WHY LIFT THE BAN IN EUROPE?

Are processed animal proteins of unique nutritional value in formulating rations for food producing animals?

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Since the EU banned animal by-products in rations in 2001 feed compounders have been forced to replace animal proteins with a variety of alternatives.

While livestock has remained well fed, many producers complain of rising input costs and competitive disadvantage as a result, which leads to the questions; how efficient are the alternatives, and what are the environmental and financial costs?

The EU is now considering lifting the ban on feed use of processed animal proteins from category 3 by-products fit for human consumption at the point of slaughter. Based on proven scientific evidence, it is considering revising current legislation and says that with strict controls in place, lifting the ban could help address the continents' 70%[a] protein deficit and level the playing field for European farmers.

But after a decade without animal proteins in feed, is there a nutritional case for using PAP in poultry and pig feeds?

Since the ban no individual feed ingredient has offered an holistic solution to fill the gap that was left by meat and bone meal. Soya, whilst an excellent source of protein and energy does not supply the same range of vitamins and minerals: calcium, phosphorous and vitamin B12, for example, were all supplied to varying degrees by animal proteins.

Vitamin B12 is important for red blood cell formation, DNA synthesis and in the maintenance of nerve cells. It is now commercially synthesised[b] using bacteria.

Feed compounders source calcium from ground limestone, crushed oyster shells and dicalcium phosphate. The latter is also an alternative source of phosphorous, as is monosodium phosphate and rock phosphate, all of which carry environmental and financial costs and are in demand for applications as diverse as alloy creation, detergent manufacture and fertiliser production.

Ever increasing fuel costs make the recovery of the rock phosphate more expensive and it is argued that reserves of this natural resource may have peaked. Remaining reserves are predominately located in Morocco and China, countries which are understandably keen to retain the resource for their own use as their economies expand. Consequently the cost of feed-grade phosphates has risen four-fold in recent years[c].

35.8 million tonnes of soya was used in compound livestock feeds in Europe during 2007, 24.8 million tonnes of which was imported from countries such as Brazil and Argentina[d]. With high demand and commodity prices driving deforestation it is estimated that at this rate 40% of the Amazon rainforest will have been destroyed by 2050. Once harvested, the crop is transported vast distances to reach the shores of the common market, further increasing its environmental and financial cost.

It is not feasible to grow soy in Europe due to the temperate climate and those alternative vegetable proteins which will grow, oil seed rape, lupins, and field beans, for example, present particular challenges to pig and poultry producers. Unlike their ruminant counterparts, pigs and poultry are unable to digest sufficient quantities of forage, demanding higher concentrations of protein and energy.

The uniqueness of PAP stems from the variety of nutritional needs to which it can make a substantial contribution. In addition to highly bioavailable proteins and energy, processed animal proteins are able to contribute to the nutritional needs for calcium, phosphorous and vitamin B12.

The most expensive aspect of diets and the starting point for many feed formulations is energy. PAP delivers highly bioavailable energy in the form of fats and proteins. By mass, fats deliver the most energy, closely followed by proteins and carbohydrates. Containing up to 14% fat and 60% protein[e], PAP is an energy rich feed ingredient able to make a significant contribution to the needs of these food producing animals.

Proteins are fundamental to most biological functions. Not only are they building blocks of cells but they are also the chemical messengers and enzymes. Proteins are made up of amino acids, nine of which are essential; they cannot be made by the body and so must be supplied by the diet. Processed animal proteins are "complete", they contain all nine of these essential amino acids in relatively balanced quantities. They are also highly bioavailable; the chemical composition is such that the body can easily break them down and absorb them.

One essential amino acid is lysine, the first limiting amino acid in pig production. Insufficient levels of lysine in diets will prevent the synthesis of proteins and therefore limit growth of livestock. PAP is particularly rich in bioavailable lysine as its chemical composition is suitable for metabolism or protein synthesis[f]. A study conducted by Wang and Parsons in 1998 revealed that over 90% of the digestible lysine in PAP is bioavailable[g].

In contrast, vegetable proteins whilst often containing the essential amino acids, tend to be lacking branch chain amino acids. Feed compounders have had to use different sources of vegetable proteins to create nutritionally balanced diets.

Whilst energy and protein make up the bulk of livestock feed, their metabolism is not possible without vitamins and minerals.

Calcium is used for the production of teeth and bones but is also essential for nerve transmission. In poultry, laying hens require high levels of calcium as it is a component of egg shells. Insufficient levels of calcium in the diets of lactating pigs can cause posterior paralysis (otherwise known as 'downer' sows) as their bodies use the calcium

in the bones for milk production.

As well as being present in the form of calcium phosphate in teeth and bones, phosphorous is essential in energy production. It is present in all cells in the form of ATP (Adenosine Tri-Phosphate) and in DNA and RNA. Unlike vegetable sources, processed animal proteins contain high volumes of the mineral in a highly digestible form. Poultry for example can digest 62% of the phosphorous contained with meat and bone meal but only 42% in soybean meal and 33% in rape seed meal[h]. To ensure livestock diets are adequately balanced we now rely on finite resources to supply most of the phosphorous needed in pig and poultry production.

With independent scientific evidence supporting the use of PAP in feed, the debate over its future in Europe is now a matter of politics, economics and taste. If approved it is likely that export markets will be the first to benefit, but PAP's unique nutritional and environmental credentials could be sufficient to see it on the ingredients list of selected European pig and poultry rations before long.

a Häusling M. 2011The EU protein deficit: what solution for a long-standing problem? (2010/2011(INI))Committee on Agriculture and Rural Development
bHaugen and Pettigrew 1985 cited by Krimpen et al, Effect of four processed animal proteins in the diet on digestibility and performance in laying hens. Poultry Science 2010. 89:2608-2616.
c Augspurger and Baker, The High Cost of Phosphorus in Pigs and Poultry: What are the options? Accessed online http://www.enzyvia.com/OptiPhos_White_Paper.pdf
d Friends of the Earth 2010, Pastures New. A Sustainable Future for Meat and Dairy Farming.
e Olukosi 2009, Meat and Bone Meal For Swine, Render Magazine, June 2009 pg 10
f Batterham, 1992; Lewis and Bayley, 1995 cited by Stein H. H. et al 2007, Invited review: Amino acid bioavailability and digestibility in pig feed ingredients: Terminology and application. Journal of Animal Science Jan 2007 Vol 85 172-180
g Wang and Parsons 1998, Bioavailability of the digestible lysine and total sulphur amino acids in meat and bone meals varying in protein quality. Poultry Science 77:1003–100
h Kamphues J. Phosphorus derived from animal by-products. Using not wasting. Institute of Animal Nutrition, University of Veterinary Medicine Hannover

EFPRA is Europe's leading authority on the use, value and bio-security of edible animal fats and meat industry by-products. Its members work closely with regulators, livestock producers, meat processors and retailers across the EU to make best use of the 18 million metric tonnes of animal by-products produced every year. The industry EFPRA represents recovers edible animal fats, valuable proteins and renewable energy at 450 sites, producing quality products for use in human food, animal feeds, petfood and for the oleochemical, pharmaceutical, energy and construction industries.