SOIL SHIELD

Composted Soil Amendment

Retains Moisture

Jump Starts Plants & Turf

No Industrial Fertilizers

Safe on Fruits & Vegetables

This product meets the definition of a treated Biological Soil Amendment of Animal Origin (BSAAO) under the FDA Product Safety Rule 21 CFR §112.54. This product is stored and handled in a manner to prevent pathogen recontamination.

0.6-1.0-0.2

BSAAO Qualified Composted Soil Amendment

Soil Shield

Product Analysis

Total Nitrogen (N)	0.57%
0.55% Organic Nitrogen	
0.005% Ammonium Nitrogen	
0.02% Nitrate Nitrogen	
Available Phosphate (P_2O_5)	1.01%
Soluble Potash (K_2O)	0.17%
Calcium(Ca)	2.81%
Sulfur (S)	0.18%

Weight Percentages include retained moisture upon product receipt
See **General Information** for more details on nutrient fluctuation levels

Derived From

Wood green waste (branches, roots, leaves) and Class B biosolids

Directions For Use

Using appropriately sized spreader for application area, generously spread across top of field or yard. Do not till. For best results, 10-12 tons per acre are recommended, yielding 110-150lb N per acre.

General Information

Compost will arrive at varying degrees of dryness. Material is typically shipped in bulk, and weighs approximately 1200lb/yd^3

Due to the individual nature of compost batches, displayed label measurements are subject to slight variations. Label will be periodically updated to reflect updated lab tests

This product is a qualified **Biological Soil Amendment of Animal Origin (BSAAO)** Under FDA Product Safety Rule 21CFR §112 and is safe to use on food products.

This product undergoes regular Seal of Testing Assurance (STA) certification via the US Composting Council. Updated labs are available upon request.

This soil amendment is intended for General Use. Our product contains materials safely recycled from animal sources

Screen Size ¾” minus (Particle diameter ¾” or less)

Distributed By:
Indianhead Soil LLC
2020 County Road 214
St. Augustine, FL 32092
(904) 342-5511
www.indianheadsoil.com

Indianhead

Your Soil’s Healthcare

SAFETY DATA SHEET (SDS) – Soil Shield

Section 1 – Identification

Product Name:	Soil Shield
Other Means of Identification:	Night Soil, Compost, Topsoil
Recommended use/restrictions:	Soil amendment and conditioner. No Restrictions
Manufacturer/distributor:	Indianhead Soil 2020 County Road 214 St. Augustine, FL 32084
Emergency Contact Number:	(904) 342-5511

Section 2 – Identification

Classification:	This product is not considered to be hazardous nor to contain hazardous chemicals based on evaluations made by our company under the OSHA Hazard Communication standard, 29 CFR 1910.1200
Signal Word:	No Signal Word
Hazard Statements:	May cause eye irritation if coming into contact with eyes May cause irritation of the respiratory tract if inhaled Not known to be toxic if ingested No hazard symbols
Precautionary Statements:	Use as directed.

Section 3 – Composition/Information on Ingredients

Chemical Name:	None
Common Name:	Compost
Ingredients:	Compost
CAS#:	Not listed in CAS Registry
Manufacturer/Distributor:	Indianhead Soil 2020 County Road 214 St. Augustine, FL 32084
Emergency Contact Number:	(904) 342-5511

Section 4 – First Aid Measures

Eye Contact:	Immediately Flush Thoroughly with water. If irritation persists after five minutes of flushing, remove contact lenses (if applicable) and flush for five more minutes. If irritation continues, seek medical attention.
Skin Contact:	Unlikely to cause skin irritation. If irritation is experienced, rinse irritated area with soap and water. If irritation persists, seek medical attention.
Inhalation:	If irritation is experienced indoors, move outside to fresh air. If irritation persists, get medical attention immediately.
Ingestion:	Drink a full glass of fresh water. If difficulty breathing or nausea is experienced, get medical attention immediately

Section 5 – Fire-fighting Measures

Extinguishing Media:	Water, foam, chemical, or carbon dioxide
Specific Combustion Hazards:	None
Precautions for Fire-fighters	None

Section 6 – Accidental Release Measures

Personal Precautions:	Wear protective eye equipment to avoid direct contact with eyes
Emergency Procedures:	None
Containment and cleanup:	Material is non-toxic. No special methods or materials required

Section 7 – Handling and Storage

Safe handling precautions:	Wear protective safety glasses. Gloves are recommended but not required.
Safe storage:	Store in a cool, well-ventilated place. No incompatibilities

Section 8 – Exposure Controls/Personal Protection

Permissible Exposure Limits:	Not controlled under permissible exposure limit (PEL) of OSHA nor Threshold Limit Value (TLV) of American Conference of Governmental Industrial Hygienists
Engineering Controls:	Use in a well-ventilated area.
Individual protection measures:	Wear safety glasses

Section 9 – Physical and Chemical Properties

Physical State:	Solid
Color:	Dark Brown
Odor:	Earthy
Odor Threshold:	Not applicable
pH:	Neutral
Melting/Freezing point:	Not applicable
Initial boiling point and boiling range:	Not applicable
Flash point:	Not applicable
Evaporation rate:	Not applicable
Flammability (solid):	Not applicable
Flammability (gas):	Not applicable
Upper/Lower flammability or explosive limits	Not applicable
Vapor pressure:	Not applicable
Vapor density:	Not applicable
Relative Density:	0.65-0.7 (Relative to H_2O at 25C and 1atm)
Solubility:	Not applicable
Partition coefficient: n-octanol/water:	Not applicable
Auto-ignition temperature:	Not applicable
Decomposition temperature:	Not applicable
Viscosity:	Not applicable

Section 10 – Stability and reactivity

Reactivity:	None
Chemical Stability:	Stable
Hazardous Reactions:	None
Conditions to avoid:	None
Hazardous decomposition products:	Not applicable

Section 11 – Toxicological Information

Routes of exposure:	Inhalation, ingestion, eye contact
Immediate effects:	May cause eye irritation. May cause irritation of respiratory tract if inhaled. Unlikely but possible irritation from prolonged contact with skin. Not known to be toxic if ingested
Chronic effects:	No known effects

Toxicity:	No acute toxicity estimates. Not listed in the National Toxicology Program (NTP) Report on Carcinogens nor found to be a potential carcinogen in the International Agency for research on Cancer (IARC) Monographs or by OSHA

Section 12 – Ecological Information

Ecotoxicity:	No known effects
Persistence and degradability:	Biodegradable
Bio-accumulative potential:	Not applicable. Material has positive effect on soil.
Mobility in soil:	None. Beneficial to soil
Other:	No known adverse

Section 13 – Disposal Considerations

Waste residues:	No product residues: Product is not packaged and provided in bulk.
Residue handling:	Not applicable. No product residues

Section 14 – Transport Information

UN Number:	Not applicable
UN Shipping Name:	Not applicable
Transport hazard:	Not regulated by DOT
Packing group:	Not applicable
Environmental hazards:	None known
Bulk transport:	Transported by dump truck or semi-truck in bulk
Special precautions:	None

Section 15 – Transport Information

Safety:	Not regulated, but pesticide and pathogen free
Health:	Not regulated, but pesticide and pathogen free
Environmental:	Not regulated, but pesticide and pathogen free

Section 16 – Additional Information

The information provided in this Safety Data Sheet (SDS) is correct to the best of our knowledge and information available at the time of its publication and updates. Information provided is to be utilized only as guidance for safe handling, use, processing, storage, transportation, disposal, and release of this material. Is it not to be considered a warranty or quality assurance or specification. This SDS relates only to Indianhead Soil Shield produced at the above-mentioned site in St. Augustine, Florida and may not be valid when used in combination with any other materials or in any process, unless specified in the above text.

This SDS was last updated: 1/24/25

From: Ingram, David <David.Ingram@fda.hhs.gov>
Sent: Friday, December 10, 2021 12:50 PM

Mr. Villaverde–

I have been able to evaluate the documentation you provided (attached) :

1) Permit Number: FLAB03976 – Florida Department of Environmental Protection for the "Class AA Treatment" of biosolids via Modified Static Aerobic Pile method (Which meets EPA 503 treatment requirements for production of Class A treated product).
2) Recent laboratory results (Midwest Laboratories, Inc. Report # 21-179-4102) of a batch of your biosolids-based compost - as run through the extensive set of quality and safety tests as stipulated by the United States Composting Council's Seal of Testing Assurance Program (USCC-STA).

My analyses is also supported by the verbal description of your operational parameters at Indianhead Biomass, LLC. as well as the virtual tour of your facility grounds during operation so I could visually confirm the manufacture of your biosolids-based compost product and ask questions appropriate to my observations in real-time.

Based on my observations, conversations about your management and process controls and documentation provided – I am happy to confirm that your biosolids-based compost meets the Produce Safety Rule's requirements under Subpart F for a scientifically validated treatment process to meet 21 CFR Part 112.54(b) and can be labelled as such. In addition, to assist the produce growing community that would like to utilize your product for the production of covered commodities, and be in compliance with the Produce Safety Rule - your label should also contain language that says your compost has been handled, stored and conveyed in a manner to prevent recontamination.

In summary, you are meeting every State and Federal requirements for the production of a "Class A" biosolids-based compost that can be utilized by produce growers in accordance with Subpart F of FDA's Produce Safety Rule.

Thank you and please don't hesitate to reach out to my office if you require any further clarification,

- David

David T. Ingram, Ph.D.
Consumer Safety Officer, Fresh Produce Branch

Center for Food Safety and Applied Nutrition
Office of Food Safety, Division of Produce Safety
5001 Campus Drive
College Park, Maryland 20740

Tel: 240-402-0335
Cell: 202-384-4972
David.Ingram@fda.hhs.gov

FDA

Indianhead Biomass

Food Safety Modernization Act (FSMA) Produce Safety Rule Model Certificate of Conformance for BSAAO that meets 21 CFR §112.54(b)(2)

08/08/2024

Indianhead Biomass soil amendments meet the definition of a treated biological soil amendment of animal origin as defined by the Produce Safety Rule. This product has undergone a scientifically valid treatment process, with appropriate process control monitoring. Process control parameters of time, temperature, moisture, Oxygen and CO2 levels, number and timing of turnings, and carbon to nitrogen ratios were monitored and recorded throughout the treatment process. Appropriate Maturity Index measurements were performed to determine proper curing has been achieved prior to sale.

The process used to achieve this treatment status was:

- **21 CFR §112.54(b)(2)**: Turned (windrow) composting (maintained in aerobic conditions at a minimum of 131°F for 15 days, with a minimum of five turnings, followed by adequate curing).
- Records available upon request

This scientifically valid treatment process, with appropriate process monitoring, conforms to the following microbial standards:

- **21 CFR §112.55(b):** No detectable *Salmonella spp.*, and fecal coliforms <1000 CFU in 1 g (total solids) or 1 mL (if liquid).
    - For *Salmonella spp.*, detection limit 3 MPN in 4 g (total solids) or 4 mL (if liquid is being sampled)

This product has been handled, conveyed, and stored in a manner and location to minimize the risk of contamination by an untreated or in-process biological soil amendment of animal origin. Practices used to minimize contamination risk include:

- Physical separation of in-process product from finished product
- Storm water and runoff were directed away from finished product
- Different equipment was used for handling finished product
    - A separate front loader is used to handle finished product compared to starting product

Name	Title	Date
[signature]	Manager	8/8/24

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Lab # 70497823 **Report of Analysis** Report Number: 24-211-4111

Account: 46851	JOE WILLIAMS INDIANHEAD BIOMASS 2020 COUNTY ROAD 214 ST AUGUSTINE FL 32084
Date Sampled:	2024-07-17
Date Received:	2024-07-18
Sample ID:	COMPOST

Robert Ferris
Account Manager
402-829-9871

STA Compost

		Analysis (as rec'd)	Analysis (dry weight)	Total content, lbs per ton (as rec'd)
NUTRIENTS				
Nitrogen				
Total Nitrogen	%	0.55	0.81	11.0
Organic Nitrogen	%	0.54	0.79	10.7
Ammonium Nitrogen	%	0.005	0.007	0.1
Nitrate Nitrogen	%	0.01	0.01	0.2
Major and Secondary Nutrients				
Phosphorus	%	0.44	0.65	8.8
Phosphorus as P2O5	%	1.01	1.50	20.2
Potassium	%	0.13	0.19	2.6
Potassium as K2O	%	0.16	0.24	3.2
Sulfur	%	0.17	0.25	3.4
Calcium	%	1.94	2.87	38.8
Magnesium	%	0.17	0.25	3.4
Sodium	%	0.050	0.074	1.0
Micronutrients				
Iron	ppm	2390	3539	4.8
Manganese	ppm	45.2	67	----
Boron	ppm	< 100	----	----
OTHER PROPERTIES				
Moisture	%	32.47		
Total Solids	%	67.53		1350.6
Organic Matter	%	9.12	13.51	182.4
Ash	%	58.20	86.18	1164.0
Total Carbon	%	7.39	10.94	
Chloride	%	< 0.01	----	
pH		7.0		
Conductivity 1:5 (Soluble Salts)	mS/cm	0.93		

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Lab # 70497823 **Biological & Physical Properties** Report Number: 24-211-4111

Account: 46851	JOE WILLIAMS INDIANHEAD BIOMASS 2020 COUNTY ROAD 214 ST AUGUSTINE FL 32084
Date Sampled:	2024-07-17
Date Received:	2024-07-18
Sample ID:	COMPOST

Robert Ferris
Client Service Representative
402-829-9871

STA Compost

	Analysis (as rec'd)	Analysis (dry weight)	Units	Detection Limit	Method
Biological Properties					
Germination	100		%	1	TMECC 05.05A
Germination Vigor	100		%	1	TMECC 05.05A
CO_2 OM Evolution	0.75		$mgCO_2$-C/gOM/day	0.01	TMECC 05.08B
CO_2 Solids Evolution	0.19		$mgCO_2$-C/gTS/day	0.01	TMECC 05.08B
Fecal Coliform		< 0.2	mpn/g	0.2	EPA 1681
Salmonella		< 1.2	mpn/4g	1.2	TMECC 07.02
Stability Rating	Stable		N/A	N/A	TMECC 05.08B
Physical Properties					
Bulk Density (Loose)	1281		lbs/cu yard	1	WT/VOL
Bulk Density (Packed)	1803		lbs/cu yard	1	WT/VOL
Film Plastics	n.d.		%	0.1	TMECC 03.08
Glass Fragments	n.d.		%	0.1	TMECC 03.08
Hard Plastics	n.d.		%	0.1	TMECC 03.08
Metal Fragment	n.d.		%	0.1	TMECC 03.08
Sharps	absent		---	0.1	TMECC 03.08
Max. Particle Length		0.5	inches	N/A	TMECC Sieve
Sieve % Passing 3"		100	%	0.01	TMECC Sieve
Sieve % Passing 2"		100	%	0.01	TMECC Sieve
Sieve % Passing 1.5"		100	%	0.01	TMECC Sieve
Sieve % Passing 1"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/4"		100	%	0.01	TMECC Sieve
Sieve % Passing 5/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 1/4"		100	%	0.01	TMECC Sieve

Compost Results Interpretations
Page 1

Report #: 24-211-4111
DATE RECEIVED: 2024-07-18

Organic Matter %

9.12 As Received
13.51 Dry Weight

Greater than 20% indicates a desirable range for compost on a dry weight basis.

Compost is a significant source of Organic Matter, which is an important supplier of carbon. Organic Matter improves soil and plant efficiency by improving soil physical properties, providing a source of energy to beneficial organisms, and enhancing the reservoir of soil nutrients.

C/N Ratio

13.4:1

20-30 indicates an ideal range for the initial compost process.
10-20 indicates an ideal range for a finished compost.

All organic matter is made up of substantial amounts of carbon with lesser amounts of nitrogen. The balance of these two elements is called the Carbon/Nitrogen Ratio. For the best performance, the compost pile requires the correct proportion of carbon for energy and nitrogen for protein production. If the C:N ratio is too high (excess carbon) decomposition slows down. If the C:N ratio is too low (excess Nitrogen) the compost pile could be difficult to manage.

Moisture %

32.47

<35% = Indicates overly dry compost

>55% = Indicates overly wet compost

Moisture Percent is the measure of water present in the compost and expressed as a percentage of total weight. Moisture present affects handling and transport. Overly dry will be light and dusty while overly wet will be heavy and clumpy. A desirable moisture content of finished compost will range between 40 to 50%.

Compost Results Interpretations

Page 2

Report #:	24-211-4111
DATE RECEIVED:	2024-07-18

Conductivity or Soluble Salts measures the conductance of electrical current in a liquid compost slurry. Excessive soluble salt content in a compost can prevent or delay seed germination and proper root growth. Conductivity analysis is done on a 1:5 basis.

Conductivity 1:5
0.9

Conductivity Level	**Interpretation**
Greater than 10	Very High nutrient content. Use for Ag Applications
5 - 10	High nutrient content. Use for Ag Applications
3 - 5	Higher than desirable for salt sensitive plants, some loss of vigor
0.6 - 3	Desirable range for most plants
0.3 - 0.6	Ideal range for greenhouse growth media
0.0 - 0.3	Very Low: Indicates very low nutrient status: plants may show deficiencies.

Compost Results Interpretations
Page 3

Report #: 24-211-4111
DATE RECEIVED: 2024-07-18

pH Value

7.0

0 to 14 scale with 6 to 8 as normal pH levels for compost

A pH in the 6 to 8 pH range indicates a more mature compost

pH measures the acidity or alkalinity of the compost, and is a measurement of the hydrogen ion activity of a soil or compost on a logarithmic scale. The pH scale ranges from 0 to 14 and 7 indicates a neutral pH. Growing media with a higher pH or pH greater than 7 can benefit from a compost that has a more acidic pH or pH below 7. This type of application will possibly lower the soil pH making the soil more conducive to plants that thrive in a more acidic soil condition.

Nutrient Index (Ag Index)

>10

The Nutrient Index normally runs between 1 and 10.

The Nutrient Index is obtained by dividing the total nutrients (N,P,K) by the amount of salt (Sodium and Chloride). The higher the Nutrient Index the less chance of having a toxic buildup of Sodium (salt) in the soil.

AG INDEX CHART

salt injury possible	*use on soils with excellent drainage characteristics, good water quality and low salts*				*you may use on soils with poor drainage, poor water quality, or high salts*					*for all soils*
1	2	3	4	5	6	7	8	9	10	> 10

Nutrients (N+P205+K20)

2.55 Average Nutrient Content Dry Weight <2 = Low, >5 = High

0.5-1-0 Rating As Received

The most commonly used compost data is the amount of Nitrogen, Phosphate, and Potash (abbreviated as N,P,K) present and the information is similar to that found in common fertilizers. If a compost result has the rating 1-2-2 it means that the compost has 1% Nitrogen, 2% Phosphate and 2% Potash. Most compost tests will have a average nutrient level (N+P+K) of < 5%.

REPORT NUMBER
24-211-4111

REPORT DATE
Jul 29, 2024

SEND TO
46851

RECEIVED DATE
Jul 18, 2024

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www.midwestlabs.com

ISSUE DATE
Jul 29, 2024

INDIANHEAD BIOMASS
JOE WILLIAMS
2020 COUNTY ROAD 214
ST AUGUSTINE FL 32084

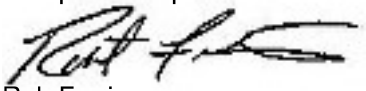
REPORT OF ANALYSIS

For: (46851) INDIANHEAD BIOMASS
STA Compost

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **COMPOST** Lab Number: **70497823** Date Sampled: **2024-07-17 1200**							
Cadmium (total)	< 0.50	< 0.50	mg/kg	0.50	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Chromium (total)	4.75	7.03	mg/kg	1.00	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Mercury (total)	< 0.05	0.07	mg/kg	0.05	EPA 7471	Mab7-2024/07/26	trh1-2024/07/29
Lead (total)	5.7	8.5	mg/kg	5.0	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Molybdenum (total)	< 1.0	< 1.0	mg/kg	1.0	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Nickel (total)	2.3	3.4	mg/kg	1.0	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Selenium (total)	< 10.0	< 10.0	mg/kg	10.0	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Zinc (total)	91.0	134.8	mg/kg	2.0	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Copper (total)	24.7	36.6	mg/kg	1	EPA 6010	erw9-2024/07/19	trh1-2024/07/29
Arsenic (total)	1.50	2.23	mg/kg	0.5	EPA 6020	jdg9-2024/07/22	trh1-2024/07/29

ppm = parts per million, ppm = mg/kg, ppm = mg/L

For questions please contact:



Rob Ferris
Account Manager
rferris@midwestlabs.com (402)829-9871

SUBFORM NUMBER: 5258856

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ORDER NUMBER: 259416

PAGE: 1

ACCOUNT NO: 46851
INDIANHEAD BIOMASS
JOE WILLIAMS
2020 COUNTY ROAD 214
ST AUGUSTINE, FL 32084

SAMPLE DESCRIPTION: STA Compost

COPY TO:

70497823-823
Samples: 1 Page: 1/2
Shannan Trudell
2024 07 18 09:44

PO NUMBER:

Automatic Order Submittal Form

PLACED BY: Cole C Parsons

	SAMPLE ID	DATE/TIME SAMPLED	MATRIX	TESTS REQUESTED	CONTAINER COUNT	COMMENTS
1	Compost	7/17/24 12:00PM		STA Compost	1	70497823
2						
3						
4						
5						
6						
7						
8						
9						
10						

Sampled by: (Signature)	Temp on Arrival	Cooler arrived intact?	Relinquished by (Signature)	Date/Time	Received by (Signature)
Joe Williams	9.6° A				
Relinquished by (Signature)	**Date/Time**	**Received by (Signature)**	**Relinquished by (Signature)**	**Date/Time**	**Received in lab (by signature)**

CHAIN OF CUSTODY

70497823-823 Samples: 1 Page: 2/2 Shannan Trudell 2024 07 18 09:44

US COMPOSTING COUNCIL

OFFICIAL Seal of Testing Assurance
Compost Sample Chain of Custody Form

STA Laboratory: Midwest Laboratories Tel: (402) 334-7770
Address: 13611 B Street FAX:
Email:
City, State Zip code: Omaha, NE 68144

Client/Reporting Company: Indianhead Biomass Tel: (904) 342-5511
Contact Name: Joe Williams FAX:
Billing Address: 2020 CR 214 Email: wshecky@yahoo.com
City, State Zip code: St. Augustine, FL 32084

Send Results to: Indianhead Biomass
City, State Zip code: Saint Augustine, FL 32084

Name or Source of Sample(s): Compost from Finished Pile
Name of Person(s), Sample Collector(s): Joe Williams, Zach Villanueva

LABORATORY USE ONLY Storage Locations
Freezer ____ Cold Room ____ Storage Shelf ____
Sample Condition: ____
Temperature: ____ Malodor: ____ Moisture: ____

Sample Type: O POINT O COMPOSITE O STRATIFIED O INTERVAL
P.O. Number: ____
USCC Member: O YES O NO

SELECTION OF ANALYSIS. Refer to http://www.tmecc.org/cap/methods.html for details. STA Suite; State DOT Tests (Indicate State); A, B, C – Specify other tests in fields A through C, (e.g., tests required for regulated samples, etc.). **NOTE !** *STA analytical results via the STA Compost Technical Data Sheet and this Chain of Custody form are submitted to STA program management.*

A	B	C

Client Sample ID and Special Instructions	1. List Feedstocks 2. Check all that apply 3. List % by volume. (Optional)	Collection Date/Time	Sample Matrix	Composting Operation Type	Shipping Temperature	Indicate Compost Analysis Requirements (*Identify state)	LAB USE ONLY Job Number & Sample Status
Compost	X Green waste; ___ Manure; ___ Food; X Biosolids; ___ MSW; X Wood; ___ Carcass; ___ Fish Waste; ___ Grease, Fats	Date: 7/17/24 Time: 12:00 PM Initials: ZV	Compost O; Feedstock O; Mulch O; ____ O; ____ O	Windrow O; Static pile ⊘; In-Vessel O; ____ O; ____ O	Ambient O; Wet Ice ⊘; Dry Ice O	STA Suite; State DOT Identify State: ____; A; B; C	

INFORM THE STA LABORATORY AND SPECIFY THE REQUIRED LABORATORY TESTS WHEN SUBMITTING REGULATED COMPOST SAMPLES (please use spaces A, B and C provided above).

PLEASE PROVIDE SPECIFIC FEEDSTOCK AND OPERATIONAL DETAIL IN THE SPACE PROVIDED.
YOUR VOLUNTEERED INFORMATION PROVIDES USCC STANDARDS AND PRACTICES COMMITTEE WITH CRUTIAL DATA NEEDED TO BETTER UNDERSTAND THE COMPOSTING PROCESS AND COMPOST END USES.

Releasing Signature 1	Joe Williams	Date 7/17/24	Time 2:00 PM	Receiving Signature 1		Date	Time
Releasing Signature 2		Date	Time	Receiving Signature 2		Date	Time
Releasing Signature 3		Date	Time	Receiving Signature 3		Date	Time
Releasing Signature 4		Date	Time	Receiving Signature 4		Date	Time

US Composting Council
Seal of Testing Assurance®

Indianhead Biomass
Joe Williams
2020 County Rd #214
St. Augustine, FL 32084
904-806-0187

Product Name: **COMPOST**
Sample Date: 7/17/2024

COMPOST TECHNICAL DATA SHEET

LABORATORY: Midwest Laboratories, Inc. 13611 B St. Omaha, NE 68144 (402)334-7770 ph (402)334-9121 fax

Compost Parameters	***Reported as (units of measure)***	***Test Results***	***Test Results***
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	Total N	0.55	0.81
Phosphorus	P_2O_5	1.01	1.50
Potassium	K_2O	0.16	0.24
Calcium	Ca	1.94	2.87
Magnesium	Mg	0.17	0.25
Moisture Content	%, wet weight basis	32.47	
Organic Matter Content	%, dry weight basis		13.51
pH	pH units	7.0	
Soluble Salts *(electrical conductivity EC_5)*	mS/cm	0.93	
Particle Size	% < 9.5 mm (⅜ in.), dw basis		100
Stability Indicator *(respirometry)*	mg CO2-C/g OM/day mg CO2-C/g TS/day	0.75 0.19	
Maturity Indicator (bioassay) Percent Emergence Relative Seedling Vigor	 average % of control average % of control	 100 100	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a) *(Salmonella > 3 mpn/4g)*	PASS	
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	PASS	

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

Directions for Product Use:

NOTE: The USCC does not assess whether or not, or to what extent, these directions are sound, sufficient or otherwise appropriate. It is the participant's responsibility alone to ensure that they are.

Compost Ingredients:

This compost product has been sampled and tested as required by the Seal of Testing Assurance Program of the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by calling Indianhead Biomass, LLC at 904-806-0187 referencing MWL report 24-211-4111. The USCC makes no warranties regarding this product or its contents, quality, or suitability for any particular use.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing Assurance Program, or the program in general, log on to the US Composting Council's website at www.compostingcouncil.org.

Compost Technical Data Sheet

STA Certified™ COMPOST
A program of the US Composting Council

Directions For Use

For plant media and bedding: Compost may be blended with another medium (sand, mulch, dirt, topsoil, etc.) or used directly. Determine intended moisture needs of desired plant. Fill beds with compost or blended media. Plant vegetation or seeds in the media and water as per direction of the plant.

For erosion control: For best results, do not apply compost prior to heavy rains to avoid washout. Spread compost to desired thickness (recommended minimum thickness ½-inch) across the area to control erosion. Flatten and level area. Optional: apply seeds before or after compost if desiring vegetative growth. Water as per needs of the vegetation.

Compost Feedstock

This compost product is made from the following feedstock(s): Green waste including tree branches and trunks, yard clippings, land clearing debris, and Biosolids.

US Composting Council

USCC Factsheet: Compost and Its Benefits[1]

What is Compost?

Compost is the product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth. Compost bears little physical resemblance to the raw material from which it originated.

Compost is an organic matter resource that has the unique ability to improve the chemical, physical, and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer.

How is Compost Produced?

Compost is produced through the activity of aerobic (oxygen-requiring) microorganisms. These microbes require oxygen, moisture, and food in order to grow and multiply. When these factors are maintained at optimal levels, the natural decomposition process is greatly accelerated. The microbes generate heat, water vapor, and carbon dioxide as they transform raw materials into a stable soil conditioner. Active composting is typically characterized by a high-temperature phase that sanitizes the product and allows a high rate of decomposition, followed by a lower-temperature phase that allows the product to stabilize while still decomposing at a lower rate. Compost can be produced from many "feedstocks" (the raw organic materials, such as leaves, manures or food scraps). State and federal regulations exist to ensure that only safe and environmentally beneficial composts are marketed.

Benefits of Compost and its Effects on Soils and Plants

Thanks to its many attributes, compost is extremely versatile and beneficial in many applications. Compost has the unique ability to improve the properties of soils and growing media physically (structurally), chemically (nutritionally), and biologically. Although some equate the benefit of compost use to lush green growth, caused by plant-available nitrogen, the real benefits of using compost are long-term and related to its organic matter content.

Benefits of Using Compost

- Improves the soil structure, porosity, and density, thus creating a better plant root environment.
- Increases infiltration and permeability of heavy soils, thus reducing erosion and runoff.
- Improves water holding capacity, thus reducing water loss and leaching in sandy soils.
- Supplies a variety of macro and micronutrients.
- May control or suppress certain soil-borne plant pathogens.
- Supplies significant quantities of organic matter.
- Improves cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use.
- Supplies beneficial microorganisms to soils and growing media.
- Improves and stabilizes soil pH.
- Can bind and degrade specific pollutants.

Physical Benefits

Improved Structure

Compost can greatly enhance the physical structure of soil. In fine-textured (clay, clay loam) soils, the addition of compost will reduce bulk density, improve friability (workability) and porosity, and increase its gas and water permeability, thus reducing erosion. When used in sufficient quantities, the addition of compost has both an immediate and long-term positive impact on soil structure. It resists compaction in fine-textured soils and increases water holding capacity and improves soil aggregation in coarse-textured (sandy) soils. The soil-binding properties of compost are due to its humus content. Humus is a stable residue resulting from a high degree of organic matter decomposition. The constituents of the humus act as a soil 'glue,' holding soil particles together, making them more resistant to erosion and improving the soil's ability to hold moisture.

Moisture Management

The addition of compost may provide greater drought resistance and more efficient water utilization. Therefore, the frequency and intensity of irrigation may be reduced. Recent research also suggests that the addition of compost in sandy soils can facilitate moisture dispersion by allowing water to more readily move laterally from its point of application.

Chemical Benefits

Modifies and Stabilizes pH

The addition of compost to soil may modify the pH of the final mix. Depending on the pH of the compost and of the native soil, compost addition may raise or lower the soil/compost blend's pH. Therefore, the addition of a neutral to slightly alkaline compost to an acidic soil will increase soil pH if added in appropriate quantities. In specific conditions, compost has

[1] Excerpted from the Field Guide to Compost Use, ©2001 The United States Composting Council

been found to affect soil pH even when applied at quantities as low as 10-20 tons per acre. The incorporation of compost also has the ability to buffer or stabilize soil pH, whereby it will more effectively resist pH change.

Increases Cation Exchange Capacity

Compost will also improve the cation exchange capacity of soils, enabling them to retain nutrients longer. It will also allow crops to more effectively utilize nutrients, while reducing nutrient loss by leaching. For this reason, the fertility of soils is often tied to their organic matter content. Improving the cation exchange capacity of sandy soils by adding compost can greatly improve the retention of plant nutrients in the root zone.

Provides Nutrients

Compost products contain a considerable variety of macro and micronutrients. Although often seen as a good source of nitrogen, phosphorous, and potassium, compost also contains micronutrients essential for plant growth. Since compost contains relatively stable sources of organic matter, these nutrients are supplied in a slow-release form. On a pound-by-pound basis, large quantities of nutrients are not typically found in compost in comparison to most commercial fertilizers. However, compost is usually applied at much greater rates; therefore, it can have a significant cumulative effect on nutrient availability. The addition of compost can affect both fertilizer and pH adjustment (lime/sulfur addition). Compost not only provides some nutrition, but often makes current fertilizer programs more effective.

Biological Benefits

Provides Soil Biota

The activity of soil organisms is essential in productive soils and for healthy plants. Their activity is largely based on the presence of organic matter. Soil microorganisms include bacteria, protozoa, actinomycetes, and fungi. They are not only found within compost, but proliferate within soil media. Microorganisms play an important role in organic matter decomposition which, in turn, leads to humus formation and nutrient availability. Microorganisms can also promote root activity as specific fungi work symbiotically with plant roots, assisting them in the extraction of nutrients from soils. Sufficient levels of organic matter also encourage the growth of earthworms, which through tunneling, increase water infiltration and aeration.

Suppresses Plant Diseases

Disease incidence on many plants may be influenced by the level and type of organic matter and microorganisms present in soils. Research has shown that increased population of certain microorganisms may suppress specific plant diseases such as pythium and fusarium as well as nematodes. Efforts are being made to optimize the composting process in order to increase the population of these beneficial microbes.

Additional Benefits of Compost

Some additional benefits of compost have been identified, and has led to new uses for it. These benefits and uses are described below.

Binds Contaminants

Compost has the ability to bind heavy metals and other contaminants, reducing both their leachability and absorption by plants. Therefore, sites contaminated with various pollutants may often be improved by amending the native soil with compost. The same binding affect allows compost to be used as a filter media for storm water treatment and has been shown to minimize leaching of pesticides in soil systems.

Degrades Compounds

The microbes found in compost are also able to degrade some toxic organic compounds, including petroleum (hydrocarbons). This is one of the reasons why compost is being used in bioremediation of petroleum contaminated soils.

Wetland Restoration

Compost has also been used for the restoration of native wetlands. Rich in organic matter and microbial population, compost and soil/compost blends can closely simulate the characteristics of wetland soils, thereby encouraging the re-establishment of native plant species.

Erosion Control

Coarser composts have been used with great success as a mulch for erosion control and have been successfully used on sites where conventional erosion control methods have not performed well. In Europe, fine compost has been mixed with water and sprayed onto slopes to control erosion.

Weed Control

Immature composts or ones which possess substances detrimental to plant growth (phytotoxins), are also being tested as an alternative to plastic mulches for vegetable and fruit production. While aiding in moisture conservation and moderating soil temperatures, immature composts also can act as mild herbicides.

A Bright Future

With these many benefits and its myriad of applications, from the traditional growing of plants to novel uses in stormwater management and climate change mitigation, the production and use of compost has a bright future indeed!

US Composting Council
www.compostingcouncil.org

About the USCC: The United States Composting Council (USCC) is a national not-for-profit organization dedicated to the development, expansion and promotion of the composting industry. For more information visit www.compostingcouncil.org

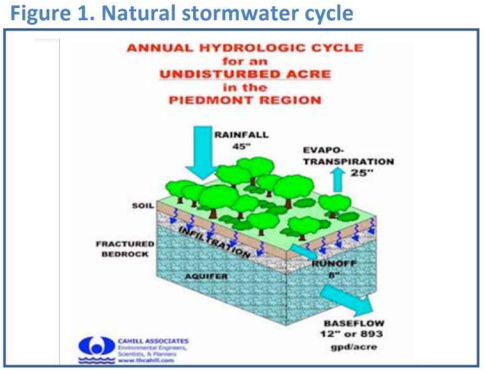
US Composting Council

USCC factsheet:

Using Compost in Stormwater Management

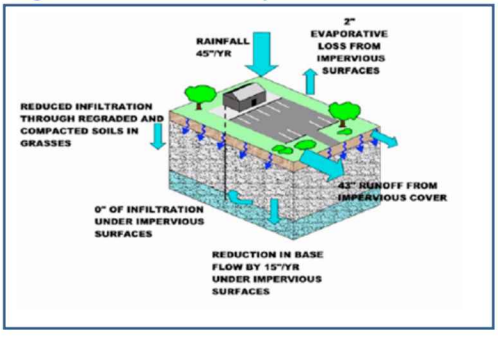
Precipitation falling on the Earth and flowing over and through the soil is a major source of water pollution. While the precipitation is natural, what happens to it after it falls is dramatically affected by human activity. For example, in the Piedmont Region of Pennsylvania, of the 45" of rain that falls during the average year, 25" would be expected to be returned to the atmosphere by vegetative evapotranspiration, 12" would infiltrate deeper into the ground, and only 8" would runoff over the surface. Yet after development, as much as 95% might leave as surface runoff (PA DEP, 2006).

Figure 1. Natural stormwater cycle



Increased runoff leads to increased erosion, more frequent and more intense flooding, habitat and species loss, higher pollutant loads, and water quality degradation. While the emphasis in stormwater management over the past 50 years has been on "peak rate" control, that is, detaining stormwater so that the highest rate of flow was no more that what would have been expected before the development (hence the ubiquitous detention basins in modern landscapes), there is a paradigm shift underway that recognizes that the most effective storm water management will be one that attempts to emulate natural processes. Thus management practices that emphasize the roles of soils and plants are gaining prominence. These practices are enhanced, and often even depend, on the incorporation of good quality compost into the practice.

Figure 2. Effect of development on stormwater



Stormwater management practices that utilize compost.

Stormwater management is generally segregated into two divisions, construction and post-construction. While construction practices have a greater impact in the short term, the post-construction design and implementation will continue to have impacts for decades. The move to reduce the environmental impact of development is called low-impact development, or LID. LID is defined as design and implementation of post-construction storm water hydrology that mimics pre-development patterns[1]. LID management practices seek to reduce both peak flow rates and runoff volume by slowing flows and increasing infiltration thereby decreasing pollutant loads entering water bodies. Incorporating compost into these practices can dramatically lower runoff volume due to improved water holding capacity, healthy vegetation/biomass, and increased infiltration.

LID Stormwater practices that include or benefit from the use of compost include:

Rain gardens and/or Bioretention Systems[2]

Figure 3. A rain garden in Maplewood, MN

[1] A good source of information on LID is the Low Impact Development Center, http://www.lowimpactdevelopment.org/

[2] A general description of this and other stormwater BMPs can be found at the EPA Menu of BMPs: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm.

A rain garden is a landscaped feature designed to treat on-site stormwater runoff. Not only is it highly effective at removing pollutants, it decreases total stormwater entering the storm drain system and does so in an esthetically pleasing manner. Sometimes called bioretention or bioinfiltration beds, they are growing in popularity throughout the country. They typically feature native plants, several inches of wood mulch, and a planting mix that includes 20-30% compost.[3]

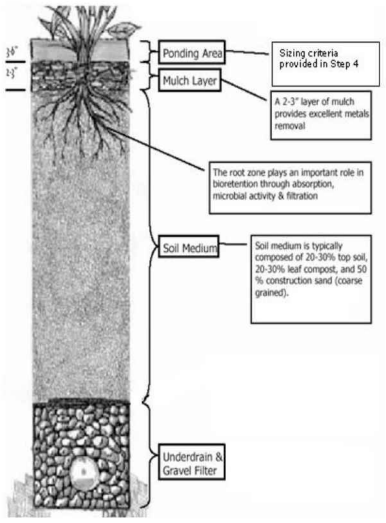


Figure 4. Section of a rain garden

Infiltration zones (including lawns, basins, filter strips, trenches, and others)

As noted above, under natural conditions a considerable amount of precipitation would typically infiltrate into the ground rather than run off over the surface. Once below the surface it either is taken up by plants or percolates further into the ground. In order to emulate that process stormwater designers are incorporating infiltration in many areas of the landscape. Some of this infiltration occurs directly in subsurface layers, being conveyed there through piping or via pervious surfaces, such as porous concrete. Other practices infiltrate the water through turf or other vegetation. For any vegetated infiltration practice to be effective for the long term it must be based on soil that is as healthy as possible. While there are many factors affecting soil health and quality, "the most critical factor is maintaining organic matter levels and carbon cycling through the soil" (Bierman,1998).

Even though soil organic matter is dynamic in nature, with constant additions and decay, having an initial adequate level of soil organic matter is the best way to assure long-term sustainability of a vegetated infiltration area. In many, if not most, situations, adding compost to the soil will be the most efficient way to achieve that minimum organic matter content.

The most aggressive example of this has been in the Pacific Northwest, home to the Soils for Salmon movement. They have been successful in instituting a post-construction soil standard that requires a minimum organic matter content in the soil of 5%. As stated in the introduction to the standard, "Healthy soil provides important stormwater management functions including efficient water infiltration and storage, adsorption of excess nutrients, filtration of sediments, biological decomposition of pollutants, and moderation of peak stream flows and temperatures. In addition, healthy soils support vigorous plant growth that intercepts rainfall, returning much of it to the sky through evaporation and transpiration" (WA DOE, 2005).

Vegetated/green roofs

Vegetated roofs, or green roofs, are another growing LID practice with the potential for huge environmental benefits. The organization Green Roofs for Healthy Cities lists over 50 public and private benefits that may be attributed to green roofs[4]. With regards to stormwater, unlike metal or asphalt roofs that can contribute to thermal and chemical water pollution, green roofs can significantly reduce total stormwater as well as improve the quality of the water. A mature compost is often included in the growing media component of a green roof. In order to meet the exacting specifications for the media, including weight, porosity, and stability, compost usually makes up 10-15% of the total volume.

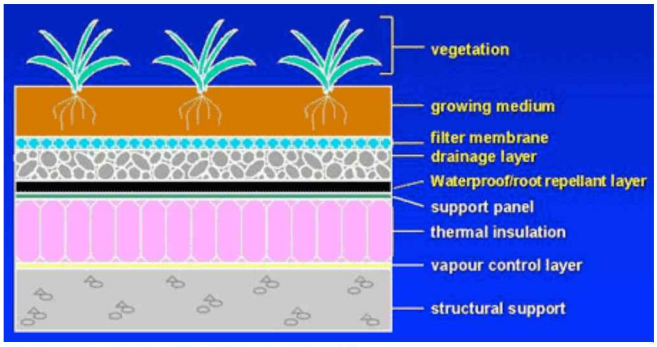


Figure 5. Layers of a vegetated roof

[3] A general design specification for rain gardens and other low-impact practices can be found at http://www.lid-stormwater.net/intro/homedesign.htm

[4] Visit http://www.greenroofs.org/ for more details about vegetated roofs.

Compost-based Erosion and Sedimentation Control Practices

The highest risk of erosion and sedimentation is while a project is under construction, especially in the beginning phases while the most earth-moving is going on. Without a protective "skin" of organic matter (both living and decaying) soils are easily erodible, with some variability depending on soil type and slope. Soil loss from construction sites can be 200 times that of forest lands, and 10 to 20 times that of agricultural lands (GA S&W Cons. Comm, 2002). Once pollutants, whether simply silt or specific contaminants, are picked up by water it is difficult to keep them from moving downstream. Therefore practices that prevent erosion are much more effective at preventing pollution than those that attempt to clean water after it has already gained a load of pollutants.

Preventing erosion with a compost blanket.

Figure 6. Applying a compost blanket in PA (photo credit: D. Caldwell)

Many studies have shown that compost can be highly effective for reducing and preventing erosion on an exposed slope.[5] Unlike most other stormwater BMPs compost has significant water holding capacity, so that low-to-medium intensity and duration rain events may produce no runoff at all (Persyn et al, 2004). Those that do produce runoff produce less, take longer before runoff starts and longer to reach peak flow (Glanville et al, 2003). Using compost of low nutrient value has the added benefit of releasing less phosphorous and nitrogen than hydroseeding, hydromulching, and seeded straw mulches, all common form of erosion prevention (Faucette et al, 2005). Compost not only helps prevent erosion immediately upon application, it also provides an effective substrate for seed growth, conserving moisture, suppressing weeds and providing slow release nutrients to support the establishment of vegetation, thus providing long term erosion prevention (Faucette et al, 2005). Compost blankets have a lower "C" factor compared to hydroseeding or rolled erosion control blankets, estimated to between .02 and .05, compared to .1 to .2 for competing practices.[6]

As of 2006 at least 32 state transportation departments, plus many Federal and local agencies, have adopted this as a best management practice. Generally these specifications are based on the generic one adopted by the American Association of State Highway and Transportation Officials (AASHTO) as MP-10, a version of which can be found at http://compostingcouncil.org/pdf/Erosion_Specs.pdf. These specifications take soil erodability and rainfall patterns into account to determine the proper depth of the blanket.

Although listed here as a construction practice, compost blankets are commonly seeded, becoming part of the post-construction landscape. At that point they are also acting as an infiltration practice as well as an erosion-prevention practice, reducing and delaying runoff and maintaining a vegetative cover on the soil.

David M. Crohn, Biosystems Engineering Specialist for the University of California Cooperative Extension, summarized how compost helps prevent erosion:

- Protecting the soil from the energy of falling rain
- Absorbing moisture
- Promoting infiltration
- Encouraging soil aggregate formation
- Promoting plant growth (Crohn, 2006)

Sediment Control – Filtering stormwater at a construction site

While preventing erosion is always the first choice, it is not always possible, and compost has also proved to be effective at filtering stormwater pollutants originating from construction sites. Typically this is done at the perimeter of the site, around storm inlets, and in storm

[5] For a good review of the research see Faucett et al, Evaluation of stormwater from compost and conventional erosion control practices in construction activities, in Journal of Soil and Water Conservation, v. 60 no. 6:288-297

[6] C refers to the Cover factor in the Revised Universal Soil Loss Equation, and is commonly used to compare effectiveness of different practices. C factors for compost and rolled erosion control blankets, Filtrexx Tech Link # 3303

channels. Both freestanding berms made of compost and compost "socks" (long tubes constructed of open weave or knit fabric and filled with composted mulch) have surpassed the traditional practices of silt fence and hay bales at reducing the pollutant loads of construction stormwater. Unlike the traditional practices, which work primarily as temporary stormwater detention devices allowing solids to settle out of the water, the berms and socks act as both detention and as true filters, removing not only the settleable solids but a significant percent of suspended solids as well as nutrients and hydrocarbons (Faucette, 2006). Berms have the advantages of a wide "footprint" with intimate soil contact that all but eliminates undercutting and very low disposal and cleanup costs, but have the disadvantages of lack of visibility in active construction zones and poor performance in direct flows. Socks have the advantages of visibility and ability to function in concentrated flows but slightly higher disposal costs.

Figure 7. Installing a 24" Filtrexx SiltSoxx. Photo by Cary Oshins

Researchers from Filtrexx International, a leader in developing compost-based stormwater water practices, and the independent Soil Control Lab, found that based on 45 tests of compost filter media the mean total solids removal was 92%, mean suspended solids removal was 30%, mean turbidity reduction was 24%, and mean motor oil removal rate was 89% (Faucette et al, 2006b). Moreover, the researchers found that by adding polymers to the filter media, removal efficiencies could be improved, sometimes dramatically. For example, turbidity reduction was increased from 21% to more that 77%, and soluble phosphorous removal increased from 6% to a remarkable 93%.

Continuing research has found a number of other applications for the compost socks. They have been used to construct sediment traps, sediment basins, ditch checks, water diversions, and streambank protectors. The key to the success of these practices is to understand the material used to fill the socks and how it functions—as filter media, growth media, or both. Especially if the device will be used as a filter, there needs to be a balance of pore space to allow water to pass through and surface area to trap pollutants. The material must be well stabilized so it does not release nutrients. Various states and agencies are developing specification for this material, and private providers of these systems, such as Filtrexx International, have detailed specifications to meet their certification standards.

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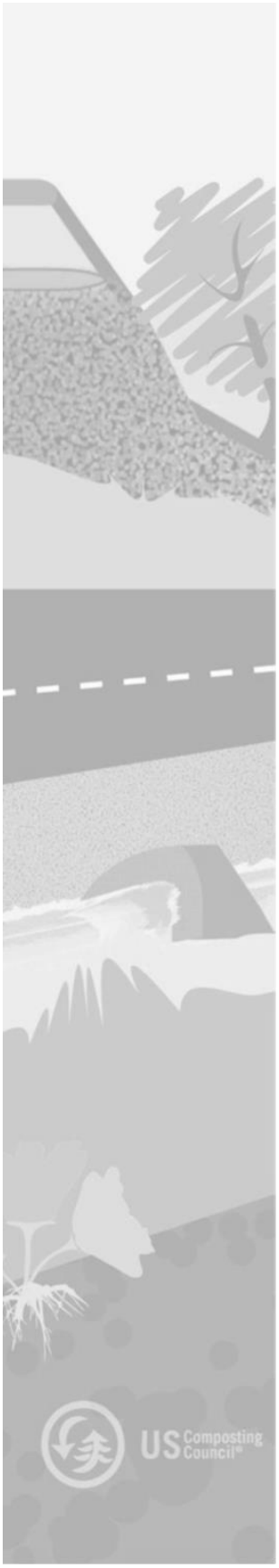
About the USCC: The United States Composting Council (USCC) is a national not-for-profit organization dedicated to the development, expansion and promotion of the composting industry. For more information visit www.compostingcouncil.org

COMPOST
THE SUSTAINABLE SOLUTION
SOIL WATER PLANTS US Composting Council

Increasing Soil Organic Matter with Compost



"Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together." Charles E. Kellogg, USDA Yearbook of Agriculture, 1938

The addition of compost to the soil will improve any soil's physical, chemical and biological properties; yielding healthier soil, plants, turfgrass, trees and shrubs, helping to reduce project costs. Compost is a great source of **Soil Organic Matter**, which offers a variety of benefits proclaimed by university research, actual field use and even regulatory agencies.

Essentially, amending soil with compost enhances the growth of ALL plant life, because the soil that they live in is improved and healthier!

AAPFCO (Association of American Plant Food Control Officials) consists of state Department of Agriculture officials from across the US. They regulate all claims made by compost manufacturers on product labels, literature and websites (subject to individual state approval). The following list, from their **Rules and Regulations for Bulk Compost**, has been **accepted as valid for the benefits of compost:**

- Improves soil structure and porosity – creating a better plant root environment
- Increases moisture infiltration and permeability, and reduces bulk density of heavy soils, improving moisture infiltration rates and reducing erosion and runoff
- **Improves the moisture holding capacity of light soils – reducing water loss and nutrient leaching, and improving moisture retention**
- Improves the cation exchange capacity (CEC) of soils
- **Supplies Organic Matter**
- Aids the proliferation of soil microorganisms
- Supplies beneficial microorganisms to soils and growing media
- Encourages vigorous root growth
- Allows plants to more effectively utilize nutrients, while reducing nutrient loss by leaching
- Enables soils to retain nutrients longer
- Contains humus – assisting in soil aggregation, making nutrients available for plant uptake
- Buffers soil pH

Compost Benefits: Beyond the plants!

The benefits outlined above are typically regarded as aids to **Plant Growth**, but they are far more than that. They also pertain to how compost improves the soil, which impacts overall soil and plant quality, but also water quality and quantity …. And therefore, the environment, and human existence (and quality of life). By adding compost which contains stabilized organic matter to the soil, you are helping the overall health of the soil:

1. Be protected from wind and water erosion
2. Retain larger volumes of water, and
3. Filter out and/or bind contaminants that might be contained in surface water.

These benefits are so important that municipal ordinances, rules and Best Management Practices (BMP) are appearing around the country that requires the addition of organic matter (OM) to the soil. One example is the following ordinance (*see reverse page*) contained in the Denver Water Authority Rules[2]:

Denver Water operating rules that apply to soil amendment and limits on use: Operating Rule 14.02.4. Soil Amendment for Irrigation of Turf at Newly Licensed Premises: Proof of proper soil preparation is required before installation of plant material. Penalties of $1,000 may apply if soil amendment is not completed and approved by Denver Water prior to the installation of plant material. **Proper soil amendment is the equivalent of adding approved compost at a rate of four cubic yards per 1,000 square feet of permeable area, incorporated (rototilled) to a depth of six inches.** *There are other rules and BMPs like this across the country.*

Facts & Benefits: Water use reduction and conservation

1. A University of Illinois study[3] about amending farmland soil with compost produced the following facts:
    - In sandy soils, compost will increase water holding capacity by absorbing water.
    - In high clay content soils, compost will improve aggregation, allowing water to move through soil faster. Following a 2nd application of amendments (i.e., compost) all amended plots increased Plant Available Water by 5 to 45% compared to the control.
    - This would have potentially reduced the average amount of irrigation water needed by 10 to 90%
    - At current prices, a reduction of one irrigation cycle would reduce energy costs by $270 to $620 on a 160 acre system, depending on the energy source used.
2. The Recycled Organics Units of New South Wales in Australia conducted a Life Cycle Analysis of compost[4]:
    [Compost use] reduced irrigation water from increased water holding capacity of 3 to 10%, thereby saving 14,000 to 100,000 gallons/acre/year.

WHY USE COMPOST?
Because amending soil with Compost will significantly reduce water use!

For every 1% increase in organic matter in your soil, you increase water retention at the rate of 3 quarts per cubic foot, OR each increase of 1% OM can increase soil water holding capacity by 27,000 gallons H2O/Acre[6] (this will vary depending on soil type).

Facts & Benefits: Bioremediation

- Bioremediation uses compost to clean and restore contaminated soils by degrading and binding contaminants in soil. The process has been used both in-situ, where compost and other amendments are incorporated into a contaminated soil, and by removing the contaminated soils and adding them to a compost pile[5].

Facts & Benefits: Resource conservation

- Applying just 2" of compost in lieu of the traditional 6" of 'topsoil', which is typically of unknown origin and quality, reduces project material costs by up to 2/3! The compost will provide additional benefits, as described above, that commercial topsoil just cannot offer.

The US Composting Council supports and strongly recommends regular compost testing to insure product quality and safety. The Seal of Testing Assurance Program (STA) is the ONLY nationally recognized compost testing program. Read more about it at: http://compostingcouncil.org/seal-of-testing-assurance/

US Composting Council Seal of Testing Assurance

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http://www.denverwater.org/Conservation/SoilAmendmentProgram/
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http://www.usawaterquality.org/conferences/2007/PPTs&Posters/AgBMPs/Friend.pdf
[4]Sharma G and Campbell A, 2003, Life Cycle Inventory and Life Cycle Assessment for Windrow Composting Systems, Recycled Organics Unit, New South Wales Department of Environment and Conservation, Sydney, NSW, Australia
[5]Summarized from "Innovative Uses of Compost: Bioremediation and Pollution Prevention", USEPA 1997
[6]USDA NCRS Soil Health Key Points, Feb. 2013

Other Useful References

How To: Soil Best Management Practices, Tools, & Specifications
http://www.soilsforsalmon.org/how.htm
Choosing a Soil Amendment
http://www.ext.colostate.edu/pubs/Garden/07235.html
Compost Effect on Water Retention and Native Plant Establishment on a Construction Embankment
http://ars.usda.gov/research/publications/publications.htm?seq_no_115=187864
Landscape Architect Specifications for Compost Use
http://compostingcouncil.org/seal-of-testing-assurance/

Please visit www.compostsolution.org for many more references on the use of compost for increasing soil organic matter and water conservation.

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