

Analysis of Fertilizer Products Sold in Connecticut 2008

CRAIG MUSATNE and MARYJANE INCORVIA MATTINA, PH.D.
Department of Analytical Chemistry



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INTRODUCTION

In the State of Connecticut, The Department of Agriculture is granted authority, under Connecticut General Statute Chapter 427a (Sec 22-111a thru Sec 22-111z), for the regulation of fertilizers and liming materials (1). This authority allows for the inspection and analysis of these products in order to ensure compliance with applicable state labeling laws. Inspectors from The Agricultural Commodities Division of The Department of Agriculture collect samples and deliver them to The Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station for analysis to ensure label compliance (2).

METHODS

From January 1, 2008 through December 31, 2008, The Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station analyzed 109 fertilizers and 10 liming material products for sale in Connecticut. These products were collected, by Agricultural Commodities Inspectors John Schneider and Wayne Nelson, at manufacturing facilities and wholesale dealers from bulk storage/delivery, as well as from retail stores in bags, boxes, and plastic containers. These inspectors then delivered these samples to the

Department of Analytical Chemistry for analysis. The fertilizer products, along with information on the manufacturer/dealer, can be found in Table 1.

After delivery to The Connecticut Agricultural Experiment Station, the fertilizer and liming material products were prepared for analysis following guidelines established by the Association of American Plant Food Control Officials (3). The samples were analyzed for their elemental composition using methods described in Official Methods of Analysis and in-house methods where appropriate (4). Total nitrogen was determined by combustion using a LECO FP528 Nitrogen Combustion Analyzer (Leco, St. Joseph, MI). Potassium, phosphorous, calcium, magnesium and micronutrients were determined using ICP-OES (Inductively Coupled Plasma-Optical Emission Spectroscopy, Thermo Jarell Ash Atom Scan 16, Franklin MA). The fertilizer and liming material products were analyzed by Mamie Pyles and John Ranciato under the guidance of Craig Musante.

RESULTS

By law, fertilizers and liming materials are to contain a minimum or maximum of the guaranteed nutrient value as expressed on the label (1). These

materials are deemed to be deficient in a nutrient if that nutrient is found to be below the label guarantee, and are reported to be unsatisfactory. The amount that a nutrient can deviate from the label guarantee is known as percent analytical variation. Percent analytical variation guidelines, for each nutrient, are established by the Association of American Plant Food Control Officials (AAPFCO) (3).

The number of samples deemed unsatisfactory in one or more macronutrients was 17 (15.6%). Specifically, 5 (4.6%) were deficient in total nitrogen; 5 (4.6%) were deficient in phosphorous; and 7 (6.4%) were deficient in potassium. Table 1 shows the results for the analysis of macronutrients, where the label guaranteed nutrient value is denoted as (%G) and the laboratory determined nutrient value is denoted as (%F). Deficiencies of a guaranteed macronutrient are expressed as a minus (-) sign next to the laboratory determined value (%F).

Table 2 contains the results for micronutrients following the nomenclature found in Table 1. Micronutrient values are expressed as percent unless otherwise noted. Of the 51 samples analyzed for micronutrients, 20 (39.2%) were found to be unsatisfactory in one or more guaranteed nutrient value.

Agricultural liming materials are products whose calcium and magnesium compounds are capable of neutralizing soil acidity and which are used for that purpose (3). Of the 10 samples defined as agricultural liming materials received for analysis, 1 (10%) was found to be

deficient in calcium. The results for liming materials can be found on Table 3.

When the laboratory determined value of a plant nutrient is found to be unsatisfactory, that sample is always reanalyzed. Table 4 contains the results (mean, standard deviation, and n) for samples found to be unsatisfactory.

The analysis of fertilizers and liming materials for the Department of Agriculture by the Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station, and the public reporting of the results are mandated under Connecticut General Statue (5). In fact, one of the first public reports produced by The Connecticut Agricultural Experiment Station was an analysis of fertilizer in 1878 (6).

The annual survey of fertilizers and liming materials is significant. The published report assures Connecticut consumers that they are getting what they paid for when purchasing a fertilizer or liming material. Also, when our analysis identifies a product as unsatisfactory, The Department of Agriculture's Agricultural Commodities Division has the authority to levy fines or take other actions regarding the products.

REFERENCES

1. The Connecticut General Assemble, General Statutes of Connecticut, Title 22, Chapter 427a (Sec 22-111a thru Sec 22-111z). Revised January 1, 2009
2. The Connecticut Department of Agriculture; Agricultural Commodities Division, <http://www.ct.gov/doag/site/default.asp>.

3. 2003 Official Publication Association of American Plant Food Control Officials; 2003, <http://www.aapfco.org>.
4. Official Methods of Analysis. 1980 13th edition, W. Horowitz, ed. Association of Official Analytical Chemists, Washington, D.C.
5. The Connecticut General Assemble, General Statues of Connecticut, Title 22, Chapter 426 (Sec. 22-81c). Revised January 1, 2009
6. Johnson S.W. Fertilizer Analysis. Station Bulletin 4A (1878).

Table 1. Results of Analysis of Fertilizer Products for NPK

Manufacturer Sample Description	Nitrogen		Phosphorous		Potassium	
	%G	%F	%G	%F	%G	%F
Agri Liance, LLC, P.O. Box 64089, St. Paul, MN 55164 Tractor Supply 10-10-10	10	10.5	10	9.9	10	10.5
Agway, Inc., PO.Box 4746, Syracuse, NY 13221 Agway Organim Plant Food 4-5-4	4	4.6	5	6.9	4	4.4
Bayer Crop Science, POB 12014, 2 T.W. Alexander, Research Triangle Park, NC 27709 Bayer Advanced All Purpose Plant Food	18	20.5	9	10.8	18	17.3
Blue Seal Feeds, Inc., PO Box 8000, Londonderry, NH 03053 Safe 'N' Simple Lawn Food	6	6.8	2	2.8	4	4.3
Bonide Products, Inc., 6301 Sutliff Rd., Oriskanh, NY 13424 Bonide Root + Grow	4	3.6	10	11	3	2.6
Chemisco Div of United Ind, P.O. Box 142642, St. Louis, MO 63114 All American All Purpose Lawn Garden 10-10-10 Expert gardener All Purpose Plant Food	10 24	11.3 26.4	10 8	8.5- 8.7	10 16	8.8- 15.8
Crop Production Services (NY), Route 7, East Side Village Mall, Cobleskill, NY 12043 CPS 10-10-10 CPS 10-8-10 CPS 12-15-15 Potato CPS 13-13-13	10 10 12 13	11.1 14.6 16.2 15.3	10 8 15 13	12.7 11.1 16.7 13.5	10 10 15 13	9.5 7.8- 15.7 11.6

CPS 13-13-13	15	18.9	15	15.1	15	18.5
CPS 15-15-15	15	11.7-	15	16.7	15	14.4
CPS 19-19-19	19	20.3	19	19.3	19	20.2
CPS 20-0-20	20	28.9	--	--	20	20.5
CPS 20-10-10	20	26.5	10	9-	10	10.4
CPS 8-3-8	8	9.8	3	5.6	8	8.9
CPS 19-0-26	19	28.8	--	--	26	20.3-
CPS 30.8-0-19.2	30.8	33.3	--	--	19.2	20.8
CPS Vegetable Starter 13-13-13	13	14.3	13	14	13	15.1
Village Green 5-10-10	5	5.7	10	11.2	10	10.9
DeCran Ag Supplies Inc., P.O. Box 215,, Voluntown, CT 06384						
40-20-200-2B	8	9.7	4	3.79	44	44.3
50-10-20	30	30.2	5	4.5	11	17.7
90-0-120	26	21.4-	--	--	29	38.1
DeCran 12-16-12	12	12	16	17	12	18.8
DeCran 13-13-13	13	13.1	13	14.6	13	15.5
DeCran 25-5-20	25	27.2	5	6.9	20	20.5
DeCran 28-7-14	28	29.3	7	7.7	14	16
DeCran 28-7-14	28	28.4	7	6.8	14	14.5
DeCran 28-7-14	28	32.1	7	7.5	14	15.4
DeCran 30-0-20	30	33	--	--	20	19.2
Easy Gardener Products, Inc., PO Box 21025, Waco, TX 76702						
Jobs Crystals	12	15.9	13	13.8	9	16
Jobs Drip Feeder for Foliage Plants	0.005	1.1	0.01	0.01	0.005	
Jobs Fertilizer Spikes For Roses	12	12.7	16	16.3	0.007	
Enviro-Safe Labs, 1579 barker Rd., Sarasota, FL 32340						
Dynamite Complete Plant - Organic All-Purpose Food	10	12.6	2	4	8	7.9
Garden Club Organic All Purpose Plant Food	10	10	2	4.6	8	7.7
Espoma Co., 6 Espoma Road, Millville, NJ 08332						

Analysis of Fertilizer Products Sold in Connecticut 2008

Espoma Holly Tone	4	5.1	6	9.1	4	4.1
Espoma Kelp Meal	1	1.6	--	--	2	2.7
Espoma Organic All Natural Organic Lawn Food	7	6.7	2	2.4	2	0.2
Espoma Organic Lawn Food	18	19.1	8	8.2	6	6.4
Espoma Plant Tone	5	5.6	3	4.6	3	4.3
Gro-Green Products, 717 Elk Street, Buffalo, NY 14210						
Gro- Green Triple Ten	10	14.1	10	1.7-	10	2.6-
Gro-Tree, Inc, P.O. Box 290, Madison, GA 30650						
Pennington Tomato+Vegetable Plant Food	9	8.6	12	11.5	12	11.6
Jonathan Green, Inc., PO Box 326, Farmingdale, NJ 07727						
Jonathan Green Green-Mulch-Seed Establishment Mulch	1	2.8	1	3	1	2.1
Jonathan Green Organic Lawn Fertilizer	8	9.3	3	4.8	1	2.2
Lebanon Seaboard Corp., 1600 East Cumberland Street, Lebanon, PA 17042						
Green Golf lawn Food 30-3-5	30	29.9	3	4.3	5	6.3
Green Veiw Green Start Starter Fertilizer	10	13.6	18	18	10	11
Green View Re Nu Seed Starter Fertilizer	11	12.8	23	25.9	10	10.4
Lebanon 10-10-10 Multipurpose Fertilizer	10	11	10	9.9	10	12
Lebanon Lawn + garden Food 5-10-5	5	6.9	10	11.3	5	5.5
Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849						
Lesco-Cal 7-1-3	7	8.3	1	1.6	3	4.7
Lesco Ecosential Professional Turf + Ornamental Fertilizer	16	17.8	2	1.6	6	6.3
Lesco Professional landscape + Ornamental All-Purpose Fertilizer	14	16.2	14	22.2	14	11.4-
Lesco Professional Starter Fertilizer	18	20.7	24	28.9	12	13.2
Lesco-Professional Turf Fertilizer 18-24-12	18	17.6	24	25.5	12	16.2
Lesco Professional Turf Fertilizer 24-0-1	24	27.5	--	--	11	13
Lesco Professional Turf + Ornamental Fertilizer 24-0-12	24	24.1	--	--	12	13

Lesco Professional Turf Fertilizer 24-0-12	24	21.5-	--	--	12	14.8
Lesco Professional Turf Fertilizer 24-5-11	24	24.3	5	6.4	11	14.3
Lesco Professional Turf Fertilizer 25-5-10	25	27.5	5	5.9	10	10.9
Lilly Miller Brands, PO Box 2289, Clackamas, OR 97015 Lilly Miller Iron Safe	4	4.2	--	--	--	--
Milogranite, 260 W. Seeboth St., Milwaukee, WI 53204 All American Lawn + Garden Fertilizer 12-12-12 Milogranite	12	14.6	12	11-	12	12.5
	6	6.5	2	4.2	--	--
Miracle-Gro Lawn Products, Inc., 800 Port Washington Blvd., Port Washington, NY 11050 Miracle Gro Organic Choice Garden Fertilizer	3	4.3	2	3.2	3	2.9
Nutrico, Inc., 92 Howard Avenue, Bridgeport, CT 06605 Mahoney's garden Lovers 8-8-8 Tree + Shark Fert. Nutrico Professional	8	10.5	8	10.4	8	8.5
	20	21.6	5	6	7	7.4
Nutrico Professional Starter Fertilizer	14	17.7	22	25.4	6	6
Nutrico Purpose 10-10-10	10	12	10	10.6	10	11.7
Olivers Nurseries, 1159 Bronson Rd., Fairfield, CT 06430 Olivers Good Stuff -10-10-10	10	14.1	10	13.1	10	10.1
Organica Biotech, Inc., 705 Gen. Washington Ave Suite 500, Norristown, PA 19403 Organic Lawn Booster Organica Plant Booster Plus 8-24	8	8.9	1	1.6	1	1.5
	8	9.7	2	3	4	3.9
Perdue Agri Recycle, , 1-888-268-2988 Perdue Fertilizer Products Pelletized Poultry Manure 4-2-3	4	4.2	2	3.5	3	3.6
Perfectly Natural Solutions Inc., P.O. Box 955, Pittsburgh, PA 15230-0955						

Perfectly Natural Tomato + Vegetable Fertilizer	5	7.3	6	9.2	6	3.9-
PMI Nutrition International, POB 19798, Brentwood, MO 63144 Bradfeild Organics Acid Adoin, Natural Fertilizer	4	5	5	6.7	4	10.15
Pokon+ Chrysal USA, 3063 NW 107 Ave, Miami, FL 33172 Chrysal Bongai Plant Food	4	4.5	6	5.9	6	5.5
Pure Barnyard Co., LLC, PO Box 661, Greenland, NH 03840 Cockadooldle Doo	4	3.6	2	2.7	3	3.1
Rod McClellon Co., P.O. Box 70, Independence, OR 97351 Whitney Farms All Purpose Plant Food	5	6.3	5	6.5	5	8.2
Schultz Co., PO Box 4406, Bridgeton, MO 63044 Garden Safe Tomato + Veg. Plant Food 5-5-3 Shultz All Purpose Slow Release Plant Food Shultz Bloom Plus Plant Food	5 16 10	6.8 16.9 12.2	5 12 54	5 14.7 54.6	3 12 10	3.6 14.5 9.8
Scotts Miracle Gro Products, P.O. Box 606, Marsville, OH 43040 Miracle Gro Houseplant Food Miracle Gro Nursery Select Starter Miracle Gro Watering Can Singles All Purpose Scott's Evergreen Flowering Tree + Shrub Food Scotts natural lawn Food Scotts Starter Scotts Step 4 Lawn Fertilizer Scotts Turf Builder	8 19 24 11 11 20 31 29	10.7 19.9 26.9 13 12.6 20.8 33.4 29.3	7 6 8 7 2 27 3 2	8.3 6.9 10.2 7.2 2.7 31.1 3.7 2.3	6 13 16 7 2 5 10 4	6.5 13.4 18.3 10.1 1.7 6 11.3 4.5
Scotts-Sierra Horticultural Products, 14111 Scottslawn Rd, Marysville, OH 43041 Osmocote Outdoor + Indoor	19	19.7	6	7.1	12	12.9

Southern States Cooperative, 6606 W. Broad St., Richmond, VA 23230 Agway 10-10-10 Agway 15-15-15 Agway 5-10-10 Agway Greenlawn Lawn Starter Fertilizer Agway Greenlawn Lawn Fertilizer	10	8.6-	10	11.4	10	9.3
	15	17.7	15	16.6	15	14.9
	5	5.6	10	9.7	10	9.8
	13	15.1	25	14.6-	12	14.8
	32	35.2	3	4.1	5	5.6
Spectrum Group, Div. of United, PO Box 142642, St. Louis, MO 63114 STA-Green Lawn Fertilizer 29-0-5 STA-Green Slow release All Purpose Plant STA-Green Starter Fertilizer Vigoro All Purpose 10-10-10 Vigoro All Purpose 5-10-5 Vigoro Moss-Ex Vigoro Super Green Vigoro Ultraturf Turf Fertilizer Vigoro Ultra Turf Starter Fertilizer	29	31.8	--	--	5	6.4
	19	20.1	6	7.8	12	12.7
	18	19.1	24	24.9	10	12.1
	10	18	10	15.1	10	11
	5	5.1	10	9.6	5	4.3-
	2	2.4	--	--	--	--
	35	36.2	--	--	5	10.9
	29	28.8	1	2.1	4	7.1
	20	23.1	27	30	5	6.6
	16	17.2	45	47.3	7	8.4
Summit Responsible Solutions, 235 S. Kresson St., Baltimore, MD 21224 EZ Lawn Seeder Lawn Starter Fertilizer	20	17.9-	14	14.3	13	12.8
	4	5.8	4	6.4	4	5.5
Sun Bulb Company, P.O. Box Drawer 698, Arcadia, FL 34205 Better Gro Orchid Plus water Soluble Orchid Food	15	16.9	1	1.8	3	3
	4	5.8	4	6.4	4	5.5
Sustane/Natural Fertilizer of America, Inc., 310 Holiday Ave. PO Box 19, Cannon Falls, MN 55009-0019 Bolster Granular 4-4-4 Fe Fine Grade	15	16.9	1	1.8	3	3
	4	5.8	4	6.4	4	5.5
The Sanctuary, P.O. Box 656, Winter Park, CO 80482 Nature's Touch Natural Organic-Based Lawn Fertilizer	15	16.9	1	1.8	3	3
	4	5.8	4	6.4	4	5.5

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<p>Wal-Mart Stores, , Bentonville, AR 72716 Expert gardener Lawn Food</p> <p>Winfield Solutions, P.O. Box 64589, ST. Paul, MN 55164 Tractor Supply Ground Work pasture 16-16-16</p>	29	29.7	3	3.2	4	4.7
	16	15.7	6	6	16	16.8

Table 2. Results of Analysis of Fertilizer Products for Micronutrients

Manufacturer Sample Description	Boron %	Calcium %	Cobalt %	Copper %	Iron %	Magnesium %	Manganese %	Molybdenum %	Sodium %	Sulfur %	Zinc %
<p>Agway, Inc., PO.Box 4746, Syracuse, NY 13221 Agway Organim Plant Food 4-5-4</p>	11.1										
<p>Bayer Crop Science, POB 12014, 2 T.W. Alexander, Research Triangle Park, NC 27709 Bayer Advanced All Purpose Plant Food Expert gardener All Purpose Plant Food</p>				0.07	0.14			0.0004		0.58-	0.06
<p>DeCran Ag Supplies Inc., P.O. Box 215,, Voluntown, CT 06384 40-20-200-2B</p>	0.02-										
<p>Easy Gardener Products, Inc., PO Box 21025, Waco, TX 76702 Jobses Crystals</p>					0.19						
<p>Enviro-Safe Labs, 1579 barker Rd., Sarasota, FL 32340 Dynamite Complete Plant - Organic All-Purpose</p>	2.9					0.29				4.1	

Food													
Garden Club Organic All Purpose Plant Food	3.4											4.7	
Espoma Co., 6 Espoma Road, Millville, NJ 08332													
Espoma Holly Tone	3.4	0.003	0.03	1.4					0.04		0.008	6	0.07
Espoma Organic All Natural Organic Lawn Food	2			1	0.5								
Espoma Plant Tone	3.9	0.0006	0.05	1.8	1				0.04		0.0006	2.5	0.08
Jonathan Green, Inc., PO Box 326, Farmingdale, NJ 07727													
Jonathan Green Organic Lawn Fertilizer	6.4-			0.22								1.9	
Lebanon Seaboard Corp., 1600 East Cumberland Street, Lebanon, PA 17042													
Lebanon 10-10-10 Multipurpose Fertilizer	9.8			1.9	4.9							0.51-	
Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849													
Lesco-Cal 7-1-3	28.2												
Lesco Ecosential Professional Turf + Ornamental Fertilizer	1.1												
Lesco Professional landscape + Ornamental All-Purpose Fertilizer				0.61					0.03			9.4-	
Lesco Professional Starter Fertilizer												1.6	
Lesco-Professional Turf Fertilizer 18-24-12												5	
Lesco Professional Turf Fertilizer 24-0-1				3.2								1.8-	
Lesco Professional Turf + Ornamental Fertilizer 24-0-12												0.85-	
Lesco Professional Turf Fertilizer 24-0-12												0.71-	
Lesco Professional Turf Fertilizer 24-5-11				7.9					2.2			2.2-	
Lesco Professional Turf Fertilizer 25-5-10				1.6								1.6-	
Lilly Miller Brands, PO Box 2289, Clackamas, OR 97015													

Lilly Miller Iron Safe	0.03						0.11		13.2
Milogranite, 260 W. Seeboth St., Milwaukee, WI 53204		2.2	11.6						
Milogranite			4						
Nutrico Professional			1.5-						
Olivers Nurseries, 1159 Bronson Rd., Fairfield, CT 06430			1.7						
Olivers Good Stuff -10-10-10									
Organica Biotech, Inc., 705 Gen. Washington Ave Suite 500, Norristown, PA 19403									
Organic Lawn Booster		4							
Organica Plant Booster Plus 8-24		6.3				0.17-			
Perfectly Natural Solutions Inc., P.O. Box 955, Pittsburgh, PA 15230-0955		7.7				1.6			4.2
Perfectly Natural Tomato + Vegetable Fertilizer									
PMI Nutrition International, POB 19798, Brentwood, MO 63144									
Bradfield Organics Acid Adoin, Natural Fertilizer									
Pure Barnyard Co., LLC, PO Box 661, Greenland, NH 03840		2.1							
Cockadoodle Doo						0.57			
Schultz Co., PO Box 4406, Bridgeton, MO 63044		10.6							
Garden Safe Tomato + Veg. Plant Food 5-5-3	0.02		0.13			0.78			3.1
Shultz All Purpose Slow Release Plant Food			0.04-				0.04-		0.11
Shultz Bloom Plus Plant Food			0.1				0.04		0.05

Scotts Miracle Gro Products, P.O. Box 606, Marsville, OH 43040 Scott's Evergreen Flowering Tree + Shrub Food Scotts natural lawn Food Scotts Step 4 Lawn Fertilizer Scotts Turf Builder	2.2	<0.0001-	0.27	0.0004	1.3 2 4.7 10.8	0.002-
Southern States Cooperative, 6606 W. Broad St., Richmond, VA 23230 Agway Greenlawn Lawn Starter Fertilizer Agway Greenlawn Lawn Fertilizer					3.6 3.03	
Spectrum Group, Div. of United, PO Box 142642, St. Louis, MO 63114 STA-Green Lawn Fertilizer 29-0-5 STA-Green Slow release All Purpose Plant STA-Green Starter Fertilizer Vigoro Moss-Ex Vigoro Super Green Vigoro Ultraturf Turf Fertilizer	0.01 0.02	. 0.07	0.42- 0.74 7.1 4.1- 1.3	0.04 0.06	5	0.1 1.1
Summit Responsible Solutions, 235 S. Kresson St., Baltimore, MD 21224 EZ Lawn Seeder Lawn Starter Fertilizer	0.02	0.04	0.09	0.004		0.05
Sun Bulb Company, P.O. Box Drawer 698, Arcadia, FL 34205 Better Gro Orchid Plus water Soluble Orchid Food	0.03	0.05	0.2	1.1	0.04	0.05
Sustane/Natural Fertilizer of America, Inc., 310 Holiday Ave. PO Box 19, Cannon Falls, MN 55009-0019						

Bolster Granular 4-4-4 Fe Fine Grade	3.7	3.6				
The Sanctuary, P.O. Box 656, Winter Park, CO 80482 Nature's Touch Natural Organic-Based Lawn Fertilizer	2.6	0.66				3.2
Wal-Mart Stores, , Bentonville, AR 72716 Expert gardener Lawn Food						1.4-

Table 3. Results of Analysis of Agricultural Liming Materials

Manufacturer Sample Description	Ca %G %F	CaO %G %F	CaCO3 %G %F	Mg %G %F	MgO %G %F	MgCO3 %G %F
Allyndale Corporation, , East Canaan, CT 06024 Allyndale Agricultural Lime Allyndale Agricultural Lawn+Garden Lime	21.4 22.2 21.4 23.8	30 31.1 30 33.3	57 55.5 57 59.5	11 13.4 11 13.8	-- 22.8 20 23.5	-- -- 50 48.3
Imerys, 100 Mainsell Court East, Roswell, GA 30076 Lime Rite Pelletized Dolomite Lime	21 22.2	-- --	-- --	12 13.1	-- --	-- --
Encap LLC, 3921 Algoma Rd., Green Bay, WI 54311 Encap Fast 4 Action Lime	38 35.8-	-- --	95.5 89.5-	-- --	-- --	-- --
Mineral Processing, 1855 CH 99, Carey, Ohio 43316 Nutrilime Lawn + Garden Pelletized	21 20.6	29.4 28.8	52.5	12 11.6	19.9	41.8

Limestone				51.4		19.2	40.2
New England Silica, Inc., PO Box 185, South Windsor, CT 06074 Nesco Lawn + Garden Lime	-- --	30 31.9	-- --	-- --	20 22.9	-- --	-- --
Old Castle Lawn + Garden, P.O. Box 501418, Atlanta, GA 31150-1418 Pro Pelletized Limestone-Dolomite Limestone	22 23	30.8 32.2	55 57.5	11.8 12.9	19 21.9	41 45.2	
Soil Doctor EZ Spread Granular Limestone	21.6 22	30.2 30.8	54 55	10 13.8	16.7 23.5	35 48.3	
Soil Doctor Pelletized Lawn Lime	-- 19.7	-- --	-- --	-- 11.8	-- --	-- --	
Southern States Cooperative, 6606 W. Broad St., Richmond, VA 23230							
Agway Pelletized Limestone	21 21.1	30 29.5	54 52.8	10 12.4	16.7 21.1	35 43.4	

Table 4. Mean (%) and Standard Deviation of Unsatisfactory Fertilizer Products

Manufacturer	Sample Description	Percent Guarantee (%G)	Mean Percent Found (%F)	
			Standard Deviation	(n)
Nitrogen				
Crop Production Services (NY), Route 7, East Side Village Mall, Cobleskill, NY 12043 CPS 15-15-15		15	11.7	0.28 (n=3)
DeCran Ag Supplies Inc., P.O. Box 215,, Voluntown, CT 06384				

26-0-29	26	21.4	0.07 (n=2)
Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849 Lesco Professional Turf Fertilizer 24-0-12	24	21.5	0.49 (n=2)
Southern States Cooperative, 6606 W. Broad St., Richmond, VA 23230 Agway 10-10-10	10	8.6	0.21 (n=2)
Sun Bulb Company, P.O. Box Drawer 698, Arcadia, FL 34205 Better Gro Orchid Plus water Soluble Orchid Food	20	17.9	0.35 (n=4)
Phosphorous			
Chemisco Div of United Ind, P.O. Box 142642, St. Louis, MO 63114 All American All Purpose Lawn Garden 10-10-10	10	8.5	0.14 (n=2)
Crop Production Services (NY), Route 7, East Side Village Mall, Cobleskill, NY 12043 CPS 20-10-10	10.00	9	0.28 (n=2)
Gro-Green Products, 717 Elk Street, Buffalo, NY 14210 Gro- Green Triple Ten	10.00	1.7	0.00 (n=2)
Milogranite, 260 W. Seeboth St., Milwaukee, WI 53204 All American Lawn + Garden Fertilizer 12-12-12	12.00	11	0.35 (n=2)
Southern States Cooperative, 6606 W. Broad St., Richmond, VA 23230 M	25.00	14.6	0.14 (n=2)

Potassium				
Chemisco Div of United Ind, P.O. Box 142642, St. Louis, MO 63114	10.00	8.8	0.14 (n=2)	
All American All Purpose Lawn Garden 10-10-10				
Crop Production Services (NY), Route 7, East Side Village Mall, Cobleskill, NY 12043	10.00	7.8	0.21 (n=2)	
CPS 10-8-10	26.00	20.3	0.99 (n=2)	
CPS 19-0-26				
Gro-Green Products, 717 Elk Street, Buffalo, NY 14210	10.00	2.6	0.07 (n=2)	
Gro- Green Triple Ten				
Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849	14.00	11.4	0.64 (n=2)	
Lesco Professional landscape + Ornamental All-Purpose Fertilizer				
Perfectly Natural Solutions Inc., P.O. Box 955, Pittsburgh, PA 15230-0955	6.00	3.9	0.07 (n=2)	
Perfectly Natural Tomato + Vegetable Fertilizer				
Spectrum Group, Div. of United, PO Box 142642, St. Louis, MO 63114	5.00	4.3	0.21 (n=2)	
Vigoro All Purpose 5-10-5				
Boron				
DeCran Ag Supplies Inc., P.O. Box 215,, Voluntown, CT 06384				

	8-4-44-0.4B		0.40	0.2	0.00 (n=2)
	Espoma Co., 6 Espoma Road, Millville, NJ 08332 Espoma Holly Tone Espoma Plant Tone		0.02 0.02	0.004 0.003	0.0007 (n=2) 0.000 (n=2)
Calcium					
	Encap LLC, 3921 Algoma Rd., Green Bay, WI 54311 Encap Fast 4 Action Lime		38.00	35.8	0.42 (n=2)
	Jonathan Green, Inc., PO Box 326, Farmingdale, NJ 07727 Jonathan Green Organic Lawn Fertilizer		8.00	6.4	0.14 (n=2)
Copper					
	Schultz Co., PO Box 4406, Bridgeton, MO 63044 Shultz All Purpose Slow Release Plant Food		0.07	0.04	0.01 (n=2)
	Scotts Miracle Gro Products, P.O. Box 606, Marsville, OH 43040 Scott's Evergreen Flowering Tree + Shrub Food		0.07	<0.0001	0.00 (n=2)
Iron					

Milogranite, 260 W. Seeboth St., Milwaukee, WI 53204 All American Lawn + Garden Fertilizer 12-12-12 Nutrico Professional	3	1.5	0.14 (n=2)
PMI Nutrition International, POB 19798, Brentwood, MO 63144 Bradfield Organics Acid Aoin, Natural Fertilizer	0.52	0.37	0.01 (n=2)
Spectrum Group, Div. of United, PO Box 142642, St. Louis, MO 63114 STA-Green Lawn Fertilizer 29-0-5 Vigoro Super Green	2 5	0.42 4.1	0.42 (n=2) 0.14 (n=2)
Magnesium			
Organica Biotech, Inc., 705 Gen. Washington Ave Suite 500, Norristown, PA 19403 Organica Plant Booster Plus 8-24	2.00	0.17	0.01 (n=2)
Manganese			
Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849 Lesco Professional landscape + Ornamental All-Purpose Fertilizer	0.45	0.03	0.007 (n=2)
Schultz Co., PO Box 4406, Bridgeton, MO 63044 Shultz All Purpose Slow Release Plant Food	0.07	0.04	0.01 (n=2)
Sulfur			

<p>Bayer Crop Science, POB 12014, 2 T.W. Alexander, Research Triangle Park, NC 27709 Bayer Advanced All Purpose Plant Food</p>	2.9	0.58	0.01 (n=2)
<p>Lebanon Seaboard Corp., 1600 East Cumberland Street, Lebanon, PA 17042 Lebanon 10-10-10 Multipurpose Fertilizer</p>	4	0.51	0.02 (n=2)
<p>Lesco Inc., 1301 E. 9th St., Cleveland, OH 44114-1849 Lesco Professional landscape + Ornamental All-Purpose Fertilizer</p>	19.4	9.4	0.00 (n=2)
<p>Lesco Professional Turf Fertilizer 24-0-1</p>	2.9	1.8	0.07 (n=2)
<p>Lesco Professional Turf + Ornamental Fertilizer 24-0-12</p>	1.9	0.85	0.15 (n=2)
<p>Lesco Professional Turf Fertilizer 24-0-12</p>	1.9	0.71	0.11 (n=2)
<p>Lesco Professional Turf Fertilizer 24-5-11</p>	3.7	2.3	0.00 (n=2)
<p>Lesco Professional Turf Fertilizer 25-5-10</p>	3.1	1.6	0.00 (n=2)
<p>Wal-Mart Stores, Bentonville, AR 72716 Expert gardener Lawn Food</p>	2.8	1.4	0.07 (n=2)
<p>Zinc</p>			
<p>Scotts Miracle Gro Products, P.O. Box 606, Marsville, OH 43040 Scott's Evergreen Flowering Tree + Shrub Food</p>	0.06	0.002	0.000 (n=2)

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