The Effect of EcoCare® feed on Manure and Swine Performance

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Field Trial

An EcoCare® field trial was performed in Minnesota using 2 barns with approx 1000 head per room. The two rooms had separate pits. The east room was fed a control diet (DDGS Premix with Lysine & Phytase) and the west room was fed the equivalent EcoCare® feed. Starting inventories for the Control side was 1063 head at 70.65 lbs on July 29, EcoCare® side was 1090 head at 65.05 lbs on July 31. The barns only had one group of pigs through, prior to the trial. The pigs were sold first on the control side on the October 31st and the EcoCare® side during the following week November 5th.
Manure analysis and swine close-out performance data were collected.
Manure sampling was performed on August 9th, August 14th and September 22nd.
On the October 31st, the manure in the pits was agitated and 1 foot was drained leaving 2 feet total. Manure sampling was also performed on November 2nd.

What are the results of EcoCare® feed on manure quality?

Manure thickness/stickiness

After 50 days, there was a visual difference between the manure in each pit. Solids were reduced by 11% and viscosity by 37% in the manure pit of the EcoCare® treatment compared to the control.
Photos were taken on 20th September - 50 days after start of trial. Sampling poles were dipped into the pit, removed and held for 30 seconds after pulling from the pit. Note the manure sticking heavily to the pole on the control side, an excellent indication of high viscosity.

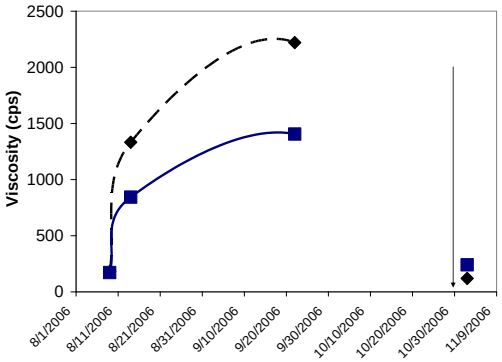
Control side

EcoCare® Feed side

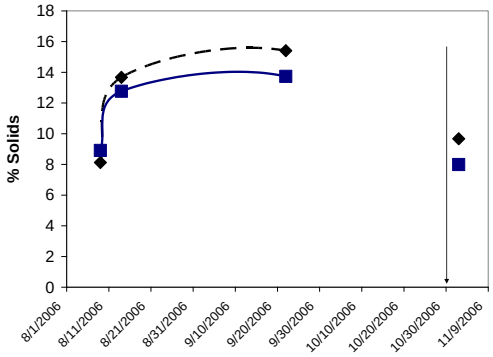
All the subsequent graphs are as follows: EcoCare® Feed - solid line, Control Feed - dashed line
The lines indicate the period of consistent manure accumulation.

Within the graphs, an arrow indicates when pigs were sold, and the pits agitated & partially pumped at the end of October. Manure samples were taken directly after this time on November 2nd and analyzed. The values are dramatically different because there has been a change in manure composition; it is clear that solids have been removed which causes viscosity to decline and nutrient levels to change.

Graph 1
- Viscosity gives an indication of stickiness/fluidity



Graph 2
- % Solids gives an indication of thickness



EcoCare® Feed - solid line, Control Feed - dashed line

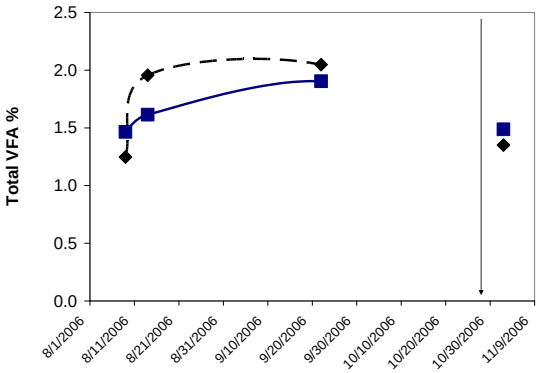
This reduction in viscosity and solids when using EcoCare® feeds means:-

Sanitation	– easier to clean flooring, less cleaning time, less cleaning cost, improved sanitation
Agitation & Pumping	– less agitation time, less energy cost, easier to pump (time & distance)
Agronomy	– uniform application to land – uniform nutrient distribution during spreading
Insurance (bad weather)	– retained manure storage capacity

Manure odor

Manure odor is often measured by ammonia and volatile fatty acids (VFA). The ventilation was excellent in these barns therefore accumulation of odor was limited. However, measuring the VFA from manure gives an indication of smell capability.
As shown, manure from pigs fed EcoCare® feed produces less VFA's and therefore less smell capability.

Graph 3
- % Total Volatile Fatty Acids



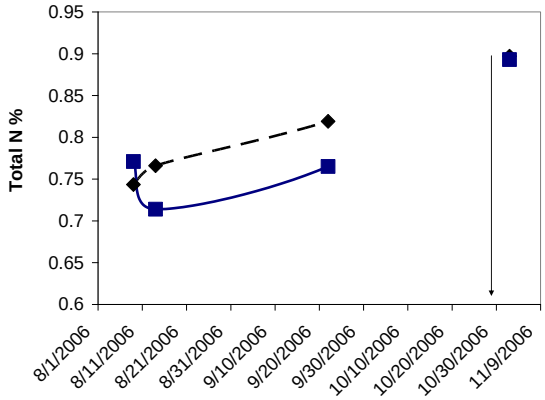
EcoCare® Feed - solid line, Control Feed - dashed line

Manure Nutrient profile

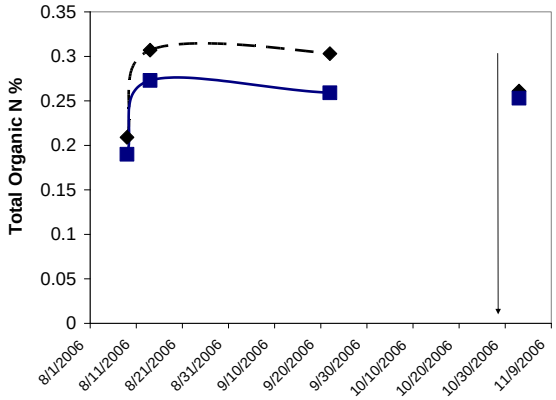
The N:P:K ratio is critical for soil application. The total quantity of nutrients in manure is not as critical as the availability of the nutrients for crop uptake. Manure nitrogen is present in both organic and inorganic forms. Organic nitrogen compounds are relatively stable and slowly breakdown through microbial activity into plant-available forms. Inorganic nitrogen in manure is considered 100% available to the plants in the year of application. Swine manure has a ratio of available ammonium-N (NH4-N) and unavailable organic-N in solid manure of 60:40 and in liquid manure of 70:30.[1]

This field trial in Minnesota demonstrated a clear difference in nitrogen composition of the manure. This was the result of incorporating crystalline amino acids and feed additives which improve the retention by the pig and reduce the volatilization of nitrogen-containing ammonia from manure pits. In this trial, pigs fed EcoCare® feeds produced manure that contained less total nitrogen. However, the manure had a better ratio of available N to unavailable N (66:34) compared to the control group (63:37) within 50 days of the trial starting.

Graph 4
- % Total Nitrogen



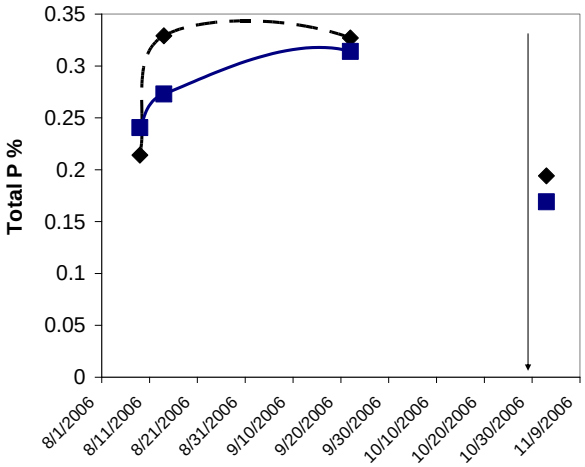
Graph 5
- % Organic Nitrogen



EcoCare® Feed - solid line, Control Feed - dashed line

On average, swine manure has a nitrogen to phosphorus ratio of about 3:1. This is often lower than that needed by the types of crops (corn needs a 6:1 ratio) grown on soil where manure has been applied. Using phytase reduces phosphorus excretion because less inorganic phosphorus is added to the diet. Lowering the phosphorus content of swine manure will improve the nitrogen to phosphorus ratio of the manure allowing more nitrogen to be applied through manure.

Graph 6 - % Total Phosphorus



EcoCare® Feed - solid line, Control Feed - dashed line

When phytase is a component of a grow/finish premix, dietary phytase concentrations decline with declining premix inclusion rates as pigs become heavier. Feeding the EcoCare® program ensures an optimum and constant level of phytase across production phases with sufficient available phosphorus for optimal grower/finisher pig production. This formulation results in the greatest possible phosphorus reduction in feed and resulting manure.
In this field trial, the control diet contained phytase as part of the premix. However, further phosphorus was reduced in the manure of the pigs fed EcoCare® feed because of the constant phytase level.

What are the results of EcoCare™ feed on swine performance?

The pigs performed adequately and there was no discernable difference between the treatment and control groups.

Parameter	EcoCare® feed	Control
Starting weight (lbs)	65.00	71.00
Finished Weight (lbs)	268.13	271.88
F/G	2.66	2.72
ADG (lbs)	1.83	1.86
ADFI (lbs)	4.87	5.06
Cost of Gain ($/100lb)	18.83	18.91
Feed $/Pig	37.54	37.55

The best feeding choice for grower/finisher pigs, the right choice for our environment.

References
1. D. F. Leikam and R. E. Lamond, 2003. *Estimating Manure Nutrient Availability*, Kansas State University, January 2003. www.oznet.ksu.edu/library/crpsl2/MF2562.pdf

For further information on EcoCare® Feed, please see your local feed sales representative at a Land O'Lakes Feed Co-op or Purina Mills Dealer. Visit us on-line at www.LOLFeed.com, www.PurinaMills.com,

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