N (Nitrogen)

Urea (46-0-0)	2¼ lb
Ammonium Nitrate (34-0-0)	3 lb
Ammonium Sulfate (20-0-0)	5 lb
20-0-20 or 20-5-10	5 lb
16-4-8 or 16-34-0	6 ¼ lb
Sodium Nitrate (16-0-0)	6 ¼ lb
15-0-14	6 b lb
13-6-6 or 13-13-13	7 b lb
Bone Meal (12% N)	8 a lb
10-10-10	10 lb
9-18-27	11 lb
8-8-8	12 ½ lb
Cottonseed Meal (7%N)	14 a lb
6-6-6 or 6-12-8	16 b lb
5-10-15	20 lb
Fish Emulsion (4% N)	25 lb
(about 10 lb/gallon or about 2½ gal for 1 lb N)	
Worm Castings (1.4% N)	71 lb
Fresh Dairy Manure (wet basis, 10 lb/Ton)	200 lb

**Average Nutrient Content of Meals and Compost Materials
Used in Organic Production (percent, dry-weight basis)**

Meals, Composts	N	P ₂ O ₅	K ₂ O	Comments
	percent (%)			
Alfalfa Meal	2.5	0.5	2	Used as animal feed
Blood Meal	12-15	2	0.8	High in ammonia, can burn; expensive
Bone Meal, Raw	4	21	0.2	22% Ca, 0.3% Mg
Citrus Pomace	1	0.1	1	Heavy and wet; best composted prior to use
Cottonseed Meal	7	3	1.5	Certifiers may prohibit due to pesticide residues
Crab Meal	2-10	0.2-3.5	0.2	Slow release; used for nematode suppression
Egg Shells	1.2	0.4	0.2	
Feather Meal	15	0	0	
Fish Meal	10-13	4	0	Available in wettable powder; a source of sulfur.
Fish Emulsion	4	1-4	1	Acid & enzyme digest, 4-1-1
Kelp Meal	1	0.5	2-10	Provides many elements; may have high salt
Mushroom Compost	2	0.7	1.5	(Spent)
Oak Leaves	0.8	0.4	0.2	Readily available
		often contaminated with trash; may acidify soil		
Oyster Shell Siftings	0.4	10.4	0.1	
Peanut Hull Meal	1.2	0.5	0.8	
Peanut Meal	7.0	1.5	1.2	
Pine Needles	0.5	0.1	0	
Sawdust	0.2	0	0.2	
Seaweed, Dried	0.7	0.8	5.0	
Shrimp Heads	7.8	4.2	0	
Shrimp Waste	2.9	10	0	
Soybean Meal	7	1.2	1.5	Protein supplement for animals; can be expensive.
Spanish Moss	0.6	0.1	0.6	
Worm Castings	1.5	2.5	1.3	Contains beneficial organisms

Adapted Soil Facts: Nutrient Content of Fertilizer and Organic Materials, NCSU Coop Extension # AG-439-18 (1997) Alternative Soil Amendments, NCAT/ATTRA # IP054 (2001).

Organic Certification Checklist

A farm plan required by most certifying organizations typically includes:

- Accurate map of the farm
- A description of record keeping protocols (include this notebook)
- A nutrient and soil management plan
- A pest management plan
- Field histories: production methods, crop, cover crop, inputs, production area
- Inputs: composition, source, rate, application method, location, date
- Seed/transplant s: source, lot N°, rate, application method, location, date
- OMRI (Organic Materials Review Institute) certification or labels from inputs
- Irrigation method and schedule
- Tillage methods and equipment used
- Monitoring and scouting practices
- Sanitation methods and checklists
- Changes in farm plans without prior approval from farmer's certification agency may result in loss of certification

**Average Nutrient Content- Mined or Natural Amendments Used in
Organic Production (percent, dry-weight basis)**

Minerals	N	P ₂ O ₅	K ₂ O	Comment
percent (%)				
Nitrogen Materials				
Sodium Nitrate	16	0	0	Maximum allowable use is 20% of total N/crop
Phosphorous Materials				
Colloidal Phosphate	0	16	0	Availability moderately faster than phosphate rock
Phosphate Rock	0	2-35	0	Slow availability
Granite – Ground.	0	0	4.5	Mostly feldspar; slow availability
Greensand	0	1.5	5-7	Soil conditioner, rich in iron, magnesium, silica and trace minerals; slow availability; expensive. (Glauconite)
Potassium Materials				
Potassium Chloride	0	0	60-62	(Muriate of Potash)
Potassium Magnesium Sulfate	0	0	22	11% Mg, 23% S (Sulfate of potash magnesia or Langbeinite)
Potassium Sulfate	0	0	50	18% S
Calcium Materials				
Calcitic Limestone	0	0	0.3	32% Ca, 3% Mg.
Dolomitic Limestone	0	0	0	21-30% Ca, 6-12% Mg
Gypsum	0	0	0.5	22% Ca, 17% S
Magnesium Materials				
Magnesium Sulfate	0	0	0	10% Ca, 14% S (Epsom Salt)
Magnesium Sulfate	0	0	0	17% Ca, 23% S (Kieserite)
Boron Materials				
Solubor	0	0	0	20.5% B

Adapted from Knott's Handbook for Vegetable Growers 4th Ed (1997) and Soil Facts: Nutrient Content of Fertilizer and Organic Materials, NCSU Coop Extension # AG-439-18 (1997).

Grass Tetany in Cattle

Grass tetany or grass staggers is a cattle disorder caused by a magnesium (Mg) deficiency. In Florida, grass tetany is more severe when cattle graze young forage, particularly the first flush of growth during December and January. Grass tetany occurs most frequently on pastures grown on soils low in available magnesium (Mg). One practice to help avoid grass tetany is to lime with dolomitic limestone, which includes magnesium, when low soil pH dictates liming. If pH is adequate but magnesium soil test is low, consider including sulfate of potash magnesia, or magnesium oxide (MgO) can be included with fertilizer materials.

from <http://edis.ifas.ufl.edu/DS137> and <http://edis.ifas.ufl.edu/ds162>

Sulfur

Many of the fertilizers that are used today are high analysis materials that contain little or no sulfur. Most agronomic crops require 15-20 lbs/A of sulfur for best yields. At least this amount of sulfur should be applied with nitrogen or as potassium sulfate, sulfate of potash magnesia or other sulfur-containing fertilizer. Growers may use nitrogen materials that contain 3-5% sulfur when applying split applications and when sidedressing.

from UF/IFAS Agronomy Dept. - Agronomy Notes, April, 2008

Alternative Pest Control Products

Ingredient	Function /Advantages	Disadvantages	Comments
INSECTS			
<i>Beauveria bassiana</i>	Fungus that targets leaf feeding insects	Multiple applications	Most effective on early stages
<i>Bacillus thuringiensis</i> (Bt)	Soft-bodied insect larvae must ingest product. Can apply same day as harvest.	Degrades quickly in sun, washes away with rain.	Match the pest to the specific liquid or dust formulation.
Spinosad*	This soil fungus product kills insects after ingestion.	Degrades quickly in sun, washes away with rain.	Formulations for garden vegetables and fire ants.
Pyrethrum	Made from extracts of chrysanthemum flowers.	Broad spectrum insecticide, Harmful to beneficials.	Liquid and dust formulations.
Rotenone	Works as a contact and stomach poison, not toxic to honeybees.	Broad spectrum insecticide, so harmful to beneficials.	Sometimes mixed with Pyrethrum.
Horticultural Oil	Works on mites, aphids, scales, insect eggs and soft adults.	Coverage under leaves is critical. Degrades quickly.	May injure sensitive plants.
Insecticidal Soap	Soft-bodied pests, ie aphids, mites, whiteflies, thrips, caterpillars, and mealybugs.	Less effective on heavier cuticles such as beetles and grasshoppers.	Only active when wet and may burn sensitive plants.
Neem	Kills aphids, whiteflies, thrips, leafminers,	Harmful to beneficials.	Active ingredient in horticultural
Neem oil	caterpillars, scales,	Apply frequently on immature insects	soaps. Works better in warm
Neem oil soap	beetles, mealybugs and other insects.	when population density is low.	temperatures. Has disease control uses.
Azadirachtin			
Diatomaceous earth (DE)	From diatom fossils. Deters slugs, beetles and many structural pests. Dehydrates the insects.	Possible effects on beneficials. Nuisance value of the dust and does not adhere well to the foliage.	To minimize destroying beneficials, should be applied late evening or at night.
Boric acid	Similar to DE. Acts as a stomach poison; causes insects to die from starvation.	Has to be consumed by the insect and is sometimes mixed with a sweetener.	Available in paste, powder, aerosol, tablet and liquid forms.

Compost and Manure

- IFAS estimates that about 50% of total nitrogen from composts and manures will be available during the season it was applied.
- Submit compost and manure samples to a licensed lab for analysis. IFAS ESTL performs analyses. See page 34.
- Repeated applications of poultry litter can lead to excess soil accumulation of phosphorus, calcium, zinc and copper.
- Apply, incorporate immature compost and raw manure during dry periods.
- Mature compost is cool, odorless and has no visible particles.
- Organic standards require that raw manure and immature compost be applied 90 days in advance of edible portion that does not touch soil, and 120 days in advance of edible portion that does touch soil.

Alternative Pest Control Products, continued

Ingredient	Function /Advantages	Disadvantages	Comments
DISEASES			
<i>Bacillus subtilis</i>	Soil bacteria used to manage <i>Sclerotinia fruticola</i> , <i>Verticillium</i> , <i>Rhizoctonia</i> and <i>Fusarium</i> .	Degrades quickly in sun, washes away with rain.	Use proper strain: Foliage: QST713; Soil: GB03, MBI600, FZB24; Seed: GB03, MBI 600.
Copper (Cu)	Copper is effective on many foliar diseases.	Accumulates in the soil. May be phytotoxic at higher rates	Must be used in a manner that minimizes accumulation of copper in the soil.
Baking soda (Potassium bicarbonate)	Non-toxic, very inexpensive. Controls powdery mildew and early blight on tomato.	Apply weekly with detergent to control powdery mildew.	High levels of sodium bicarbonate will burn plants.
Sulfur (S)	Prevents fungal blights, spots, downy and powdery mildew, leaf blister, anthracnose, scab, stem canker, <i>Septoria spp.</i> and <i>Stemphylium spp.</i> leaf molds.	Sulfur is toxic to mammals. Do not apply when air temperatures exceed 80 °F or when oil has been recently applied.	May burn plants. Sold as sulfur, lime-sulfur, and Bordeaux mixture.
<i>Streptomyces graminicifaciens</i>	Contains active cultures of <i>Streptomyces</i> that grow around plant roots and prevent infection from other diseases, including <i>Fusarium</i> .	May cause sensitization by inhalation and skin contact. Wear all protective equipment including a dust mask.	Do not allow re-entry for 4 hours after applied.
WEEDS			
Corn gluten meal	A by-product of corn processing, this herbicide also has N. Some formulations have added K and P.	Is not effective on emerged or established weeds. Expensive.	Effective on some broadleaf annual weeds when applied prior to weed emergence in spring.

*Safer for Beneficial Insects

Compiled from The Resource Guide for Organic Insect and Disease Management (2006), NY Ag Extension, Cornell University and The Organic Gardener's Handbook of Natural Insect and Disease Control. (1996), Rodale Press

Food Safety for Fresh Vegetables and Fruit

- Wash your hands!
- Take a bathroom break when necessary (but not in the field).
- Wear gloves when touching produce.
- Triple-wash leafy vegetables.
- Be aware of microbial sources such as livestock manure.
- Avoid cross-contamination.
- Keep animals (including pets) away from vegetables - especially after the produce has been washed.

Refer to **edis** Food Safety index http://edis.ifas.ufl.edu/TOPIC_Food_Safety. Select "Commercial Food Safety" for HACCP (Hazard Analysis Critical Control Point) guidelines. Check with Family and Consumer Science Extension agent.