

SCD Probiotics®

Case Study Summary – SCD Probiotics® for Compost Quality

Composting (CSS-015-16)

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Industry: Composting
Application: Products applied to compost material
Products: Compost material applied with SCD Probiotics product

Highlight

- SCD Probiotics product showed a better performance on compost quality parameters than commercially available composting product

Introduction

Interested researchers would like to clarify the composting parameters in using SCD Probiotics product compared to X Compost. A trial was conducted to verify composting parameters present in composted materials after product application. The objective of the experiment is to compare the composting parameter values after application of two composting products.

The composting parameter values are the guide to successful compost. The Carbon: Nitrogen ratio and pH are the most important parameters to evaluate. The Carbon: Nitrogen (C: N) ratio of the compost mixture determines the most important information; how rich or poor a compost mixture is. This is indicated by the ratio of carbonaceous materials and nitrogen it contains. Therefore, it is called the C: N ratio.

The pH of the compost material is also important because it helps facilitate the process of decomposition. Compost microorganisms operate best under neutral to acidic conditions (pH 5.5 to pH 8). During the initial stages of decomposition, organic acids are formed. The acidic conditions are favorable for growth of fungi and breakdown of lignin and cellulose. During the fermentation of the compost, the organic acids become neutralized. Mature compost generally has a pH of 6.5 to 8.

Methodology

At an accredited lab, samples were brought and the SCD customer did laboratory procedures. Compost materials used in this study included: (a) compost material treated with SCD



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Probiotics product and (b) compost material treated with X Compost. Parameters measured on each compost material included pH, C: N ratio, percentage of organic carbon, total phosphorus content, total potassium content and NPK nutrients present. A series of two tests were done in the lab on different times after composting to verify parameter values.

Results

After a series of two tests, compost materials treated with SCD Probiotics product and X Compost showed composting parameters values accordingly in Table I and II on next pages.

Table I: Composting Parameter Values of the First Trial with SCD Probiotics Product and X Compost.

PARAMETERS	SCD Compost	X Compost
Total Plate Count, cfu/g	2.1×10^4	2.5×10^4
Crude Fat	1.06	1.48
Crude Protein	9.55	11.76
Crude Fiber	2.75	2.44
Ash	37.46	39
Organic Carbon, % w/w	31.66	27.59
Total Nitrogen content, % w/w	2.03	2.25
Total Phosphorous content as P ₂ O ₅ , % w/w	0.81	5.52
Total Potassium content as K ₂ O, % w/w	12.55	3.5
NPK nutrients-total, % w/w	15.39	11.27
C:N ratio	15.60	12.26
pH (1:5 Solution)	7.78	8.31
Conductivity (as ds/M)	25.791	19.453
Arsenic content as As ₂ O ₃ , ppm	5.00	5.00
Cadmium content as Cd, ppm	0.0	0.0
Chromium content as Cr, ppm	22.02	15.0
Copper content, ppm	47.05	49.6
Mercury content as Hg, ppm	<0.1	<0.1
Nickel content as Ni, ppm	0.0	5.4
Zinc content as Zn, ppm	96.1	376
Moisture Content, % w/w	16.99	27.66

To clarify if the sampling was done homogenously because of NPK difference of both products because of first lab test, second test was done (See Table II).



Table II: Composting Parameter Values of the Second Trial with SCD Probiotics Product and X Compost.

PARAMETERS	SCD Compost	X Compost
Total Plate Count, cfu/g	5×10^4	3.9×10^4
Crude Fat	2.55	1.64
Crude Protein	10.94	12.01
Crude Fiber	2.51	2.78
Moisture	15.61	15.87
Ash	39.78	39.43
Nitrogen	1.75	1.92
Potassium	7094.72	7498
Phosphorous	545.63	558.75
Organic Carbon, % w/w	31.29	32.05
Total Nitrogen content, % w/w	2	2.42
Total Phosphorous content as P_2O_5 , % w/w	0.8	1.07
Total Potassium content as K_2O , % w/w	14.69	16.11
NPK nutrients-total, % w/w	17.49	19.59
C:N ratio	15.62	13.26
pH (1:5 Solution)	7.9	8.06
Conductivity (as ds/M)	25.407 ds/M	23.886 ds/M
Arsenic content as As_2O_3 , ppm	5	5
Cadmium content as Cd, ppm	0	0
Chromium content as Cr, ppm	42.96	43.89
Copper content, ppm	59.95	69.82
Mercury content as Hg, ppm	<0.1	<0.1
Nickel content as Ni, ppm	0	0
Zinc content as Zn, ppm	95.9	91.8
Particle Size – Material passing through 4 mm IS Sieve, % w/w	88.4	81.8
Bulk Density, gm/cm ³	0.61	0.64

The composting parameter values found in the study will provide a point of reference in determining good compost quality. In terms of pH, compost material treated with SCD Probiotics product presented better results compared to commercially available products. This is critical since microorganism's activity is best determined at a desired pH value (usually within a range of 5.5 to 8).

Based on the Table III summary from the first trial, SCD Compost was better in terms of organic carbon, NPK and pH. The second test results showed little variation in most parameters except pH, in which SCD Compost showed better value than X Compost. The general significant differences between these two products were not measured in this study.



Table III: Summary of the Parameter Values Measured in First and Second Trials Done with SCD Probiotics Product and X compost.

Description	1 st Results		2 nd Results	
	SCD Compost	X Compost	SCD Compost	X Compost
Organic Carbon, % w/w	31.66	27.59	31.29	32.05
Total Phosphorus content, % w/w	0.81	5.52	0.8	1.07
Total Potassium content, % w/w	12.55	3.5	14.69	16.11
NPK nutrients – Total, % w/w	15.39	11.27	17.49	19.59
pH (1:5 solution)	7.78	8.31	7.9	8.06

Conclusions

In this trial, pH levels on SCD-treated compost material were around 7.7 to 7.9 respectively in the 1st and 2nd trial. This is normal as optimal pH for the best quality compost ranges from 6.5 to 8.0, in contrast with the X Compost that is at 8.06 to 8.31 pH range. Bacterial count in the SCD-treated compost material was higher than the X Compost, this could be seen after the second test was conducted; that is ~100% increase in SCD-treated compost material while in X compost bacterial count increases at ~50% only.

Organic material, specifically carbon, was within range at 31.5 in average for SCD-treated compost material while X Compost had an average of 29.82. Other substances measured with respect to SCD-treated compost material, irrespective of the two tests conducted, were Cadmium which was at 0 ppm (limit is 10 ppm), Nickel at 0 ppm (limit is 200 ppm), Copper at 45-59 ppm (limit is 1000 ppm) and Zinc at 96-95 (limit is 2500 ppm), all under the limits of Standards. The other substances in X Compost, aside from the two tests conducted, were Cadmium at 0 ppm (limit is 10 ppm), Nickel at a range 0 - 5.4 ppm (limit is 200 ppm), Copper at a range of 49.6 - 69.82 ppm (limit is 1000 ppm) and Zinc at 91.8 - 376 (limit is 2500 ppm). Although those are all under the limits of Standards but still there are differences in values when compared to the SCD-treated compost material.

