

Feeds evolve in ecological footprint



by CATHERINE BROWN

THE MOVEMENT to address nutrient management challenges through feeding practices continues to grow with new developments in feeding technology. The latest buzz word in swine nutrition, says nutritionist and University of Guelph researcher Dr. Ming Fan, is "Ecological Feeds."

As Dr. Fan notes in one research document, "the progression toward sustainable swine production must involve nutrient management procedures that minimize the excretion and emission of odour-causing and acidifying compounds into the environment."

That's what an up and coming complete feed marketed by Land O'Lakes-Purina, promises to do. It's a feeding program formulated to optimize nutrient delivery in every phase of production while addressing nutrient management, odour emissions and nutrient utilization. In research trials, the feed has reportedly reduced ammonia emission, odours and manure solids, resulting in a healthier working environment and improved manure storage and handling capabilities which save time and money.

According to Brad Adams, Canadian marketing manager for Land O'Lakes, a trademarked feed program called EcoCare is scheduled to become available in Canada

by mid-year in 2007. By that time, says Adams, it will have been used and proven on commercial U.S. farms for over a year.

KenPal Farm Products Inc. has been on the forefront of this market for the past few years, providing environmentally friendly premixes to swine producers to include in their homegrown feed. It was the first in Canada to introduce what it calls "AA" (amino acid) feeding. It also added the "P" (phytase) to end up with the "AAP" feeds throughout the industry.

About 80 per cent of Kenpal's customers are now using "premixes which include synthetic amino acids, which allow producers to reduce the amount of ammonia and nitrogen output in the manure," says Ken Palen, owner of KenPal.

"This improves the environment in the barn with less free ammonia in the air and also puts less in the field, which may or may not all be consumed by the crop, depending on whether manure is applied in the spring or the fall." Palen says a lot of producers are trying to apply manure in the spring, so the fresh, new growing corn can use the nitrogen right away. This saves having to purchase any more nitrogen.

The other product that 80 per cent of KenPal customers are purchasing is the phytase enzyme, which reduces phosphorous in the

Synthetic amino acids, smarter protein feeding, phytase and more attention to detail are making hog rations better for the environment and in many cases, less expensive too

manure output. "When using the phytase enzyme in feeds, we can supplement less inorganic phosphorous to the diet, because the enzyme helps release the phosphorous that is naturally in the soy meal and corn," says Palen.

The cost to producers has been the same, if not less than traditional ingredients, says Palen, which is additional incentive to use it.

Ecological feeding practices are being adopted where they make economic sense, says Dr. Ruurd Zijlstra, associate professor and chairman of ingredient evaluation and feed processing research at the University of Alberta. The strategies work where science and economics meet, he says.

So while nutrient management regulations play a part, as well as producers' own environmental initiatives, cost is definitely a deciding factor where adoption of ecological feeds is concerned.

Nevertheless, Cedric MacLeod, environmental programs coordinator for the Canadian Pork Council, says when feed mills are not taking advantage of the ecologically friendly feed inputs, producers are looking for it and asking for it.

The largest environmental issue that producers can control somewhat through dietary measures, remains phosphorous. It most often remains the first nutrient targeted for reduction in

Nutrient Management Plans.

"Phytase is the most effective feed additive to reduce it," says Dr. Kees DeLange, professor of animal science and swine nutrition researcher at the University of Guelph. "It is used extensively around the world."

"Pigs do not have the enzymes to break the phytate down that is found in plant sources such as soy meal and corn," says DeLange. "Most of it ends up in the manure. By adding enzymes you can enhance

the digestion of phosphorous." DeLange believes most feed companies are now using phytate in their feed rations. It is cost-effective, so it's described as a win-win.

Another alternative, he says, involves the industry's adoption of the EnviroPig which is genetically engineered to produce its own phytate. While still not accepted for use commercially, the Canadian and U.S. industries are still pushing for the public's approval of the EnviroPig.



According to Dr. Zijlstra, the trend of including phytase, especially with a lot of on-farm grains fed, to reduce phosphorus excretion, began just a few years ago when phy-

tase came down significantly in price. Once again, as soon as it made economic sense, he said, the barriers disappeared and now phytase is widely accepted.

The one very frustrating barrier that remains, say Canadian swine nutritionists, is regulatory in nature. Feed industry regulations stipulate the inclusion of minimum levels of individual nutrients, including phosphorous. The use of phytase has resulted in better digestion and absorption of this nutrient so less of it is required. But regulations have not been modified to reflect this. It is an ongoing hurdle for feed manufacturers who sell feeds with labels.

Labels should be changed to reflect digestible phosphorus and not total phosphorous, say feed manufacturers who are pressuring the federal government to make this change, which, incidentally, was adjusted 15 years ago in other countries. The time lag to make the changes, says Zijlstra, puts the swine industry, the environment and consumers, at risk needlessly.

More information regarding ecological feeding practices has also resulted in increasingly less resistance to the use of synthetic amino acids over the past 10 years, says Zijlstra. Some of the proteins in swine diets, such as those found in soybean meal, are now being replaced with synthetic amino acids such as lysine.

Most commercial feed companies are doing this, according to DeLange. The most direct result is less nitrogen output but this practice also reduces ammonia emissions, according to Macleod.

As MacLeod explains, traditional finishing rations have been comprised of about 17 per cent crude proteins. But research has shown that crude protein levels can safely and effectively be reduced to 15 per cent, going down over time to as low as 13 per cent. Every one per

cent reduction of crude protein in the swine diet, results in an eight to 10 per cent reduction in nitrogen output, up to a maximum reduction of 20 to 40 per cent.

When soybean meal doubled in price three years ago, the cost savings realized by reducing its influence in the swine diet was welcomed.

Dr. Daniel Hurnik of the Atlantic Veterinary College, recently completed research that slashed crude protein levels by up to five per cent in finishing rations resulting in equal performance when compared to conventionally fed hogs, while those with the decreased crude protein levels actually finished with larger loin eye sizes.

As Hurnik explains it, while today's pigs require amino acids to make muscle, not all protein sources have the right mixture of amino acids. So to compensate for shortages in some amino acids, the industry has tended to overfeed overall protein content to avoid a shortage of specific amino acids. That's okay when feed sources are cheap or pig prices high but unused protein has an environmental cost.

"Excess protein is digested by the body and eliminated mostly in the form of ammonia," says Hurnik. "Ammonia is an important contributor to air pollution both inside and outside the barn."

In his research which compared the protein needs of finishing pigs, a conventional diet was compared to a diet balanced with synthetic amino acids to minimize the amount of crude protein used. While the pigs on the low protein diets performed as well or better than those on the

conventional diets, the diet costs were very similar.

Furthermore, as Dr. Fan suggests, new amino acids are being discovered to reduce the dependency on soybean meal and increase nitrogen retention. "Protein is still the most expensive component of feed," says DeLange. "We're feeding a little too much protein, especially to young pigs."

Dr. Fan also describes research projects involving the use of probiotics to replace and/or reduce the use of antibiotics in swine feed, which also have an impact on odour emissions.

Odour, as it happens, is not only an irritant and toxin to barn workers and neighbors but is also responsible for decreased immunity in the pigs, reduced growth performance and a contributor to the poor quality of animal products (i.e. boar taint). Dietary strategies for controlling odour, as Fan describes them, include the formulation of low-protein and low-sulfur diets and the manipulation of dietary pH lev-

els, among other methods.

Supplements are also being developed to improve carbohydrate digestion. As Dr. Fan says, some complex carbohydrates are not digested efficiently, thereby contributing to gas and volatile compounds. He says there is a lot of potential and room for improvement in this area.

Macleod describes some research at the University of Guelph which is currently looking into the way high moisture corn can break down phytate when fermented, making phosphorus more available to the pig.

Also reducing odours and improving pig health is the addition of more fibre in the pigs diet. It's all part of taking a more balanced approach to feeding pigs, says Fan, who compares the evolution of swine diets to that of humans. Organic oils, reduced protein, complex carbohydrates and increased fibre are all playing a role in more efficient, environmentally friendly diets.

What's best for the pig, as it turns

out, is best for the herdsman and for the farm too. *hwy*