# SUSTANE®

**NATURAL FERTILIZERS & SOIL BUILDERS** 



PRODUCTS, RESEARCH, AND USAGE GUIDE FOR HEMP AND MEDICAL

# CANNABIS

For Professional Cultivators, Greenhouse Managers and Home Growers... Worldwide





KNOWN WORLDWIDE FOR SIMPLY THE BEST...
...NATURAL FERTILIZERS & SOIL BUILDERS!

#### **COMPLETE PLANT NUTRITION**

Suståne provides complete plant nutrition in safe, effective, and easy to apply granules and a line of organic liquid feed solutions. Sustane products are derived from biologically stable humus-rich compost and contain both water soluble nitrogen (WSN) and slow release nitrogen (SRN), beneficial microbiology, and all 17 elements essential for plant photosynthesis. With a near-neutral pH, a low salt index and low ammonium nitrogen percentage, Sustane will not cause seedling stress or plant fertilizer "burn". Suståne products increase soil cation exchange capacity (CEC) by supplying humates and stable organic matter. Suståne's organic and blended natural fertilizers provide all soil types with additional buffering capacity, allowing for more consistent and productive growth.

#### SUSTÅNE IS PROFESSIONAL GRADE

Used by professional growers under multiple growing conditions in over 60 different countries. Sustane is backed by over 30 years of independent applied research on diverse crops and ecosystems. This research is unmatched by any other organic fertilizer manufacturer and it is this foundation that has helped develop products that perform consistently under a wide variety of soil and crop production systems, and is why Sustane is recognized by growers from around the world. There simply is no substitute for testing and applied research or a better way to optimize plant growth sustainably.



# GROW IT ORGANICALLY - GROW WITH CONFIDENCE

Quality Assurance is paramount at Sustane. Consumers and patients expect your products to be pure and unadulterated. Sustane takes this responsibility to heart and as result of our commitment to you Sustane fertilizers are allowed for use in the production of certified organic crops by multiple organic material review organizations throughout North America. Moreover Suståne products are allowed for export to more than 60 countries worldwide including the EU nations, the Middle East, and most of Asia including China; meeting multiple and various health and safety criteria. Suståne products are independently tested to verify compliance with the Leafy Green Products Handler Marketing Agreement (LGMA) requirements and are guaranteed to be pathogen and pesticide residue-free.

#### **MAXIMIZE THE YIELD**

Serious growers optimize plant yields with Suståne's complete fertility programs. Suståne provides the plant response and yield that professional growers require. The combination of Suståne granulars – either all-organic or natural base with controlled release nutrients – incorporated into or top-dressed on the growing media and supplemented with Suståne liquid fertigation and compost teas promote plant health and yield enhancement from transplant through the bud stage.

# LOWER THE COSTS - IMPROVE RETURN ON FERTILIZER INVESTMENT

Suståne's organic granular programs can cost 1/10th the cost of liquid hydroponic programs. Potting mixes and soil beds supplemented with Suståne fertilizers provide all of the nutrients a cannabis plant needs to grow and yield top quality product – whether oil, bud, seed, or fiber; and do so at a fraction of the cost of most industry standard cannabis fertilizers; but without the hype.

# ABOUT SUSTÅNE

#### UNIQUE PROCESSES PRODUCE DISTINCTIVE PRODUCTS

#### REDUCE THE COMPLEXITY - SIMPLIFY BETTER GROWTH

Suståne's basic fertilizer programs are easy to use. Application rates and timing are easy to follow. Growing with Suståne requires only a few applications dry granular nutrients into soil or potting mix at seeding or transplanting followed by timed top dressing and soil drench every few weeks. Use Suståne with appropriate irrigation and quality environmental growing conditions. There are no complex calculations, few detailed measurements and a plain, simple approach to growing that works.

#### **BIOLOGICALLY RICH - MICROBIALLY DIVERSE...**

Through careful formulation and manufacturing Sustane's compost-based fertilizers remain biologically rich and deliver microbial species diversity. Every Sustane granule contains millions of beneficial micro-

organisms that help cycle nutrients and have been demonstrated to assist in plant and soil disease suppression.

#### ...YET BIOLOGICALLY STABLE

Suståne fertilizers do not cause native soil microbes to rob oxygen from the root zone as other raw organic fertilizers do. Unlike blood, bone and meat meals, or fresh manures and fish-based fertilizers, Suståne is biologically stable and holds no food value or attractant to flies and other insects, rodents or other animals.

#### **PLANT NUTRIENT OPTIONS**

Suståne fertilizers are available in dry homogenous, low dust granules in different NPK ratios and concentrations; and in (liquid feed) water dispersible fertilizers (WDF) and compost teas. Growers can apply plant nutrition that best suits their growing system and preferences. (Refer to Granular Product options on pages 4-5 and to Liquid Feed Product options on pages 6-7.)









# GRANULAR PRODUCTS

### FOR INDUSTRIAL HEMP AND MEDICAL MARIJUANA



#### SUSTÅNE GRANULAR FERTILIZERS

Professional Suståne natural and organic granular fertilizers offer an efficient method for delivering plant nutrition for cannabis production. Ideal for commercial and home growers, Suståne granulars are a simple and safe way to improve both cannabis yield and increase profits. Available in dry homogenous, low dust granules in different NPK ratios and concentrations, growers can apply plant nutrition that best suits their production system and preferences.



NEW Suståne BOLSTER® MycoBio™ is a specially formulated blend of endo-mycorrhizae and beneficial bacteria used for inoculating soils and growing media with the added benefits from compost and humic acid. This biologically charged granular soil amendment can enhance root growth for rapid plant establishment and increases nutrient use efficiency from seedling through maturity. This product formulation supports the growth of diverse crops in all types of growing environments. Ideal for transplant production with container mixes and preparation of garden beds. MycoBio should be soil-incorporated for new plantings of all horticultural and agricultural crops. MycoBio delivers a minimum of 120 spores/g of Mycorrhizae and 100,000 CFU/g of Bacterial Inoculant.



**Suståne 4-6-4** is the all-purpose slow release nitrogen fertilizer for seeding, establishment, transplanting and during the flowering stage. 4-6-4 is the fastest and most reliable organic starter available, and has been demonstrated through independent research to suppress certain plant pathogens. 4-6-4 is allowed for use in the production of certified organic crops.









**Suståne 8-2-4** is an all-natural slow release high nitrogen fertilizer releasing plant nutrients over 7 - 12 weeks. Incorporated into potting media at transplanting and top-dressed during vegetative growth stage of cannabis. Suståne supplies the soil with a rich supply of stable humus and all of the essential nutrients required for quality growth. 8-2-4 is allowed for use in the production of certified organic crops.



**Suståne 16-4-8** Organic + CRF was developed as a combination fertilizer to provide greenhouse crops with a time released 4-1-2 nutrient ratio by combining 50% humus rich, premium organic Suståne base and 50% coated controlled release NPK substrates. Suståne 16-4-8 Organic + CRF is available in both 120-day and 180-day release profiles to meet the needs of variable crop production cycles.

# **GRANULAR PRODUCTS**

### FOR INDUSTRIAL HEMP AND MEDICAL MARIJUANA







**◄** Suståne offers three partical sizes

	CANNABIS GRANULAR PRODU		
Product	Description and features	Application	Technical Details
Mycobio	<ul> <li>A blend of five beneficial bacteria species, four Vesicular Arbuscular Mycorrhizal Fungi inoculant strains, humic acid and Sustane aerobic compost.</li> <li>Supplies beneficial microorganisms to soils and growing media</li> <li>Encourages vigorous root growth</li> <li>Allows plants to better utilize water and nutrients</li> </ul>	Incorporate at planting for full grow cycle bene- fits. Available in 1lb. jars, 6 lb. canisters, and 40 lb. bags.	<ul> <li>Mycorrizae species include Rhizophagus irregularis, Rhizophagus clarus, Septoglomus deserticola and Claroideoglomus etunicatum.</li> <li>Bacterial species include Bacillus subtilis, Bacillus pumilus, Bacillus megaterium, Bacillus licheniformis, and Bacillus amyloliquefaciens</li> <li>Available in Fine Grade (100 SGN)</li> </ul>
Suståne	Granulated organic fertilizer that	Incorporate	N 4%, P <sub>2</sub> O <sub>5</sub> 6%, K <sub>2</sub> 0 4%, Ca 4%,
4-6-4 Organic	provides a high phosphorus and balanced N and K and Ca for bud formation during flowering.  • 45 Day Release Slow Release Nitrogen (SRN) 80%  • Provides all plant essential nutrients  • Promotes abundant blooms  • Provides humic acid and micronutrients  • Adds beneficial microbiology to soil	and topdress during flowering stage	Mg 1%, S 1%, Fe 0.5%, Mn 0.05%, Zn 0.05%, Humic Acid 5%, Organic Matter 60%, SRN 80%  • Available in Fine (100 SGN) and Medium (200 SGN) grades  • Available in 5, 20, and 50 lb. bags and 1,000 lb. and 2,000 lb. totes
Suståne 8-2-4 Organic	Granulated organic fertilizer, rich in slow-release nitrogen for vigorous growth.  • 45 Day Release Slow Release Nitrogen (SRN) 90%  • Provides all plant essential nutrients  • Promotes rapid vegetative growth  • Provides humic acid and micronutrients  • Adds beneficial microbiology to soil	Incorporate and topdress during vegetative stage	N 8%, P <sub>2</sub> O <sub>5</sub> 2%, K <sub>2</sub> 0 4%, Ca 2%, Mg 0.5%, S 1%, Humic Acid 3%, Organic Matter 65% SRN 90% • Available in Fine (100 SGN) and Medium (200 SGN) grades • Available in 5, 20, and 50 lb. bags, and 1,000 lb. and 2,000 lb. totes
Suståne 16-4-8 Natural Based 120 Day or 180 Day	Organic + Coated Control Release Nutrition (CRF) fertilizer that delivers 120 or 180 days of extended release. • 50% blend of natural organic base that is rich in humus and 50% coated control release NPK	Incorporate at planting for full cycle nutrition	N 16%, P <sub>2</sub> O <sub>5</sub> 4%, K <sub>2</sub> 0 8%, Ca 2.75%, Mg 0.75%, S 1.00%, Fe 0.25%, Mn 0.05%, Zn 0.05%  • Available in Medium Grade (220 SGN)  • Available in 50 lb. bags and 1,000 lb. and 2,000 lb. totes

# LIQUID FEED PRODUCTS

FOR INDUSTRIAL HEMP AND MEDICAL MARIJUANA



#### PROFESSIONAL TOOLS FOR FERTIGATION

in a concentrated, simple to use powder. Measure, mix, and feed for precision application and explosive growth while adding nutrients, microbiology and humic material with Suståne's new WDF and Compost Tea. Waste less by precisely dosing plants with only what they need, and get more control of plant growth and greater nutrient use efficiency.



#### SUSTÅNE FLOURISH 8-2-4 WDF

A workhorse **water dispersible** fertigation material formulated with all essential nutrients to provide plants complete nutrition.





#### SUSTÅNE HI-N 12-0-1 WDF

Specifically for commercial fertigation and hydroponic systems. A rich source of **water soluble** nitrogen that can be used alone or in combination with Compost Tea.







#### SUSTÅNE COMPOST TEA BAGS/ROOT-ZONE FEEDER PACKS

- \* Easy to use liquid organic fertilizer supplement: no fuss, no mess, no measuring
- Beneficial microbes in the tea convert nutrients to plant available forms when added to soils and can help protect plants from pests and pathogens
- Increases yield with minimal effort



► Suståne 50 pack of 21 gram 4-6-4 Compost Tea Bags/Root Zone Feeder Packs



■ Suståne 4-6-4 Compost Tea is simple to prepare. Add two 21 gram tea bags per gallon (42 grams), or a 5 lb. Compost Tea Bag in 100 gallons of water. Brew with aeration for 24 to 48 hours at 60 to 85 degrees F°. For Enriched Compost Tea, just mix in HiN at 1 tablespoon per gallon or 1 lb. per 100 gallons during the last two hours of the brew cycle.

ology of Suståne's Compost Tea

# LIQUID FEED PRODUCTS INCREASE MASS, QUALITY AND GROW GREENER







■ Suståne offers different liquid fertilizers

<u>SUSTÅI</u>	NE CANNABIS FERTIGATIO	N PRODUCTS 1	TECHNICAL DI	TAIL
Product	Description and Features	Application	Technical Details	Product Details
Suståne Flourish 8-2-4 WDF	Water dispersible powder for liquid applications, provides premium organic nutrients suitable for all stages of growth.  • Provides complete plant nutrition • Low risk of nutrient burn or salt buildup compared to other liquid fertilizers • Contains kelp as a biostimulant	Soil drench through- out vegetative and flowering stages. Not for use in irriga- tion lines.	N 8%, P <sub>2</sub> O <sub>5</sub> 2%, K <sub>2</sub> 0 4%, Ca 3%, Mg 0.5%, S 1.5% 1% Humic Acid, 1% Kelp Extract	Item # 70-50-2001 1 lb. jars 12 / case  Item # 70-50-2003 3 lb. canisters 12 / case
Suståne Hi-N 12-0-1 WDF	Water dispersible powder for liquid applications high in nitrogen.  • Fully organic nitrogen for a quick plant response  • 99% water soluble  • Low risk of nutrient burn or salt buildup compared to other liquid fertilizers  • Less smell and mess compared to other liquid organics	Soil drench during vegetative stage. Can be combined with compost tea	N 12%, K <sub>2</sub> 0 1% • 90% water soluble organic N • Made with plant protein hydrolysates • Mutlifunctional N sources to to improve nutrient use efficiency	Item # 70-55-2001 1 lb. jars 12 / case  Item # 70-55-2003 3 lb. canisters 12 / case  Item # 70-55-2011 40 lb. bags
Suståne 4-6-4 Compost Tea Bags	Provides premium liquid nutrition and beneficial microbiology.  Invigorates growing media with diverse populations of beneficial microbes  Helps aid in the uptake of nutrients  May improve plant disease tolerance, resistance, and/or suppression	Soil drench during flowering. Can be used alone or in combination with WDFs.	Two 21 gram bags make 1 gallon of tea and one 5 lb. bag makes 50 gallons and up to 100 gallons	Item # 80-20-2005 (12) 21 gram tea/ pouch  Item # 80-20-2020 (50) 21 gram tea bags/pouch  Item # 80-20-2050 (8) 5 lb. bag /case

# INDUSTRIAL HEMP RESEARCH

GENERAL APPLICATION GUIDANCE

#### PROVEN INDUSTRIAL HEMP GROW PROGRAMS

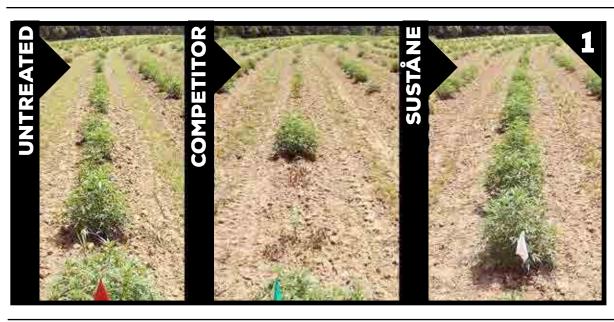
In cooperation with state licenced growers, Suståne has demonstrated superior performance for industrial hemp crops. Whether growing for seed and fiber or cannabidiol (CBD), Suståne's programs provide healthy organic crops with an excellent return on investment for growers.

#### RESEARCH TRIALS FOR INDUSTRIAL HEMP

#### HEMP CANNABIDIOL (CBD) RESEARCH 2016 - KENTUCKY

GOAL: Evaluate Sustane 8-2-4 as a sidedress treatment for CBD Hemp.

Product	Height/Inches after sidedress	Stand %	Fresh Weight (lb.) per plant	Biomass (lb./acre)
Untreated	19.1	88	5.7	11,880
Competitor 10-2-8*	16.9	70	5.0	8,259
Suståne 8-2-4*	19.2	91	5.8	12,690



- \* 800 lb. of fertilizer per acre sidedressed at four weeks, post transplant.
- ✓ Figure 1: Hemp plants six weeks after transplanting.1) Untreated (left)
- 2) Competitor treated (center)
- 3) Suståne treated (right)

#### HEMP CANNABIDIOL (CBD) RESEARCH 2017 - KENTUCKY

GOAL: Establish value of using Sustane to fertilize irrigated CBD Hemp.

Treatment	Applied lb. N/Acre	Fresh Weight Yield (lb./plot)	Dry Weight Yield (lb./acre)	Gross (\$/acre)	Suståne Return on Investment
Untreated	0	54	408	\$12,240	n/a
Suståne 3-7-4 Low Rate**	80	77	564	\$16,420	5.2
Suståne 3-7-4 High Rate**	160	101	738	\$22,140	5.6

<sup>\*\*</sup> Broadcast and incorporated prior to planting



GENERAL APPLICATION GUIDANCE

#### PROVEN INDUSTRIAL HEMP FERTILIZATION PROGRAMS

- 1. Broadcast and incorporate Sustane granules into soil prior to planting
- 2. On fertile, well managed organic soils, use 1000 lb. of Suståne 8-2-4 per acre to produce solid yields
- 3. Where soil P is low, use Sustane 3-7-4 to improve soil quality and deliver all essential nutrients
- 4. Use Suståne Compost Tea (with or without Hi-N WDF) to improve drought stress tolerance and increase yields
- 5. Work with Sustane Ag Services to develop a custom fertility program that optimally fits your soil and growing conditions

EXAMPLE HEMP FERTILITY PROGRAMS					
Crop Type	Application	Products*	Rate		
Organic Seed/Fiber	Pre-plant incorporation on day of seeding	8-2-4 Granular	800-1600 lb. per acre		
Organic CBD	Pre-plant incorporation immediately before bed formation	8-2-4 Granular	1000 to 2000 lb. per acre		
	Supplementation during transplanting	8-2-4 Granular	1/8 to 1/4 cup per transplant		
	Fertigation during flowering	4-6-4 Compost Tea	100 gal per acre		
	Fertigation during flowering	Hi-N WDF	2 lb. in 100 gal per acre		
Conventional Seed/Fiber	Pre-plant incorporation up to 2 weeks before seeding	16-4-8 (120 d) Granular	400-800 lb. per acre		
Conventional CBD	Pre-plant incorporation before bed formation	16-4-8 (120 d) Granular	500 to 1000 lb. per acre		
	Fertigation during flowering	4-6-4 Compost Tea	100 gal per acre		
	Fertigation during flowering	Hi-N WDF	2 lb. in 100 gal per acre		

<sup>\*</sup>Product recommendations are for well balanced soils with >3% organic matter and a slightly acidic pH. Sustane Ag Services can prescribe custom blends tailored to individual farms based on farm management practices and soil test data.





# MARIJUANA RESEARCH

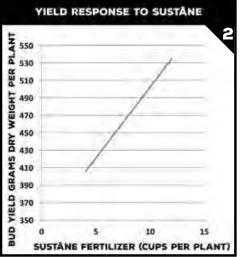
PROVEN IN THE FIELD

#### RESEARCH TRIAL FOR LICENSED MARIJUANA

#### **MEDICAL MARIJUANA 2016 - MICHIGAN**

GOAL: Improve production of outdoor and indoor grows using Suståne Natural Fertilizers to reduce material and labor costs.





▲ Figure 1: From left to right, Suståne low, medium, and high rates versus grower standard hydro program just prior to bloom stage.

Growth and color improvements resulting from increasing rates of Sustane fertilizers relative to the grower's initial hydroponic program.

◀ Figure 2 : An illustrated relationship between Suståne fertilizer additions to potting mix and yield of Cannabis plants.

#### **MEDICAL MARIJUANA 2017 - MICHIGAN**

GOAL: Establish an optimal fertility rate for outdoor cultivation of medical cannabis in Michigan that uses Suståne's organic fertilizers with and without various supplements.



MEDICAL MARIJUANA RESEARCH 2017					
Suståne Fert. Program		Number of Applications		Cost per plant	
Organic High Rate	122	5	878	\$3.34	
Organic Low Rate	95	5	779	\$2.67	
Hybrid Med Rate	109	4	786	\$3.00	
Hybrid Low Rate	73	4	573	\$2.01	

■ Figure 1: Typical growth and maturation of Cannabis following addition of Suståne Fertilizers. Plant A10 shown at time of initial transplant (left) and just prior to harvest (right).

# MEDICAL MARIJUANA GROW PROGRAMS

SIMPLIFY PRODUCTION WHILE MAXIMIZING YIELD

#### PROVEN GREENHOUSE CONTAINER GROW PROGRAMS

Working with licensed growers, Suståne has developed highly effective programs for indoor and outdoor production of medical marijuana. While there are many ways to grow, Suståne-based programs are simple, safe, and successful. Below are key elements of organic and natural fertility programs that can be readily adapted to your specific growing conditions.

#### PROGRAMS TO SUIT YOUR PRODUCTION REQUIREMENTS

A. **One and done full grow cycle** in 20-gallon containers: Preplant media mix with 6 lb. per yd<sup>3</sup> Suståne 16-4-8 180-Day controlled release. Supplies 1 lb. N per yd<sup>3</sup> of grow media for entire grow cycle. For optimal root development also add 1 to 2 lb. per yd<sup>3</sup> Suståne BOLSTER MycoBio enhanced mycorrhizal inoculant with beneficial bacilli and humic acid to this or any of the following fertility programs.

**Suståne Granular Organic Fertility Programs** using Suståne 8-2-4 for 9 to 18 week grow cycle for 3 to 4 cycles per year.

- B. For **2 to 3 transplant** stage production during crop grow cycle **Preplant Mix**:
- 1. Starting seedlings in containers that are ≤3-gallon size preplant media mix with 8 lb. per yd³ Suståne 8-2-4. Supplies 0.64 lb. N per yd³ of grow media and will last for four to six weeks.
- 2. First transplant at 4 weeks into a 3 to 10-gallon container preplant media mix with 10 lb. per yd<sup>3</sup> Suståne 8-2-4. Supplies 0.8 lb. N per yd<sup>3</sup> of grow media and will last for four to six weeks.
- 3. Second transplant at 8 weeks into ≥ 10-gallon containers, preplant media mix with 12 lb. per yd³ Suståne 8-2-4. Supplies 0.96 lb. N per yd³ of grow media and will last for six weeks.
- C. Or, for **Preplant Mix followed by topdress** fertility for  $\geq$  10-gallon containers:
- 1. Preplant media mix with 10 lb. per yd<sup>3</sup> Suståne 8-2-4. Supplies 0.8 lb. N per yd<sup>3</sup> of grow media and will last for four to six weeks.
- 2. Topdress with Sustane 8-2-4 at ½ to 1 cup every 3 to 4 weeks per 10-gallon container. Rake into the surface and water in after application.

# D. Or, for Enhanced Organic Fertility Program - Preplant Mix, Topdress Fertility and Fertigation with Sustane Compost Tea Enriched with Sustane 12-0-1 Hi-N WDF

- Follow C. program above and supplement with Sustane Enriched Compost Tea
- 2. Brew 50 gallons of Suståne compost tea with 5-lb. Suståne reusable compost tea bag for 24 to 48 hours at 60° 85° F water temperature. During last 2 to 4 hours of brewing blend in 3 lb. Suståne 12-0-1 Hi-N WDF. Apply at Enhanced Compost Tea at 1 gallon per week per 20-gallon container during bloom stage. If applying through irrigation, follow fertigation with two volumes of water to flush lines.



### FOR SUPERIOR GROWTH, IT'S SUSTÅNE... NATURALLY.



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