

Product / Produkt:

Penergetic-g, Penergetic-k

**User / Anwender:**

Beaver Meadow Farm 1971 Ltd.

Application report /

Anwendungsbericht

Adviser / Fachberater:

Planistics Management Ltd.

Heather Pratt

CAN-Vancouver

Date / Datum:

November 17th, 2004 to March, 9th, 2005

Dairy Farm with good results in slurry

Trial was carried out on a heritage dairy farm in Comox on Vancouver Island, B. C. in co-operation with Edgar Smith who with his two brothers holistically manage the 700 acre farm in an environmentally sensitive manner.

Details of operation: 600 dairy cows (350 milking), housed in a sloped concrete floor barn during winter months and fed silage. The barn is flushed out twice per day during the winter with manure water from the 1st lagoon. The effluent flows to a collection pit then is pumped unto a separator where 80% of the particles are removed. The liquid drains into the 1st lagoon and the solid manure is carried away by truck. Overflow of the 1st lagoon flows into a second lagoon which also receives effluent from the milking parlour (chlorine based acid wash, alkaline dairy soap and monthly hydrogen peroxide). A third lagoon collects the overflow from the 2nd lagoon and provides irrigation water for the farm. (Irrigation is done with a mix of 90% spring water (pH 7) and 10% manure water).

The purpose of the trial was to determine whether changes occurred in the atmosphere/condition of the dairy barn (odour reduction), to measure any changes in the nitrogen, ammonia, dissolved oxygen and total suspended particle levels in the liquid slurry and to determine if the solid manure decomposition was accelerated.

Prior to the trial, the 1st lagoon was drained and then filled 2/3rds full (about 1120m³ in volume) with spring water which mixes with the accumulated manure sediment approximately ¾ m deep at the bottom of the lagoon. An initial application of 16.8 kgs of **Penergetic-g** was applied to the lagoon, then (400 LSU x 5 g) 2 kgs per week was applied into the lagoon.

Penergetic-k was mixed with some soil and applied daily to the solid manure when it came off the separator at a dose of 40 g per m³. There was a one month accumulation of untreated solid manure that was collected prior to the trial (October 15th to November 16th) and stored separately.

The trial lasted 16 weeks. Liquid manure samples were taken every Wednesday at 1 pm except for one week during the Christmas holiday when no sample was taken. The slurry lagoon was mixed one hour before the sample was taken and the same sampling procedure was used each time. The lagoon continued to be mixed for one hour after the sample was taken and then a weekly application was applied.

An analysis of total ammonia and nitrate (by ion chromatography) dissolved oxygen (by DO meter) and total suspended solids (TSS-ALPHA2540) was performed by North Island Laboratories.

A soil sample from each of the solid manure piles was taken June 28, 2005 after the piles were turned.

Observations:

- The slurry in the 1st lagoon was homogenous; there was no evidence of solids accumulating on the bottom of the slurry lagoon, the slurry spread consistently with no clogging. The slurry lagoon did not develop a crust.
- The wash water from the lagoon is more liquid with less odour. It did not leave a firm deposit on the barn floor. The barn floors were cleaner.
- The second lagoon was showing evidence of some microbic activity. Small circles of activity were visible over the surface.
- The odour in the barn was consistent throughout to trial. This is an improvement as no increase in odour was evident during the time the cows were housed in the barn.
- One person noticed that the suspended particles in the barn were slightly reduced. Some odour was evident when the slurry was spread on the fields.
- There is now a reduction in flies. This is being monitored to determine whether this is influenced by weather.
- The two manure piles were turned June 27/28th and there was a striking difference. The treated pile was uniform, odorless and well decomposed. The untreated pile, which is older, was only partially decomposed, unconsolidated and gave off a strong ammonia odour.

Test Results:

- Manure water: The ammonia levels fluctuated between 529 and 1360 mg/L with one reading (the second week) registering .07 mg/L. They did not increase but rather stayed in a range.
- The nitrate levels were negligible except for 4 readings (the 3rd, 5th, 6th and 14th reading).
- The TSS (Total suspended solids) reading peaked in the third week and trended downward for the remainder of the trial. There was not an increase in TSS as would normally be expected with daily deposits of barn effluent into the slurry pit.
- The soil analysis of the two solid manure piles show significant differences in the treated and untreated manure including a higher nitrogen content and a lower pH reading in the treated manure. The Carbon Nitrogen Ratio was consistent with the desired CN Ratio in the treated manure sample.

Summary:

The PENERGETIC products successfully improved the quality of both the liquid manure and the solid manure. The appearance of bubbling on the surface of the second lagoon is a positive sign of active microorganisms.

The results of this trial are very satisfying to Beaver Meadow Farm and they are now looking to test the PENERGETIC-t feed additive and to conduct a forage test with the treated and untreated compost.

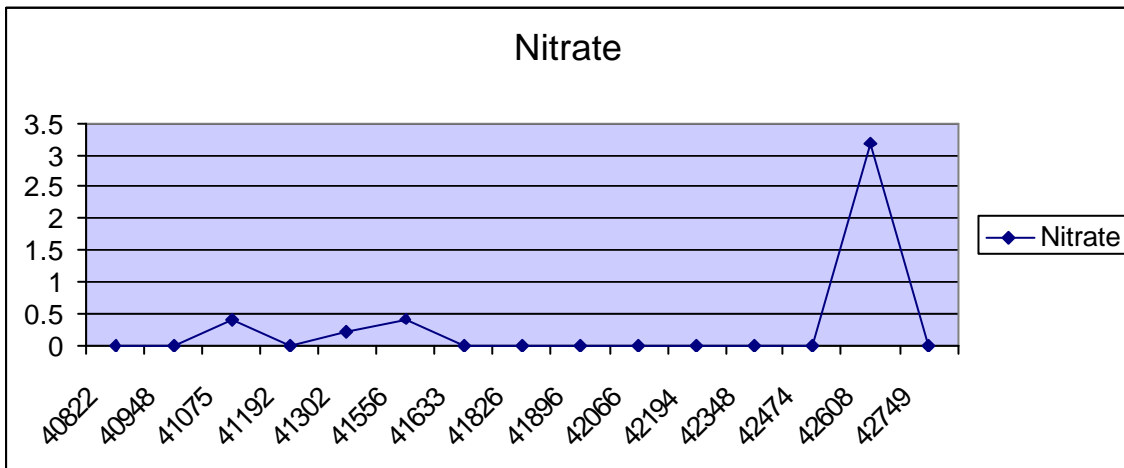
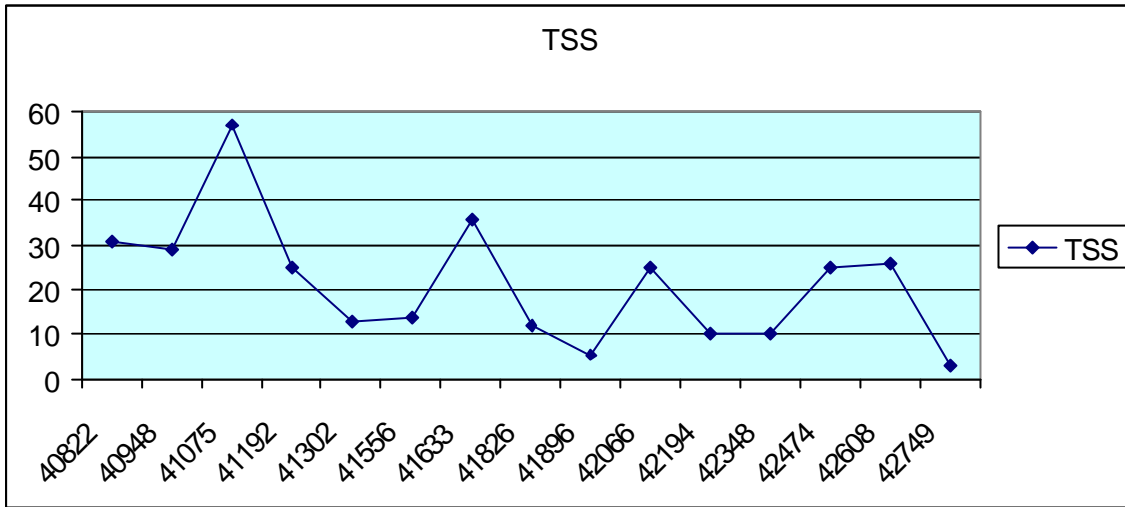
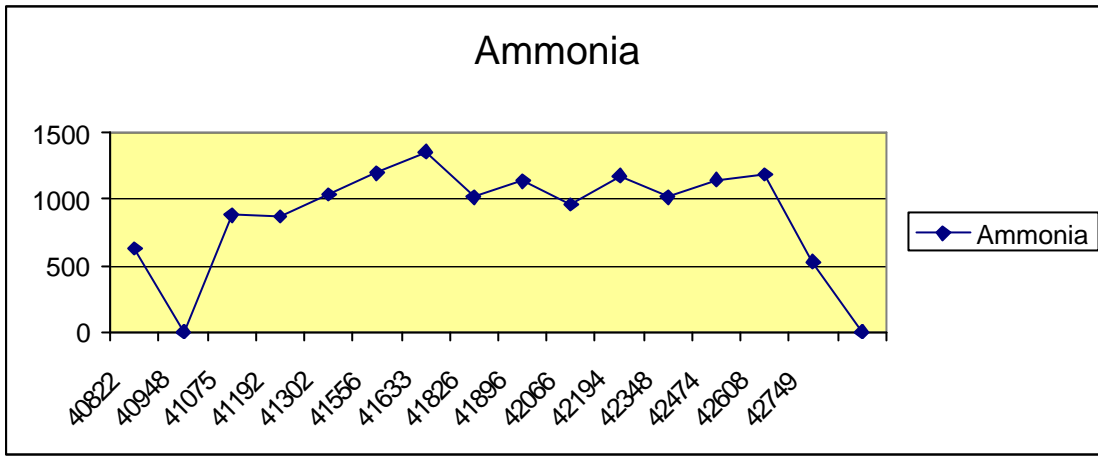
BEAVER MEADOW FARM 1971 LTD

PENERGETIC TRIAL Nov 2004 March 2005

Slurry Pit Samples – Lab report Summary*

Date	Sample #	Ammonia	DO	Nitrate	TSS
Nov 17 04	40822	633	<1.2	<0.1	31
Nov 24 04	40948	0.07	<1.0	<0.2	29
Dec 1 04	41075	881	<1.0	0.38	57
Dec 8 04	41192	871	<1.0	<0.2	25
Dec 15 04	41302	1040	<1.0	0.21	13
Dec 22 04	none				
Jan 5 05	41556	1200	<1.0	0.42	14
Jan 12 05	41633	1360	<1.0	<0.50	36
Jan 19 05	41826	1020	<1.0	<0.10	12
Jan 26 05	41896	1140	<1.0	<0.10	5.7
Feb 2 05	42066	962	<1.0	<0.02	25
Feb 9 05	42194	1180	<1.0	<0.10	10
Feb 16 05	42348	1020	<1.0	<0.10	10
Feb 23 05	42474	1150	<1.0	<0.10	25
Mar 2 05	42608	1190	<1.0	3.2	26
Mar 9 05	42749	529	<1.0	<0.10	3.3

*North Island Laboratories
Courtenay, B. C.



BEAVER MEADOW FARM (1971) LTD

NORWEST LABS ANALYSIS OF TREATED AND UNTREATED MANURE JULY, 15 2005

Compost/Manure – Physical

	Untreated Manure % DRY WEIGHT	Treated Manure % DRY WEIGHT	Typical content for good quality compost*
Moisture	74.6	78.7	30-55%
Ash	8.36	10.34	
Organic Matter	91.6	89.7	>30%
pH	9.5	8.2	5.5-8.5
EC-Compost/Manure	23.9 ds/m	24.8 ds/m	

Carbons and Nitrogens

Total nitrogen	1.02	1.67	Min 0.60
Total carbon	46.95	45.47	
Total sulfur	0.29	0.36	
C:N Ratio	45:1	27.2	25:1-30:1**

Minerals

Calcium	0.485	0.661	Min 3.0
Phosphorus	0.182	0.318	Min 0.25
P ₂ O ₅	0.417	0.728	
Potassium	1.48	0.886	Min 0.20
K ₂ O	1.79	1.07	
Magnesium	0.281	0.234	Min 0.30
Sodium	0.064	0.17	
Zinc	81.0 ppm	80.7 ppm	
Boron	18 ppm	20 ppm	
Manganese	90.3 ppm	109.0 ppm	
Copper	14.0 ppm	18.7 ppm	
Iron	1140 ppm	1250 ppm	
Molybdenum	1.6 ppm	2.1 ppm	
Aluminum	0.052 ppm	0.057 ppm	
SAR	0.01	0.02	<5

*Composting Council of Canada

Regulations and Guideline Impact to the Marketing of Compost in Ontario 1/2001

**On-Farm Composting Handbook, 1992 Alberta Government, Agriculture, Food and Rural Development



