



Evaluating the Effects of Using Bio-Organic Catalyst (BOC) on Air Emissions Greenwaste Composting

BioCycle Conference- April, 2013

Purpose of the Discussion

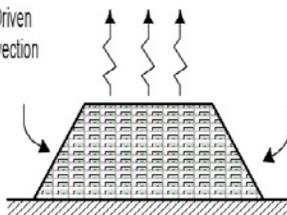
- Present the results of a one-day testing effort designed to determine the effect of a Bio-Organic Catalyst (BOC) on greenwaste windrow composting
- Present air emission assessment technology used
- Discuss the implications of using BOC at compost sites

Technical Approach

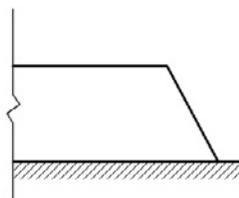
- Two greenwaste piles were constructed at a compost site in the Central Valley, CA, (summer 2012)
- Both windrows were constructed of the same chopped greenwaste and watered
- The piles were treated identically except the test pile was watered on Day 1 with an approx. 1% solution of BOC in the water truck; the other with water only

Mechanically Mixed Windrow

Thermally Driven
Natural Convection



Cross Section



Side Section



Testing Program

- Control and test windrow piles were aged five days (peak emissions in life-cycle)
- Testing included flux measurements using the USEPA flux chamber technology as modified by the SCAQMD for advective flow area sources
- Four flux measurements were made on both test piles; two on top and one on each side accounting for spatial variability

What's A Flux Chamber?

- A flux chamber is a device used for measuring the flux of gas species from an area source
- USEPA Recommended Technology, mixed tank reactor operated at atmospheric pressure and intended for diffusive air flow sources
- SCAQMD has recommended modifications to the USEPA technology for sources at compost facilities (Rule 1133)

SCAQMD Modified USEPA Flux Chamber Technology

- Validation work approved by SCAQMD and published- up to 600 lpm into the flux chamber
- Standard exhaust port replaced with 6" diameter duct- sampling from duct at six duct diameters down stream in the stack
- Internal impellor used at 3 rps and diffusive air inlet ring with 10% helium trace gas



Analytical Menu

- Both windrow piles were sampled for total non-methane non-ethane organic carbon (TNMNEOC or total VOCs) and ammonia
- TNMNEOC was determined by SCAQMD Method 25.3 (Rule 1133)
- Ammonia was determined by ASTM Method D-4490 (colorometric tube detection)
- Advective flow and temperature monitored

Test Results (flux units: mg/m²,min⁻¹)

TEST	VOCs	CH₄	CO₂	NH₃	Advective Flow	Temp
	Flux	Flux	Flux	Flux	(lpm)	(°F)
Control Pile	32.4	0.568	7,763	0.568	13	119
BOC PILE	66.8	4.70	11,479	4.70	17	130

Application and Case Studies of BOC Used on Compost and Other Facilities

- Feedstock piles- greenwaste, biosolids, manure, and food waste
- Compost windrows or beds
- Curing windrows or beds
- Product beds/stockpiles

Summary

- Many or all compost sites and storage facilities may benefit from using the BOC additive
- Limited field and lab data demonstrate that the BOC additive increases the rate of aerobic microbial activity, probably related to increased oxygen transfer
- Antidotal fugitive odor observations indicate increased oxygenated compound release and decreased anaerobic and more odorous compound release, or lower odor emissions
- BOC additive may enhance a variety of compost technologies
- More research is needed to demonstrate shorter life-cycle profiles, changes in total TNMENOC emissions per ton, and lower odor emissions from composting