

penergetic®

...for intelligent agriculture

A Comprehensive Approach to Swine Production

Water



Feed



Manure



Water

Healthy water is a core requirement for any swine operation. Water is the most consumed nutrient, by volume, in a pig's diet¹, yet often receives inadequate attention.

Water intake is directly correlated to feed intake. So keeping the water supply in a swine operation clean and performing at maximum efficiency is essential to a well-functioning nutrition program. Due to water importance to a successful nutrition program, its quality and value should be given as high a priority as the quality and value of feed chosen for your herd. Minerals and microbes are two factors that can impact the quantity and quality of water swine consume, by restricting the flow through pipes and by simply causing the water to smell or taste off.

AQUAKAT® By addressing water-related issues such as lime build-up, iron, hydrogen sulfide smell and chlorine taste, the AquaKat (Penergetic's water device) can improve the water's taste and quality. This can lead to swine drinking more and making more efficient use of the water they do drink – creating the potential for healthier and more productive animals.



AQUAKAT®²
Capacity: 3,000 gal/day

AquaKat technology was developed over 25 years ago. An AquaKat is easy to install (requires no plumbing/disruption to the water lines), no on-going operating expenses (no filters to change, salt or chemicals to add or power supply) and the first AquaKats (installed over 25 years ago) are still in use today.

The AquaKat offers the following attributes:

- Improves water's taste and smell
- Eliminates lime build-up and rust
- Prevents biofilm in lines
- Eliminates chlorine taste in water
- Keeps water nipples & mister from clogging
- Increases nutrient bioavailability

¹ Under normal conditions, swine consume 2 to 5 quarts of water / lb. of dry feed or 7 to 20 quarts of water / 100 lbs. of body weight daily.

AQUAKAT USAGE AT TWO MINNESOTA SWINE OPERATIONS

First Location: Operator says: "*Before AquaKat installed, water filter on the main water line had to be cleaned every two weeks or pigs had no water (as filter filled with sediment shutting off flow of water).*" Yet, as shown in picture (on right), six weeks after AquaKat installed there is still no sediment in the filter and has not needed to clean it". He also says: "same water source supplies the house as the barns (and in the past would never drink water at the barns). Yet, since AquaKat was installed, the water at the barn now tastes and smells better than at the house." – so he now drinks (and prefers) it.



Second Location: This property contained five (5) swine houses: two recently emptied, the three remaining houses still contained swine (close to market weight). These three barns were identical in terms of genetics and age of pigs, feed rations, water, etc. The only difference was that one barn was equipped with two AquaKat XLs on the water line. Without expressing an opinion, the operator asked us to first visit one of the non-AquaKat (Control) houses and then go into the AquaKat barn. As documented below, the differences simply by changing the water were dramatic.

| | CONTROL BARN | AQUAKAT BARN |
|-------------------------------|--|--|
| Demeanor/Disposition | jittery, nervous, irritated, jumping up on one another | calm, appeared relaxed, contented, ≈ 30% sitting on haunches looking at us |
| Hide Coloration | grey | pink |
| Tail Biting / Scratches | yes, easy to spot evidence of both | no tail biting evident, one scratch |
| Coughing | high incidence, various animals | 1 coughed in back of barn after 5 min. |
| Odor | strong, pervasive swine house odor | noticeably fresher smelling |
| Slurry Condition (thru slats) | still, nothing evident | bubbling, active |



Feed

No matter what type of swine operation, feed utilization is an important consideration. It also, typically is the highest cost component of the swine production cycle. Consequently, anything extra added to the feed regime needs to be able to prove its worth.

Penergetic t (for pigs), a feed additive, supports the efficient use of feed and helps in growing healthy productive pigs. Suitable for all stages of the pig production cycle, some of the key attributes swine producers attribute to Penergetic t usage include:

- improves digestion
- reduces animal stress
- boosts the immune system
- increases feed conversion

Penergetic t (for pigs) is available in powder or liquid forms (it can also be pelletized). [Suggested Inclusion rate: 100 – 150 g / finished ton of feed.]

SAMPLE RESULTS

Farm 1 (Finishers): Comparative study of penergetic t in control group and test group

Feeding: Both groups received conventional feed. Test (Penergetic) group also received penergetic t @ 60g / ton of feed

Results: Test group (Penergetic): no coughing, calmer, normal lymphocytes, reddish meat color, no meat smell

Control group (without Penergetic): frequent coughing, easily startled, enlarged lymphocytes, dark meat color, unpleasant meat smell

Farm 2 (Farrow to Finishers): Comparative study of two groups.

Feeding: Both groups received conventional feed. Penergetic group received penergetic t @ 100 g / ton of feed (and antibiotic use was reduced by 90%)

Results: Penergetic group had 16.9% better feed conversion ratio; expense ratio per cwt was 16.0% lower; feed expense per pig sold 15.4% lower; and, total days (birth to market) was 7.3% shorter. [Note: the shorter days to market (15 days fewer), has freed up space in the barn for operator to add 50 more sows.]

Farm 3 (Wiener to Finisher): Involved use of both Penergetic t (for pigs) [@ 60 g / ton of feed] and Penergetic g (Slurry Activator).

Results: Penergetic group had lower mortality, less coughing & hyperemia, better nutrient utilization, more microorganisms in gut and better meat quality (results shown adjacent).

Farm 4 (Piglets): Study of penergetic t administered to two groups of piglets (24-30 days old at start) for 32 days.

Results: penergetic t group experienced 7.7% greater increase in weight gain.

Farm 5 (Piglet scours): testing penergetic t (2g twice daily) on various populations of piglets with scours.

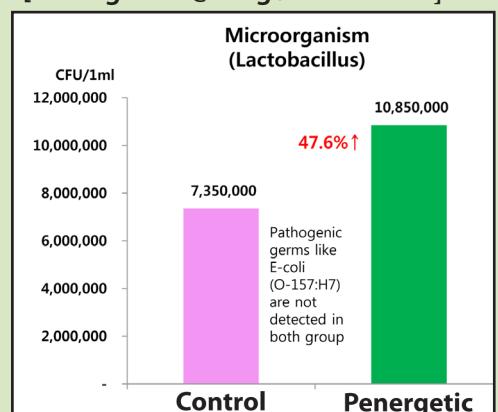
Results: whether sprayed on fodder, mixed into feed or included in drinking water scours disappeared within three days.

** Results shown are not to be interpreted as a claim as to product performance. **

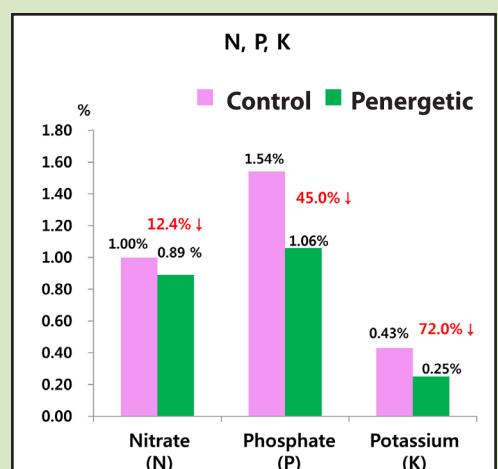


Based on Manure Analysis

[Penergetic t @ 60 g / ton of feed]



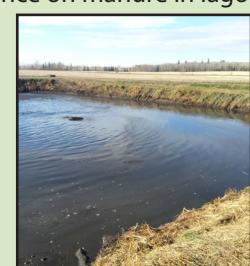
More microorganisms (Lactobacillus) in pigs' intestines



Less Nitrates, Phosphate and Potassium excreted, due to more utilization

Penergetic t (for swine)

Evidence of positive influence on manure in lagoon



BEFORE

Five months after started using Penergetic t – with no agitation – former crust has all but disappeared.

Hind Leg – Meat Quality Comparison



Control Group



Penergetic t Group
Firmer and better coloration

Manure

Manure management is an important aspect of any swine operation. One thousand (1,000) finishing pigs produce over ½ million gallons of manure annually. Swine manure represents a valuable economic source of fertilizer – the retention (and proper use) of nutrients in manure can significantly reduce the need for other sources of crop fertilizer.

Penergetic g (slurry activator – for pig slurry) acts to convert swine manure from an anaerobic state (putrefaction) to a more beneficial aerobic condition. Penergetic g provides the following benefits:

- Increased biological activity in the manure
- Converts ammonia to ammonium (retaining nitrogen in a non-volatizing, stable, more plant available form)
- Limits vitalization of hydrogen sulfide (reducing risk of asphyxiation from barn gases)
- Supports manure phosphorus conversion to (plant available) inorganic phosphorus
- Improves in-barn environment (= healthier for pigs and workers)
- Eliminates bottom sludge buildup and/or crust formation
- Helps mitigate manure foaming and methane emissions ¹
- Makes manure homogenous for easier pump out (from in barn and lagoon)
- Negates need for manure injection or incorporation when field applied
- Contributes to protecting groundwater and surface water resources

¹A special product (Penergetic g/k/f) is used to target barns requiring foam (and methane) suppression.



Easy pumping when Pen g used!



Slats lifted reveal homogenous slurry



Reduces Asphyxiation Risk



Helps Overcome Foaming



Eliminates Need for Injection



Protects Aquatic Resources

Penergetic g (slurry activator - for pig slurry) works by activating micro-organisms that already exist in the manure.

- easy to use
- economical
- 100% natural
- polymer free
- long shelf life
- no special equipment required

OVERCOMING HIGH PHOSPHORUS LEVELS IN SOILS

High rates of swine manure application on crop land can lead to elevated Phosphorus levels in soils, which if not corrected can lead to pollution of downstream watercourses. State environmental agencies regulate nutrients levels – Phosphorus (P) and Nitrogen (N) levels – permitted in soils.

A six (6) year study, in Quebec, showed that regular use of Penergetic g (slurry activator for swine manure), on average, reduced soil Phosphorus levels by 8.0% per annum.

A companion Penergetic product – **Penergetic k (Soil Activator)** – can help reduce high P (and N) in soils to more manageable levels. As shown in the table below, at a large livestock operation in the southwestern U.S., 10 months after applying Penergetic k at a rate of 600 g/ac., soil **Phosphorus was reduced by 41% and Nitrogen fell by 69%**.

| | PHOSPHORUS (ppm) | NITROGEN (ppm) |
|------------|------------------|----------------|
| UNTREATED | 470 | 42 |
| TREATED | 283 | 13 |
| Difference | -187 | -29 |

For more information contact:

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