

FORMYL™

Acidifier which supports a healthy gastrointestinal tract

FORMYL™ is a coated source of citric and formic acid encapsulated by a fluid bed process, resulting in greater than 80% active ingredients. The encapsulation allows for superior handling ease and targeted release in the intestinal tract – to deliver optimal performance.

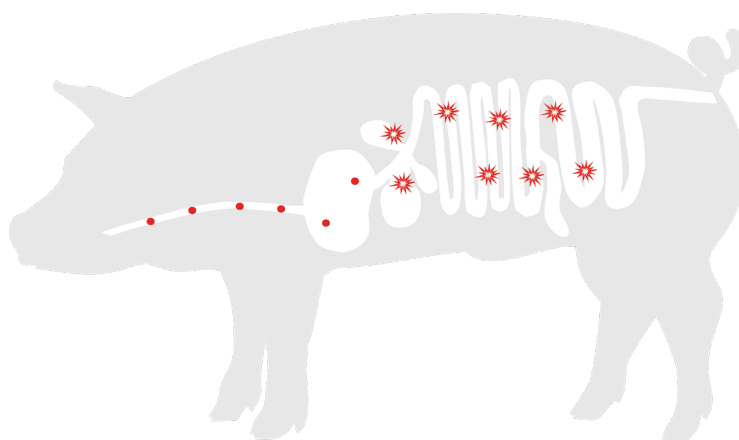
A NEW ACIDIFIER FOR SWINE

The most accepted and effective acidifiers in the market are brought together in the same microgranules through an innovative encapsulation process. It contains triggers that target the release of active ingredients along the gastrointestinal tract. This innovative product results in an improved acid binding capacity.

Active ingredients: Calcium formate (source of both formic acid and calcium) and citric acid. Due to different chemical-physical properties (pKa), the two organic acids act sequentially guarantying a complete release of formic acid along the full length of the gastrointestinal tract.

BENEFITS

- Encapsulated for targeted release
- Acidification; inhibits bacterial growth and propagation and promotes enzyme activity
- Antimicrobial activity and digestion enhancer
- Control of *Escherichia coli* and *Salmonella*
- Improve feed intake, growth performance, and pig uniformity
- Decrease the calcium content of diets to the minimum required
- Improved acid binding capacity, leading to improved performance



FORMYL Activity in the Gastrointestinal tract

MODE OF ACTION

- Encapsulation allows for a majority of the acids to pass through the stomach, so they don't inhibit parietal cell formation in very young piglets and HCl production in older phases.¹
- Source of calcium with low ABC (Acid Binding Capacity) versus other sources.²
 - The calcium formate in FORMYL is coated so it is not binding any endogenous gastric HCl.³
- As the fat matrix is removed, citric acid and calcium formate are released in undissociated forms.
- Intact formic acid easily penetrates the cell membranes of bacteria especially gram-negative bacteria (*E. coli* and *Salmonella*).⁴
 - Formic acid dissociates inside the cell and releases H⁺ ions, disrupting enzyme activity in the bacterial cell.
 - The bacteria expend energy to try and expel the H⁺ ions, killing the bacteria.
 - Formic acid has been shown to be highly effective at killing gram negative bacteria such as *E. coli* and *Salmonella*.

DOSAGE RECOMMENDATION

Nursery: 4 - 11 lbs / ton of feed

Grow-finish: 1 - 8 lbs / ton of feed



References

1. Formyl™ 2B Nutritional Acidifier for Piglets, PRE-14-00066
2. Acid Binding Capacity of FORMYL versus other calcium sources, INF-2012-00035
3. Bosi et al. 2006. A continuous dietary supply of free calcium formate negatively affects the parietal cell population and gastric RNA expression for H⁺/K⁺-ATPase in weaning pigs. *The Journal of Nutrition*. 136: 1229-1235
4. Strauss, G., and R. Hayler. (2001). Effects of organic acids on microorganisms. *Kraftfutter*. 4:147-151



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