

By-products usage

Results from a survey of major petfood manufacturers

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The petfood industry represents a significant market outlet for meat by-products, including rendered fats and protein meals. Roughly 25% of all meat by-products produced in the US are utilized in petfoods. The inclusion rate of meat or meat by-products in specific cat and dog foods may be as high as 50% and 40%, respectively.

This article will briefly review the US rendering cycle of animal fats and protein meals, and address meat by-product usage trends. Results from a survey of major petfood manufacturers will also be covered.

Rendered animal by-products

In the US, approximately 50% of every meat animal is not consumed by humans and must be dealt with in a safe, acceptable manner (Phillips, 1994). The US meat industry produces approximately 44 billion pounds of by-products per year. The rendering industry converts these by-products into usable products. Figure 1 illustrates the rendering cycle from animal production to inedible animal material to the production of fats and proteins.

Rendered products are used in four major sectors of today's economy:

- The petfood, poultry and live-



Rendered animal by-products. Petfood manufacturers want nutritional consistency, but do not want products manipulated to consistency. Photo courtesy Darling International, Inc., Irving, Texas, USA.

stock industries;

- Industrial production of metals, rubber, pesticides and fertilizers;
- Soaps and personal care products; and
- The human food industry (edible tallow, gelatin and defatted meat tissue).

This article will focus only on the

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petfood sector's use of animal by-products, which includes fats and protein meals.

Fat facts

More than half of the domestic use of human-inedible fat is in animal feeds. The major benefits of using fats in petfoods are: Increased energy density, increased essential fatty acids, improved petfood palatability, enhanced nutrient utilization (fat-soluble vitamins), improved pet performance and hair-coat, reduced feed dustiness and reduced wear on machinery.

The principal means to determine fat quality and fat value are: Color, fat hardness (degree of unsaturation), free fatty acid content, amount of impurities, moisture content and fat stability. Laboratory tests have been developed to quantify these parameters. Most petfood companies run these tests as part of their supplier approval process and as routine quality control of incoming fats.

Protein meals

Protein meals are produced from the solid material remaining after the removal of water and fat from animal by-products. Common protein meals include meat and bone meal, meat meal, feather-meal, poultry by-product meal and bloodmeal. Many species specific protein meals have also been developed, such as beef meal, pork meal, chicken meal, turkey meal, lamb meal and specific fish meals. Rendered protein meals are rich sources of protein, amino acids, energy, calcium, phosphorus, trace minerals and vitamins.

The quality and value of protein meals for petfoods are generally assessed based on:

- Nutritional consistency (amino acids, fiber, ash, moisture);
- Protein digestibility;
- Absence of salmonella and pesticides; and
- Palatability.

In general, the variation in nutrient content of animal protein meals is larger than that of plant origin proteins (Fahey and Hussein, 1997). These variations are introduced from mixing animal tissues and the varying amounts of bone and fat in the raw material. The type of processing system and the rendering temperatures also affect the availability of nutrients in the animal protein meal.

In a recent review by Fahey and Hussein (1997), several research studies evaluating the nutritional variation in animal by-products were summarized. Wang (1996) evaluated the effects of meat and bone meal (MBM) source and processing conditions on the availability of amino acids. The MBM sources evaluated were all beef, all pork, mixed species and a mixture of high bone ingredients. The effect of the raw material source on amino acid digestibility was found to be minor.

The meals investigated were produced by seven different commercial cooking systems at different processing temperatures (ranging from 96-152°C). Amino acid digestibilities in MBM varied

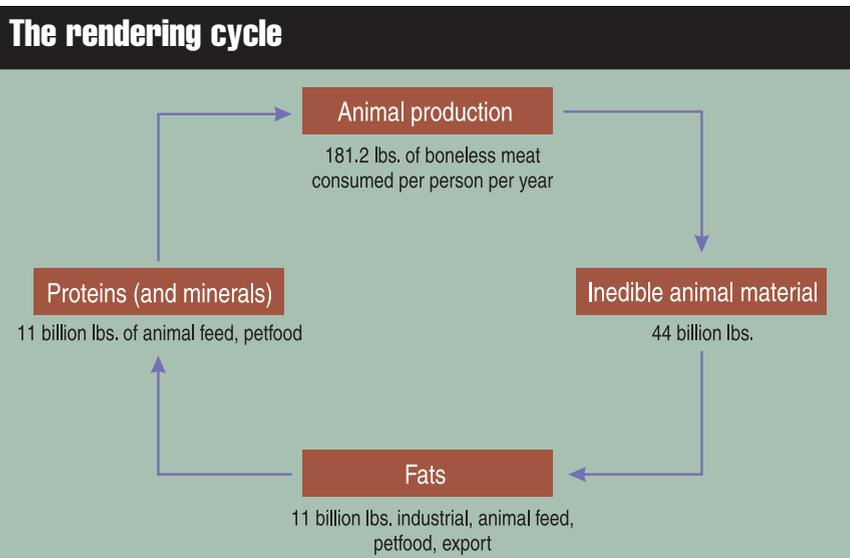
substantially among the processing systems. In general, the higher processing temperatures yielded lower amino acid digestibilities. These results suggest that differences in the processing systems and temperature can significantly affect the protein quality of meat by-products.

Survey of petfood manufacturers

To evaluate the latest trends regarding meat by-products, we conducted a survey of large petfood manufacturers. In August of 1997, a questionnaire was mailed to the nutritionists of these companies, and follow-up phone calls were made. The response rate was well over 50%. The following summarizes the responses to this survey:

What meat by-products are currently being used by your company? As expected, a wide variety of meat by-products are being used by the petfood industry. These by-products could be categorized as follows:

- General protein meals: Meat meal, meat and bone meal, poultry by-product meal, fish meal, etc.;
- Species specific meals: Beef



The rendering cycle in the US. The US population consumes 181.2 lbs. of boneless meat per person per year. That consumption rate generates approximately 44 billion lbs. of inedible animal material that is rendered. The rendering process generates 11 billion lbs. of fat, 11 billion lbs. of protein and 22 billion lbs. of water. Source: Gary Pearl, DVM, Fats and Proteins Research Foundation, Inc.

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meal, pork meal, chicken meal, lamb meal, turkey meal;

- Fresh meats: Beef, pork, chicken;
- Specific fish meals: Herring meal, tuna meal, crab meal;
- Organ meats and blood products: Chicken liver, porcine plasma;
- Digests: Poultry digest, lamb digest; and
- Fats: Tallow, poultry fat, chicken oil.

What is a typical inclusion rate of meat by-products in various petfood lines? In general, it appears that meat by-product inclusion rates are higher in cat foods compared to dog foods. The typical level of meat by-products in cat foods was 35-50% compared to a range of 25-40% in dog foods. The average protein level in cat foods is higher than that of dog foods.

What are your processing requirements for suppliers of meat by-products? Strong, trusting relationships between petfood manufacturers and suppliers of meat by-products are essential. Standard GMP (good manufacturing practices) documents, vendor certification, APHIS certification for export and generally plant inspections are required. Quality control programs monitor nutritional specifications, bacterial specifications, product appearance and stability, protein digestibility and the type of preservation system utilized.

Petfood manufacturers want nutritional consistency, but do not want products manipulated to consistency. They do not want "altered" ingredients.

What novel meat by-products are being used by the petfood industry? One nutritionist commented that "virtually any part of the cow or pig can be (and is) dried and smoked." Meat by-products primarily being used in pet treats include: Pig ears, pig snouts, cow hooves, cow tails, various rawhides (skins), cow femur

bones, shark cartilage and various meat solubles and broths. Unusual meat sources, such as rabbit meal and venison meal, are used in select pet lines.

What trends in the petfood industry might impact meat by-product usage? The petfood industry is dynamic, so changes in it will likely affect the levels and types of meat by-products used. Noted trends were as follows:

- More species specific meals (reduced interest in "collective" terms such as meat meal, poultry by-product meal, etc.);
- Greater interest in "real" meat rather than protein meals;
- The ability to trace animal identities back to feedlots or production facilities;
- More hypoallergenic formulas (lamb and rice);
- Certified "organic" meat sources;
- Naturally preserved meats; and
- More premium pet lines.

BSE or other concerns? BSE remains an important issue, particularly for petfood exports. A comment was made, however, that the petfood industry has already dealt with this issue and has taken appropriate steps. Processing conditions are controlled and monitored through APHIS certification, etc.

Dynamic suppliers

There appears to be a general trend towards more species specific protein meals and greater interest in "real" scrap meats. The innovative supplier of meat products will enjoy good margins along with the petfood industry. The petfood industry is dynamic, and successful suppliers to the industry must be dynamic as well.

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