

HORSE MANURE TREATMENT PROGRAM

Introduction

A proprietary consortium of beneficial, naturally occurring microorganisms were used to treat approximately 100 cubic yards of horse manure mixed with sawdust and straw bedding at an equestrian manor in Rancho Santa Fe, California. The aim of this experiment was to reduce or eliminate the odor being emitted from the manure stockpile. Secondly, we were interested in the degradation of organic matter (similar to aged manure) and a possible decrease in certain constituents and characteristics of the manure. As Rancho Santa Fe is very exclusive suburb near San Diego, and a residential development was completed directly south and adjacent to the equestrian manor, fears of the residential community complaining of the odor problem prompted this pilot study.

Methods

The Bio-Raptor™ process, a patented soil remediation system designed to work in conjunction with U.S. Microbics' proprietary "bugs", was used for this study. The Bio-Raptor™ is a bio-remediation shredder, conveyor, and sprayer system designed for hydrocarbon contaminated soil remediation as well as manure degradation applications.

Initially, on June 16, 1999 25 lbs. of a mixed consortia (blended with diatomaceous earth) was dissolved in a water tanker truck holding 2000 gallons of water. The microbial blend then sat in the water for approximately 4 hours to allow for microbial activation. Manure was then placed onto the Bio-Raptor™ using a front loader. Following the treatment of 100 cubic yards of manure, the manure was spread over the ground to approximately 15 inches.

Sampling was conducted on June 25, 1999 (9 days after initial treatment) to verify measurable parameters of biodegradation. Wallace Labs (El Segundo, CA) completed a total compost analysis. Wallace Labs is a certified laboratory that specializes in soil fertility and structure analysis as well as in the complete analysis of organic soil amendments for fertility and structure (complete analysis in appendix). Fresh manure was used as a control. Odor was measured qualitatively by none other than one of the most sensitive instruments known, the human nose.

Results

The objective of this treatment program, odor control, was reached. Within three days of the first treatment, the classic manure odor had completely disappeared. The treated manure had begun to take on a rich, humus texture. On what exact day the odor disappeared is unknown, however, it can be said that the disappearance of the odor occurred within one week. Measurable biodegradation results appear in the table below and in graphic view.

Parameter	Untreated Manure	Treated Manure	Net Difference
Chemical Oxygen Demand	110,500 mg/kg	37,200 mg/kg	66% reduction
% Organic Matter-dry wt. Basis	63.44%	10.45%	98% reduction
Bulk Density	991 lb/yd ³	1.806 lb/yd ³	45% volume reduction
Ammonium as N (saturated extract)	46.9 mg/kg	2.6 mg/kg	95% reduction
Nitrate as N (saturated extract)	13.9 mg/kg	21.7 mg/kg	36% increase
Sulfate as S (saturated extract)	190.9 mg/kg	157.7 mg/kg	17% reduction
% Total Nitrogen-dry wt. Basis	0.62%	0.21%	93% reduction
Exchangeable ammonium-mg/kg dry wt.	1,487 mg/kg	26 mg/kg	98% reduction
Phosphorus (saturated extract)	114.7 mg/kg	4.3 mg/kg	96 % reduction
Potassium (saturated extract)	1,029.3 mg/kg	657.8 mg/kg	36% reduction
Carbon:Nitrogen ratio	46.5:1	25.8	not applicable



