

behind the science of
Animal Nutrition newsletter

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EnMax™: Precision Technology Maximizes Energy



Pictured above: Dr. Jim Hedges, vice president swine technical group for Ralco Nutrition, Inc.

Inside Story:

- *Keeping hogs on the right track with the "coolest" swine feed on the market*

EnMax™ is the most technologically advanced swine feed program in the world. EnMax™ employs net energy formulation, crystalline amino acids and supplemental enzymes to improve diet digestibility. The diet provides pigs more energy from corn, reduces soybean meal use, and precision amino acid formulation means pigs do not waste energy breaking down excess amino acids they do not need.

EnMax™ is a revolutionary product that boosts lean gain for the new generation of swine. In an environment of high ingredient and energy costs, instead of stripping ingredients from feed rations to lower costs, EnMax™ maximizes the available energy of the ingredients.

"Compared to most swine grower/finisher diets EnMax™ is quite different and very precise," said Dr. Jim Hedges, vice president swine technical group for Ralco Nutrition. "EnMax™ is different. We formulate the diet according to amino acids, not protein and we are taking that to the Nth degree."

For Hedges, EnMax™ has been the culmination of decades of work with net energy formulation. Net energy is the actual energy pigs use to build muscle tissue. Far more precise than digestible energy or metabolizable energy, net energy places a higher value on ingredients that have a lower heat increment, which makes for a

"cooler diet."

Today's lean hogs are much more susceptible to heat stress, but with EnMax™ the detrimental effects of heat are greatly reduced. Hedges said precision crystalline amino acid formulation gives EnMax™ the edge.

"Instead of feeding too much of the rest of the other amino acids required to get the right level of lysine, we use crystalline amino acids which are more valuable because the pigs don't need to break down the excess amino acids," Hedges said.

Crystalline amino acids have several advantages over traditional protein-bound amino acids. Crystalline amino acids require less energy to digest and extract leaving more energy for growth. Also, since finishing hogs do not have to breakdown excess amino acids less ammonia is produced which reduces odor.

Even small improvements in energy digestibility are important. The use of supplemental enzymes improves nutrient digestibility and feed conversion. The nutrient matrix of supplemental enzymes used in EnMax™ allows for lower fat, soybean meal and phosphorus supplementation of the diet. The decreased nutrient supplementation from other sources translates into cost savings for producers of \$1 or more per hog.

Swine producers will see most of the cost savings when their pigs demonstrate a higher rate of lean gain while requiring less soybean meal. EnMax™ uses 100-150 pounds of soybean less per ton than conventional diets.

Inside:

- Knowledge is power when feeding DDGS



Next month:

- EnMax™ for sows

EnMaxTM helps Bret Lindaman use DDGS in his hog operation

When soybean meal prices jumped a few years ago, Bret Lindaman turned to dry distiller's grains with solubles (DDGS) as an economical ingredient in his hog feed. Lindaman grinds his own feed, and the incorporation of DDGS into rations allowed him to back off on both the amount of corn and soybean meal he needed to feed. After Lindaman began feeding DDGS he noticed that the gut health of his herd improved. DDGS along with ReganoTM from Ralco Nutrition, and the EnMaxTM feed program has improved the health of his hogs and added profit to the bottom line.

Lindaman sells about 6,000 hogs annually from his isowean-to-finish operation near Westbrook, Minn. He has been feeding DDGS for three years. He wanted to improve gut health, and it wasn't long before he noticed results.

"In my finishing barns I noticed my gut health was not up to par. There was loose and dark stool, I call it bloody bowel. I wanted to work on the gut health during the later stages of feeding and do it naturally," Lindaman said. "Now my death loss is down and overall gut health has improved."

When piglets are first shipped to Lindaman, he starts them off with Early Wean dry pellets as a complete feed along with ExSelTM from Ralco with ReganoTM. At two and a half weeks he begins feeding Porkflex 625 base mix and transitions to Nursery Base 75 with phytase. When the pigs move out of the nursery after eight or nine weeks and weigh 60 to 70 pounds they begin the EnMaxTM program with GroMax 50 DDGS base mix, and GroMax 7.5 XE³ base mix. The pigs are introduced to DDGS at a five percent inclusion rate at that point. At 90 pounds, Lindaman begins feeding his hogs DDGS at a



Pictured above: Bret Lindaman of Westbrook, Minn.

10 percent inclusion until they are marketed.

The health of his finishing hogs has improved, but Lindaman said he noticed some additional benefits of feeding EnMaxTM; his hogs stay cooler in the summer time.

"I actually go by the pigs and how they are acting when it comes to running the drippers and I haven't had to do that as much. So my pits don't fill as fast," Lindaman said.

Lindaman will continue to feed DDGS. He has two bulk bins on his farm to store the grain, and said he has never had a problem handling it. If the DDGS seems a little warm, he leaves the top of the bin open so it can cool. After three years of experience, Lindaman is confident about the future of DDGS as a component of swine feed.

"With all the ethanol plants going up, the DDGS hopefully will remain profitable," he said.

Keep Hogs on the Right Track with EnMax™

Dr. Jim Hedges loves NASCAR. He likes the speed of racecars and photo finishes, but what Hedges enjoys most about car racing is the precision involved in creating the highest performance. As vice president of swine technical group for Ralco Nutrition, Hedges brings the same passion for racing to swine feed formulation. The result is the most technically advanced swine feed on the market: EnMax™.

Hedges views today's hogs as highly evolved racecars. Hogs have become leaner and more efficient, but this has also made them more susceptible to common occurrences like heat stress. EnMax™ is formulated for modern swine. The diet strips away excess ingredients in order to promote digestibility and improve performance.

"Pigs today are different because of genetics. The pig has become a completely different animal than they were years ago. What we have done with EnMax™ is reduce the excesses. We don't put in there what the hog doesn't need," Hedges said.

Everyone knows that an engine runs best when it stays cool and doesn't overheat. It's the same with hogs. Conventional swine diets require the digestion of unnecessary protein and other nutrients. When the weather turns hot that additional digestion leads to lower feed conversion, less feed intake and higher death loss. With EnMax™ the effects of those pitfalls are lessened.

Studies have shown that the increase in muscle mass of lean hogs has increased their total heat production by 25-30 percent over fatter lines. At about 85 degrees feed intake is reduced by about 25 percent. The reduced feed intake can add two weeks before hogs can be marketed, or result in a 20-30 pound loss of market weight. High heat increment

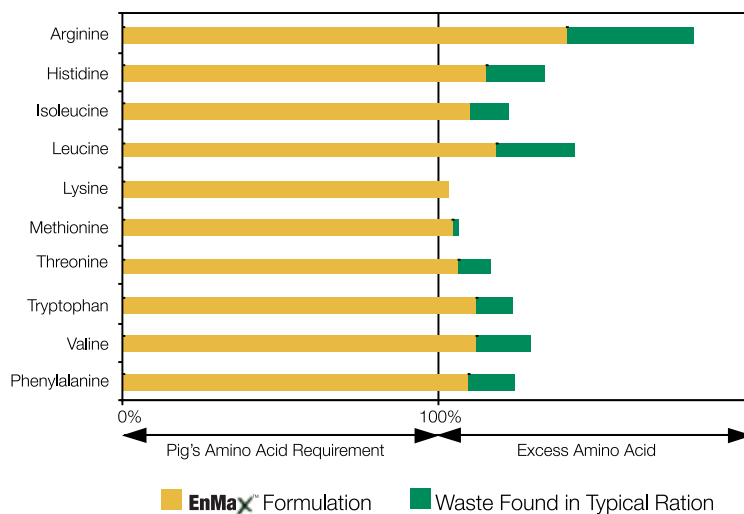
feeds can cause even more problems.

Net energy formulation, precise crystalline amino acids and supplemental enzymes ensure that a hog performs optimally during extreme conditions while at the same time capitalizing on energy from corn and reducing soybean meal costs.

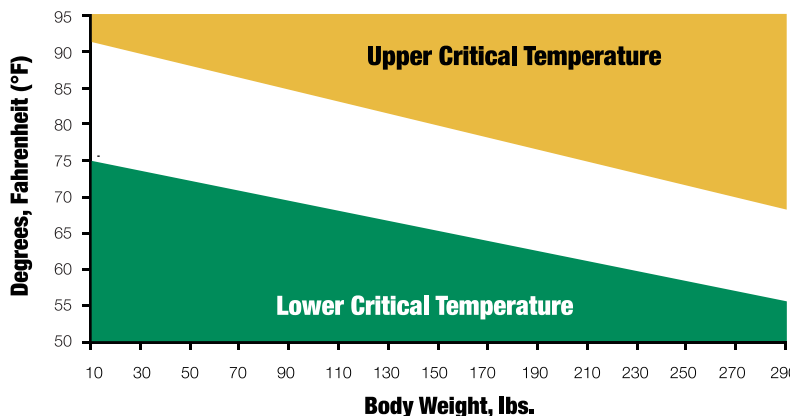
"When it comes to hot weather, it's almost like we are cheating," Hedges said.

The precision Hedges has brought to EnMax™ is an extension of his passion for racecars. Producers can turn that passion into profits when EnMax™ ensures that their hogs stay on the right track.

Amino Acid Levels



Typical Thermoneutral Zone for Nursery and Growing Finishing Pigs (Adapted from Close, 1998)



Knowledge is Power **when feeding DDGS**

Pick up most swine publications that talk about feeding dry distiller's grains with solubles (DDGS) to hogs and it seems that the jury is still out. Some say not enough is known about DDGS, some question the effects of DDGS on hog tissue growth. Ralco Nutrition has helped producers utilize DDGS for years. As long as a few simple rules are followed, DDGS is a safe, affordable energy source with abundant available phosphorus.

Dr. Jeff Knott, of Ralco Nutrition swine technical group, has been working with DDGS since 1999. Knott began his work with DDGS during his studies at the University of Minnesota. Knott encourages the use of DDGS as long as it is cost effective. With the dramatic increase in ethanol plant construction during the next year, it looks as though DDGS will become an increasing force in the swine industry. Ralco Nutrition retains the most knowledge of DDGS use in swine diet of any other company.

"We have the most experience feeding DDGS than any other feed company in the world," Knott said.

Knott recommends a five-percent inclusion during first-time usage for hogs weighing at least 25 pounds. The feed smells different and if first-time inclusion rates exceed five percent, feed intake can be reduced. Producers can then boost the DDGS rate to 10 percent until the last few weeks for finishing hogs when the inclusion rate can be dropped back to five percent.

Some producers question the consistent lysine content of DDGS. Knott said it is important for producers to locate a source that provides a consistent product and stick with it.

"If you have a good consistent source, I always tell producers that it is worth the couple bucks extra to keep receiving DDGS from the same plant where they are confident of the source and the content," Knott said.

A rule of thumb for judging nutrient digestibility in DDGS is that the more golden it is, typically the higher the amino acid digestibility.

"The closer it looks to corn, the better," Knott said. "The more golden the color, the more digestible lysine and other amino acids should be."



During his time at the University of Minnesota, Knott studied the lysine variability in DDGS. Knott found that at a 10-percent inclusion rate, lysine contribution to the diet is small, which minimizes the variability of the lysine concentration of the diet. However, Knott stresses that producers hit the mark with the amount of lysine in the diet because it is the first factor to limit growth.

One of the major advantages of feeding DDGS is its abundant available phosphorus. The phosphorus is more digestible which means less or no phosphorus needs to be added to feed, and less phosphorus is excreted in manure. Digestive stress is reduced and overall gut health is improved while feeding DDGS because of increased fiber content.

Producers that incorporate DDGS into their feed rations can reduce the amount of corn, soybean meal and fat in those diets. Knott developed a computer program that automatically calculates rations depending on inclusion rates for producers looking to feed DDGS.

Another rule of thumb to remember when dealing with DDGS is that everything is concentrated by a factor of three. Lysine, fat, energy, and phosphorus are all concentrated. Mycotoxins, substances harmful to pigs from corn that has undergone stress in the field or that contained mold, are also concentrated by a factor of three. Knott recommends that producers use rxb-212 from Ralco Nutrition, a natural substance that binds harmful mycotoxins, when feeding DDGS especially to sows.

As the ethanol industry continues to expand, Knott sees DDGS gaining more of a foothold in the swine industry.

“People are going to have to use more DDGS, and we haven’t seen any problems with it, and we have been



Pictured above: Dr. Jeff Knott, swine technical group for Ralco Nutrition, Inc.

using this stuff for a long time,” Knott said.

Ralco provides a base mix specifically designed for DDGS inclusion. Ralco can also help with reliable DDGS sources for producers. Knott recommends that producers visually appraise each batch of DDGS they receive for particle size and color in order to ensure consistent quality.

The old adage says that knowledge is power, and no company knows more about using DDGS in swine feed than Ralco Nutrition.

“We don’t know if we have all the answers, but swine producers shouldn’t be worried about using DDGS, and we are looking at ways to use more,” Knott said.

Ralco Nutrition has helped producers utilize DDGS for years.





Changing times demand knowledge and innovation.

THERE IS A DIFFERENCE.

Ralco's nutritional team is known for *knowledge* and *innovation*. Their combined experience of over 250 years brings the best, most innovative nutrition and production solutions to your farm.

Ralco Nutrition, Inc. has some of the best technical minds in the industry working on production issues you face every day. They develop our high quality nutritional programs and *implement* the power of those advances in real-world livestock operations.

Taken as a whole, our scientists account for an impressive array of credentials, but you'll probably prefer to evaluate their work based on its success in your operation. You'll discover we bring the science to your production with our team.



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