

SUSTÅNE

NATURAL FERTILIZERS & SOIL BUILDERS



**PROFESSIONAL NURSERY
GREENHOUSE & LANDSCAPE**



Sustâne® Natural Base Nursery Fertilizers

Provides growers the Best in Organic and Controlled Release Fertilizers

- Sustâne® Organic, Granulated Slow Release Nitrogen fertilizer.
- Sumicoat™, the most reliable polymer-coated fertilizer available.

AND



Sustâne Introduces the first true organic fertilizer designed and developed for the professional nursery, greenhouse and landscape company.

Sustâne Offers a range of formulations from 100% organic to organic with controlled release fertilizers that reduce cost and enhance “green” production.

Sustâne Produces predictable results, dependable performance, and high quality plants. Sustâne Organic and Sumicoat Controlled Release Fertilizers are the new generation of environmentally friendly fertilizers.

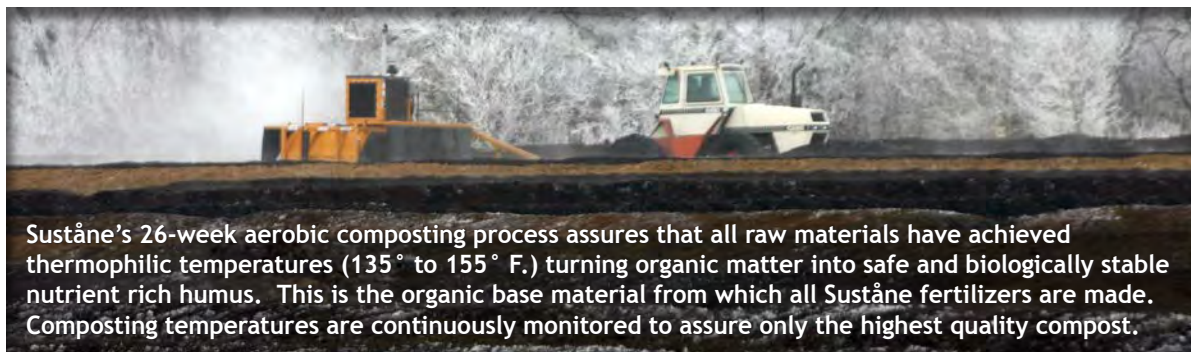
“Plants fertilized with Sustâne are potted into a non-amended substrate as this product adequately replaces dolomitic limestone and micronutrients.

Nitrogen Losses in Container Production, North Carolina State University, 1992

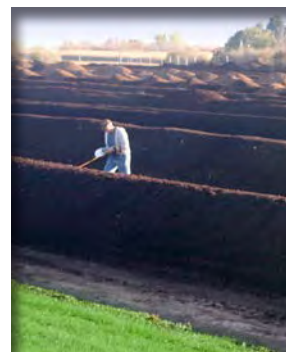
Sustâne Organic Fertilizers are manufactured from renewable resources, distributed throughout North America and exported to over 50 countries worldwide. Since 1988 Sustâne has established the standard in natural and organic fertilizers for product quality, testing, research and development. Sustâne is committed to supply only the best natural and natural base professional fertilizers available today. With over 400 research papers and articles

to its credit since 1987 Sustâne is known to be the most predictable, safe and effective organic on the planet.

Sustâne Organic Fertilizers are derived from truly aerobically composted turkey litter, turned into homogenous and stable humus over a 26-week composting process. Sustâne Natural Fertilizers include all primary, secondary and micronutrients held in an organically chelated humus rich base.



Sustâne’s 26-week aerobic composting process assures that all raw materials have achieved thermophilic temperatures (135° to 155° F.) turning organic matter into safe and biologically stable nutrient rich humus. This is the organic base material from which all Sustâne fertilizers are made. Composting temperatures are continuously monitored to assure only the highest quality compost.



Sustâne’s U.S. EPA permitted composting facility supplies nutrient-rich aerobic compost year round to its manufacturing facility. Sustâne produces a wide range of organic, slow and controlled release fertilizers for professional growers worldwide.

Sustane® All-Natural Nursery Fertilizers

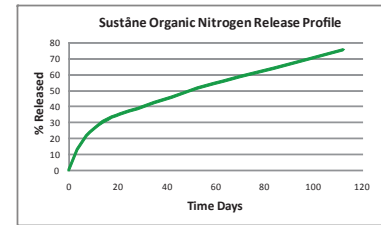
Provides growers the Best in Organic and Controlled Release Fertilizers

Sustane 4-6-4 + Humates

For organic potting soil, garden and landscape beds

Sustane 8-4-4 High Nitrogen

For 45-day flower, vegetable and bedding crops



Sumicoat

Sumicoat™ Controlled Release Fertilizer

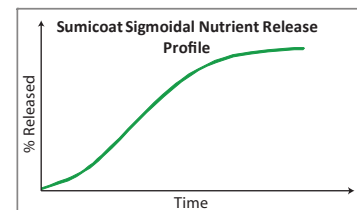
Sumicoat Controlled Release Fertilizers provide the most advanced polymer coating technology that performs consistently in low, moderate and high temperature environments. Growers depend on fertilizers to provide their crops with optimal timing of nutrient release to maximize plant growth and performance. Sustane and Sumicoat provide the winning combination that will not under or over release.

Sumicoat Controlled Release Fertilizers are polymer-coated controlled release fertilizers initially tested and developed for the rice production markets in several different climates in Japan. Sumicoat products have been used for years to release precisely the right amount of fertilizer to optimize plant growth. For the past several years Sustane has been evaluating different Sumicoat release products blended with Sustane organics to create the optimal nursery and greenhouse fertilizer combinations. These combination products are available today throughout North America and Sustane's worldwide distribution network.

Sumicoat is produced by applying a polyurethane resin coating on the surface of the fertilizer. This resin coating has been developed to have just the right physical-chemical properties to produce the desired fertilizer effect resulting from sophisticated coating technologies. The longevities of Sumicoat are expressed in days required to release 80% of the fertilizer in soil temperatures of 77° F. (25°C.) Formula longevities depend on temperature. As soil temperature increases 10° C above 25° C, the duration of release is halved.

Sumicoat technical advantages include a high mechanical tolerance and durability meaning that the coating is not damaged from blending and handling. Sustane and Sumicoat offer a wide product range with multiple nutrient release options for different growing conditions.

- **Sustane + Sumicoat 12-12-12**
All-purpose 90-day greenhouse and landscape
- **Sustane + Sumicoat 16-4-8**
For 120 to 160-day perennials and short-term crops
- **Sustane + Sumicoat 16-4-8**
For 180 to 210-day woodies and long-term ornamentals



- ✓ Sustane Organic and Sustane plus Sumicoat CRF's provide the best of both
- ✓ Slow Release Natural and Polymer-Coated Controlled Release fertilization



*Lower nutrient loss to the environment.
Lower cost production for the grower.*

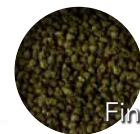
Sustane® Natural Base Nursery Fertilizers

Provides growers the Best in Organic and Controlled Release Fertilizers

All-Natural Organic Fertilizers



Medium



Fine

4-6-4+Humates

All Natural Slow Release Nitrogen Fertilizer + Humates

Sustane 4-6-4+Humates is all natural, slow release nitrogen plus natural phosphorous, potassium and all secondary and trace elements – high in organic content. 4-6-4+Humates is perfect for general soil preparation of landscape beds, shrub and tree establishment, incorporation into potting soils and overall soil building. Sustane 4-6-4+Humates is made from Sustane

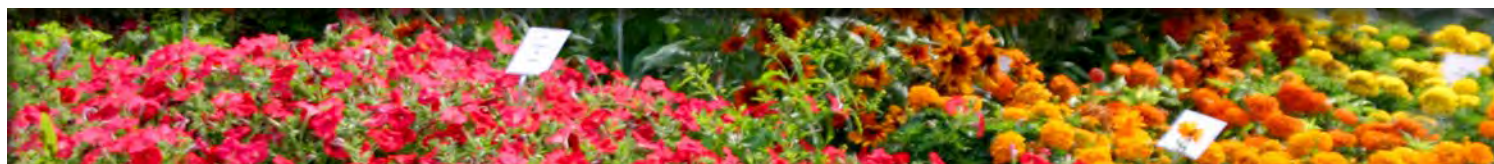
aerobically composted turkey litter, hydrolyzed feather meal, sulfate of potash and humates. Designed to improve soil health and provide a full season nutrient supply. Used worldwide since 1993, 4-6-4 is available in both Medium Grade and Fine Grade particle sizes. Fine Grade granules are ideal for use with plug production to provide uniform distribution of nutrients in low volume pots.

8-4-4 45-Day

All Natural 45-Day Slow release Nitrogen Fertilizer

Sustane 8-4-4 all natural fertilizer is ideal for the production of bedding and foliage crops, hanging baskets, herbs and vegetables. Sustane 8-4-4 is excellent for the production of Begonias, Petunias, Impatiens, Geraniums, Caladiums, Chrysanthemums, and vegetable crops. It is available in both fine and medium particle

sizes. Fine granules are ideal for use with plug production to provide uniform distribution of nutrients in low volume containers. When used in containers the nutrient release profile is 45 days. Sustane 8-4-4 is composed of aerobically composted turkey litter, hydrolyzed feather meal, and sulfate of potash.



Natural Base Fertilizers



Medium

12-12-12 90-Day

All Purpose 90-day Controlled Release Nitrogen Fertilizer

Sustane's 12-12-12 is an all purpose fertilizer for use in landscape beds and container production of herbaceous perennials, bedding and foliage crops. Coated Controlled Release NPK plus Sustane humus rich, premium organic base. This fertilizer works great for the production of Begonias, Petunias, Impatiens,

Geraniums, Caladiums, and Chrysanthemums, Coleus, Hostas, Lilies, Rudbeckia and ornamental grasses. When used in container production the release profile is 90 days. Sustane 12-12-12 all-purpose fertilizer is derived from aerobically composted turkey litter and polymer coated urea, MAP, and potassium nitrate.

16-4-8 120-Day

Nursery 120-day Controlled Release Nitrogen Fertilizer

Sustane's 16-4-8 was developed as a combination fertilizer to provide nursery stock with a time released 4-1-2 nutrient package blended with a 50% Sustane humus rich, premium organic base. Sustane 16-4-8 is perfect for production of perennials and woody ornamentals. Nursery producers can use Sustane 16-4-8 to grow beautiful Azalea, Holly, Weigelia, Crape

Myrtle, Cotoneaster, Boxwood, Spiraea, Salvia, Hibiscus, and Daylily. Sustane 16-4-8 Nursery Fertilizer is available in both 120-day and 180-day release profiles to meet the needs of your production cycle. Sustane 16-4-8 Nursery Fertilizer is derived from aerobically composted turkey litter, polymer coated urea, polymer coated MAP, and polymer coated potassium nitrate.

16-4-8 180-Day

Nursery 180-day Controlled Release Nitrogen Fertilizer

Sustane 16-4-8 Nursery Fertilizer is also available in 180-day release profiles to meet the needs of 5 – 6 month production cycles. Sustane 16-4-8 Nursery Fertilizer is derived from aerobically composted

turkey litter, polymer coated urea, polymer coated MAP, and polymer coated potassium nitrate.

18-1-8 90-Day

90-day Top Dress Only Slow Release Nitrogen Fertilizer

Sustane 18-1-8+Fe is for top dressing containers and field grown trees. 18-1-8+Fe is a natural base 15.3% slow release nitrogen (SRN) 85% of the total N -fertilizer complete with five different sources of nitrogen: two forms of organic nitrogen and Sustane

iron-chelated compost homogenized with methylene urea and ammonium sulfate, then blended with polymer coated sulfur coated urea (PCSCU). Top dressing with Sustane 18-1-8+Fe is an economical and safe method to feed plants longer into the growing season.

Sustâne® Application Rates

Low

Recommended for use: on salt sensitive species; when concurrent with liquid feed; with production systems utilizing low leaching fractions (less than 10%); and when applied to heavy potting substrates (total porosity less than 65%).

Medium

Recommended for use: on medium feeding species; on most nursery stock and foliage plants; and when liquid feed is not performed concurrently.

High

Recommended for use: on heavy feeding species; with production systems utilizing high leaching fractions (greater than 20%); and when applied to light, porous substrates (total porosity greater than 80%).

These rates are intended as guidelines. Sustâne encourages a trial prior to changing any fertilizer program.

Sustâne Incorporation (Container Media) and Landscape Application Rates

Incorporation Rates by Volume

Landscape Rates by Area

Sustâne Product	lb. per cubic yard			kg. per cubic meter			lb. per 1,000 square feet			kg. per 100 square meter		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
4-6-4 + Humates 45 days	11	20	30	6.5	11.8	17.8	18	36	56	8.8	17.6	27.4
8-4-4 45 days	5.5	10	15	3.3	5.9	8.9	9	18	28	4.8	8.8	13.7
12-12-12 90 days	4.5	8.5	14	2.6	5	8.3	8	16	25	3.9	7.8	12.2
16-4-8 120 days	4	7	9	2.4	4.2	5.3	9	17	23	4.4	8.3	11.2
16-4-8 180 days	5	9	12.5	3.0	5.3	7.4	10	18	24	4.9	8.7	11.7

- Do not store container mix more than two weeks after incorporating fertilizer. Plant material can be damaged from salt accumulation.
- If mix is stored longer than two weeks, leaching container mix may be required to remove accumulated salts.
- Do not steam sterilize container mix after fertilizer has been incorporated.
- Monitor electrical conductivity (EC) of container substrate throughout production cycle. Adjust application rates as needed.

Sustâne Container Topdressing Application Rates in grams

Sustâne product	Rate	Container Size								
		5" Std.	6" Std.	1 gallon	2 gallon	3 gallon	5 gallon	7 gallon	10 gallon	15 gallon
8-4-4 45 days	Low	3	6	7	15	28	45	63	77	82
	Med	7	13	19	39	67	108	140	186	200
	High	10	18	28	59	104	165	237	285	306
12-12-12 90 days	Low	3	4	6	13	23	37	53	64	69
	Med	6	10	15	33	56	90	117	155	167
	High	8	15	23	49	86	138	200	238	255
16-4-8 120 days	Low	4	6	9	20	35	55	79	95	102
	Med	6	9	14	30	52	83	119	143	153
	High	7	13	20	41	73	116	166	201	215
16-4-8 180 days	Low	5	8	12	26	46	74	105	128	137
	Med	7	12	19	40	69	111	158	191	205
	High	10	17	26	55	97	155	221	268	287
18-1-8+Fe 90 days	Low	2	3	4	9	16	25	35	43	46
	Med	4	7	10	22	37	60	78	103	111
	High	5	10	16	32	57	92	131	159	170
Top Diameter of Container	in.	5	6	6 3/8	9	11	11 7/8	14	15 3/8	18 3/8
	cm	12.7	15.2	16.2	22.9	28.0	30.2	35.6	39.0	46.7
Approximate Containers per	yd ³	800	450	300	140	80	50	35	21	14
	m ³	1045	589	392	183	104	65	45	27	18

Other fine Greenhouse, Landscape & Nursery Products from Sustane® Natural Fertilizer, Inc.



Sustane All-Organic 21-gram Feeder Paks & Compost Tea Bags
Sustane 4-6-4 in water permeable sachets for all hanging baskets, potted plants & landscape maintenance. Available by the bag with 50 x 21-gram paks or by the case with 5 bags x 50 21-gram paks, 250 doses total.



Sustane Season Long 21-gram 16-4-8 Feeder Paks
50% Sustane Organic & 8-Month Controlled Release Fertilizer. Ideal for long-term controlled dose flower, shrub & trees. Available by the bag with 50 x 21-gram paks or by the case with 5 bags x 50 21-gram paks, 250 doses total.

BOLSTER Liquid Plant Growth Supplement

For quick start on bare root stock, protection against and recovery from draught and heat-stressed plants and grasses, compacted and saline soil conditions. Contains iron chelate, humic acid and seaweed extract. Available in 10 x 1-liter bottle cases, 2 x 2.5-gal cases and 55-gal drums. Application rate is 3 oz. per 1,000 sq. ft. topical and 6 oz. per 1,000 sq. ft. for soil drench.



2.5 gallon or 1 liter

BOLSTER Granular 4-4-4+3Fe

Sustane Organic, plus BOLSTER Plant Growth Supplement and 4 types of mycorrhizae. This is the complete soil bed preparation for low organic and low biologic activity soils. BOLSTER Granular is for use in all landscape plantings including flowers, shrubs, trees, new sod installation and new turf seeding. Enhances plant establishment and increases survivability and soil water use efficiency. Available in 25 lb. or 50 lb. bags. Apply at 25 - 50 lb. per 1,000 sq. ft. and incorporate to 3 to 4 inch depth.



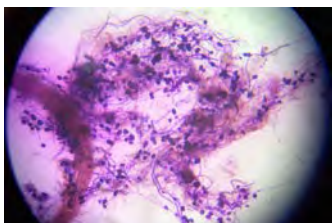
Sustane Arbuscular Mycorrhizal Inoculant

Mycorrhizal fungi are living organisms that provide several benefits for their host plant. These organisms are entirely dependent upon their symbiotic relationship for survival and consequently provide a number of services and materials to assure their host plant's survival and productivity. Key Benefits of Sustane mycorrhizae:

1. Efficient use of water and plant nutrients
2. Enhanced Plant Immune and Defense System
3. Improved Soil Structure

Plants that benefit from mycorrhizae include most flower, annuals and perennials; forage crops (alfalfa, clover, corn, cowpea, millet and Sudangrass); cereal grains such as barley, corn, rice, soybeans, sunflowers and wheat; herbs, ornamental crops, trees, bushes, fruit and nut trees and vine crops; turfgrasses and groundcovers (bentgrass, bluegrass, buffalograss, bermudagrass, fescues, dichondra, ryegrass, vetch and vinca); and many tree species including alder, beach, birch, black locust, chestnut, cottonwood, eucalyptus, hemlock, larch, oak, pecan, poplar and walnut.

Guaranteed minimum: Sustane guarantees 200 spores/g, Rhizophagus irregularis 140 spores/g, Rhizophagus clarus 20 spores/g, Septoglomus deserticola 20 spores/g, and Claroideoglomus etunicatum 20 spores/g. Product is available in 11.025-lb (5-kg.) or 40-lb. (18.14-kg.) weather-resistant packaging.



Sustâne® Case Studies

Great new products are born from discovery, and through years of research and development. Sustâne began studying and evaluating treatment effects, plant response, nutrient release, EC rates and other fertilizer responses to container grown nursery plants at North Carolina State University in 1991 and 1992. Basic Sustâne 4-6-4 was discovered to be the perfect base fertility compliment to commercial potting soils. In 2002 Sustâne began experimenting with different formulations that combined Sustâne Organic with numerous sources of slow and controlled release fertilizers including SCU, methylene urea, ureaform N, and several types of polymer coated NPK products. The photo on the right shows the comparative growth differences between two identical formulations of 16-4-8 using the same coated fertilizers. The only difference between treatments was that Sustâne Organic was substituted for 50% of the blend in the treatment on the right. This discovery led to the development of new combinations of Sustâne plus coated NPK controlled release fertilizers available today.



Standard 16-4-8 Sustâne 16-4-8



Sustâne 11 lbs./yd³ Sustâne 16.5 lbs./yd³ Sustâne 22 lbs./yd³

Sustâne 4-6-4 + Humates - 2003 The Effects of Three Commercial Potting Soil Formulations with Sustâne Organic fertilizer and Various Competitive Potting Mixes on the Growth of Three Potted Plant Species: 'Golden Wizard' Coleus, 'Janie Tangerine' Marigolds, and 'Better Boy' Tomatoes. Potting media contained aged pine bark: sphagnum peat moss: perlite (40:40:10) plus dolomitic lime at 5 lb. per cu. yd., Therm-X wetting agent at 4 oz. per cu. yd. and Sustâne 4-6-4 at 11, 16.5 and 22 lb. per cu. yd. Plants growing in the three treatments containing Sustâne and not supplemented with soluble liquid fertilizer were superior to those growing in Miracle Gro Enriched, Scotts + Osmocote, and Schultz Garden Safe potting mixes. The same plants growing in the three mixes containing Sustâne outperformed or were equal to those growing in StaGreen All Purpose of Schultz Professional mixes. The selected cultivars of coleus and tomato that did not receive supplemental fertilizer but treated initially with the 16.5 and 22 lb. per cu. yd. rate of Sustâne 4-6-4 + Humates were generally superior to those growing at the 11 lb. rate. All three rates of Sustâne provided excellent growth on Marigolds.

Sustâne 8-4-4 Vinca and marigold bedding plant material performed better when grown with Sustâne 8-4-4 compared to two industry standard fertilizers with an N-P-K ratio of 1-1-1. Each fertilizer was incorporated at a rate of 0.85 pounds of nitrogen per cubic yard. The container substrate was a 50:40:10 mix (by volume) of pine bark, peat and perlite.

Sustâne 8-4-4 has also been compared against Sustâne 12-12-12 and 16-4-8 and against industry standard coated fertilizer formulations on multiple plant species, both short and long term crops in five different U.S. growing regions: Deep South (Mobile, AL), Mid-South (Rydal, GA), Midwest (Columbus, OH), Upper Midwest (St. Paul, MN) and Pacific Northwest (Salem, OR).

Sustâne 8-4-4 was consistently the best performing fertilizer in most trials for the first 45 days. After the first 5 to 6 weeks, comparison treatments utilizing controlled release fertilizers fared better as result of ongoing nutrient release. Sustâne 8-4-4 is an excellent 6-week product for any greenhouse and nursery operation.



Sustâne 8-4-4 Standard 13-13-13 Standard 14-14-14

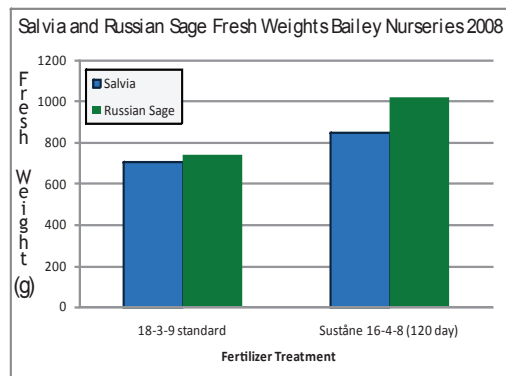


Sustâne 12-12-12 Standard 13-13-13 Standard 14-14-14

Sustâne 12-12-12 all purpose controlled release fertilizer was evaluated against two industry standard controlled release fertilizers (14-14-14 and 13-13-13) with identical N-P-K ratios and similar longevities. Coleus, fountain grass, rudbeckia, mini rose and marigold were grown under overhead irrigation during the summer of 2008. The container substrate was a 50:40:10 mix (by volume) of pine bark, peat and Perlite. Each fertilizer tested was incorporated with the container substrate at a rate of 0.85 pounds of nitrogen per cubic yard. For each species, Sustâne 12-12-12 performed equal to, or better than the industry standard controls on plant quality, growth index, root quality and end-of-season dry weight.

Sustâne 16-4-8 (120 day) was evaluated at Bailey Nursery in Cottage Grove, MN. Both Sustâne 16-4-8 (120 day) and an industry standard controlled release fertilizer with analysis of 18-3-9 were incorporated at a rate of 1.8 pounds of nitrogen per cubic yard. The container substrate was a 4:3:2:10 mix (by volume) of composted bark and hard wood chips, peat, composted discarded plants and sand. The species evaluated were Russian sage and salvia. The trial results showed both species had superior visual ratings and end-of season fresh weights when grown with Sustâne 16-4-8 compared to the 18-3-9 standard.

Sustâne 16-4-8 (180 day): Azalea grown in southern Alabama with Sustâne had equal growth index, quality rating and dry weight compared to Azalea grown with an industry standard controlled release fertilizer with analysis of 17-7-12. Azalea grown with Sustâne had better root quality than the 17-7-12 standard. Root quality was measured to assess the potential of soluble salt damage. This result confirms the low burn potential of Sustâne natural fertilizers compared to synthetic CRF products. In this study each fertilizer was incorporated at a rate of 2 pounds of nitrogen per cubic yard. The substrate used was a 3:1 mix (by volume) of pine bark and peat.



Sustâne Nursery Fertilizer Developmental Research 1992 - 2008

1992 North Carolina State University, Tyler, Warren, Bilderback and Fonteno - Sustâne (composted turkey litter): Effect on chemical and physical properties of a pine bark substrate and plant growth. 1993 Journal of Environmental Horticulture Sept. 1994 Sustâne (composted turkey litter): Effects on Loamy Sand Soil, presented at TVA UK 1995 North Carolina State University, Warren, Bilderback, et al - Effect of irrigation volume, cyclic irrigation and fertilizer on nutrient efficacy, water efficiency and plant growth, 1997 Nitrogen mineralization of composts as affected by container substrate temperatures, 2000 North Carolina State University, H. T. Kraus and S. L. Warren - Container Substrate Temperatures Affect Mineralization of Composts Performance of Sustâne (composted turkey litter) as a Slow release Fertilizer in Containerized Plant production. Published in HortScience. Vol. 35(1). February 2000

2002 Horticultural Consulting Service, Athens, GA, B. McElhannon - Organic fertilizer evaluations with and without humates for potting soils, 2003 Nitrogen carrier evaluations with Sustâne container fertilizers, 2004 Nitrogen carrier evaluations with Sustâne con-tainer fertilizers 2004 Pat2h Consulting Service, Inc., Rydal, GA, W. D. Davenport - Effects of Three Potting Soil Formulations with Sustâne and Other Potting Mixes on Coleus, Marigolds, and Tomatoes

2005 University of Florida, Quincy, Florida Experimental Station, Jyotsna Sharma - Organic Fertilizer for Minimizing Nutrient Loss and Optimizing Container Grown Nursery crops (Daylilies)

2006 North Carolina State University, Stuart L. Warren, Ted E. Bilderback - Sustane Organic plus controlled release fertilizer compared to syntheticcontrolled release fertilizers in Nursery Container Production, 2007 North Carolina State University, Can an organic/synthetic hybrid con-trolled release fertilizer compete with a synthetic controlled release fertilizer?

2008 Effects of Various Sustane Fertilizers on the Growth of Containerized Perennial and Containerized Woody Ornamental Species in Five Different U.S. Growing Zones: Alabama, Georgia, Minnesota, Ohio and Oregon - Evaluation of effects of multiple fertilizer blends on the growth of common containerized ornamental crops, compared to industry standard controlled release fertilizer sources of equal longevities - Pat2h Consulting Service, Inc., Rydal, GA, W. D. Davenport; Auburn University, Ornamental Horticulture Research Center, Mobile AL, Charles, Gilliam, John Olive; Ohio State University, Columbus, OH, Daniel K. Struve; Bailey Nurseries, Inc., Cottage Grove, MN, Don Peterson, Eric Nordlie, Sam Drawn, Jean-Marc Versolato; HortSolutions LLC, Salem, OR, Sven Svenson.

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