



FATS AND PROTEINS RESEARCH FOUNDATION, INC.

801 N. Fairfax Street, Suite 205 Alexandria, VA 22314 USA

Telephone: (703) 683-2633 FAX: (703) 683-2626 www.fprf.org

Directors Digest

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The Fats and Proteins Research Foundation is under new direction, following an aggressive strategic planning process that began in early 2010. In addition to increasing focus and direction in our requests for proposal (RFPs) to ensure research funded is important to renderers, efficient, and effective, we will be engaging more with researchers and will be using various methods to communicate results. We will use old methods that worked in the past and new methods that show promise. The Directors Digest will be distributed by email and posted on the website rather than sent by post. Please pass it on to anyone interested.

FPRF published the “Directors Digest” from 1962 to 2005. It was started by D.M. Doty, continued by several people including Dr. Fred Blispinghoff and Dr. Gary Pearl up to volume number 345 in 2005 (all of these are available at fprf.org). Dr. Sergio Nates continued communications efforts with 15 issues of “FPRF Newsletter” until April 2011 (these are also all available on the website). We’ll resume Directors Digest with number 346 to provide simplified summaries of the work and will produce additional issues from time to time. Full research reports by the original authors will also be on the website with all their details, tables, and references.

This first issue (attached) and future issues of Directors Digest will feature results reported recently by researchers, results from the Animal Co-Products Research and Education Center (ACREC) at Clemson University, and from time to time we’ll report again on projects from recent years that had useful outcomes—so you may have seen some of these before. While this issue has a nutrition theme, all research areas will be covered in the future. We’ll plan to send this quarterly.

David L. Meeker, Director of Research, dmeeker@nationalrenderers.com

Feather Meal and Meat and Bone Meal in Aquaculture Feeds and Production

Ehab El-Haroun and others, Cairo University, Egypt

This project included several feeding trials. The first highlighted the importance of meat and bone meal as a source of phosphorus in fish diets and using meat and bone meal in tilapia diets could decrease environmental impact. Another showed the optimal inclusion rate of feather meal in place of fish meal and soybean meal are 33 and 66% respectively. Another trial showed phosphorus concentration in a green water under hapa-in-pond system is not enough to meet the nutritional requirements of tilapia broodstock, and that using meat and bone meal to supply phosphorus supports greater reproductive performance. Finally, this study showed high levels of meat and bone meal can be used in fish meal diets supplemented with lysine for Nile tilapia, provided that the diets are also supplemented with L-tryptophan.

This project was co-funded by the Poultry Protein and Fats Council.

Digestibility and Effective Level of Meat and Bone Meal in Diets for Milkfish
Mae R. Catacutan and others, Southeast Asian Fisheries Development Center, Philippines

Milkfish is one of the most important food fish of Southeast Asia. Based on growth efficiencies, survival data, and histology of tissues examined, milkfish were able to utilize meat and bone meal in practical diet formulations at dietary level of 22.5% when grown in salt water, and at 30% when grown in fresh water. For the most part, there were no changes in the histology of fish liver, intestine, muscle, kidney, and brain tissues.

This project was co-funded by NRA's International Market Development Committee.

Attractability and Palatability of Rendered Animal Proteins to Blue Shrimp
George Chamberlain and others, Integrated Aquaculture International, Hastings, NE

This study established that poultry byproduct meals have attractability and palatability factors, but at levels slightly lower than those of fishmeal. At inclusion rates of up to 10%, poultry byproduct meal does not adversely impact attractability and palatability of shrimp feeds. At higher inclusion rates, especially when such inclusion occurs at the expense of fishmeal, there is likely to be a slight negative impact on attractability, palatability, and growth. This negative impact can be offset by the low level inclusion of a highly effective attractant and palatability enhancer such as krill meal. Blood meal has a negative impact on attractability and palatability even at an inclusion rate of 3%. Abundance of low molecular weight (< 1000 Dalton in size) peptides seemed to indicate ingredients that impart considerable attractability and palatability to shrimp feeds.

This project was completed in 2009 and previously reported.

Effect of Phase-Feeding Beef Tallow along with Dried Distiller Grains on Pork Quality
Jason K. Apple and others, University of Arkansas

With current feed prices and expanding ethanol production, many pigs are fed high amounts of dried distillers' grains with solubles (DDGS). This has caused problems with soft fat in pork bellies. It's been long known that feeding pigs a saturated fat such as tallow can improve the firmness and desirability of the resulting carcass. This study showed little or no impact on live pig performance or pork carcass characteristics when pig diets containing DDGS were supplemented with tallow in a phase-feeding manner. However, feeding tallow in the finishing phases rather than the growing phases may prevent problems with soft fat, specifically fresh belly quality in pigs fed high amounts of DDGS or unsaturated fats.

Developing and Formulating Novel Peptide-based Antioxidants from Rendering Proteins for Potential Aquaculture and Pet Foods
Feng Chen, Clemson University

This experiment demonstrated that the hydrolysates of rendered proteins possessed antioxidant activities which may enable them to be used as natural antioxidants in animal feeds as substitutes for some commonly used commercial antioxidants such as BHT, Vitamin E, and ethoxyquin. Hydrolysates prepared using base hydrolysis exhibited strong antioxidant activity comparable to BHT using different assays. It could be a great benefit to the rendering industry to develop such safe and "natural" substitutes for use as nutraceuticals, functional foods, and other applications where use of currently used commercial antioxidants are under scrutiny and criticism.

This project was developed and funded within the Animal Co-Products Research and Education Center (ACREC) at Clemson University.

Determination of Carnosine Content and Antioxidant Activity in Rendered Poultry Meals

Paul Dawson and Paljinder Manhiani, Clemson University

This study found that natural antioxidant and bioreactive compounds found in meat can be recovered in the active form from poultry by-products and from rendered protein meal. Tissues such as the liver contained greater amounts of carnosine compared to other tissues such as the heart. Poultry meals also contained carnosine and these meals also displayed antioxidant activity. Live birds that were stressed prior to slaughter had higher concentrations of carnosine in their tissues compared to unstressed birds. The imidazole ring contained in the structure of carnosine was found to be the major contributing factor. Even though carnosine was recovered and quantified in poultry tissues and in protein meals, it may not be the only contributing factor for the antioxidant activity of these materials. Carnosine is a high value product currently being sold as a nutritional supplement for animals and humans. Soy and other vegetable proteins don't have carnosine, so the high level of this antioxidant in poultry meals is a selling point.

This project was developed and funded within the Animal Co-Products Research and Education Center (ACREC) at Clemson University and was co-funded by the Poultry Protein and Fats Council.

Use of Animal By-Product meals in Zero Exchange Feeds for Shrimp

Albert Tacon, Aquatic Farms Ltd, Kaneohe, Hawaii

Fishmeal replacement can improve the economic viability and sustainability of marine shrimp culture operations within the U.S. and globally through the development of cost-effective fishmeal-free feeds using terrestrial animal by-product meals as the main protein source. This experiment shows the nutritional and economic efficacy of totally replacing fishmeal and squid meal within commercial shrimp feeds by using poultry byproduct meal up to a dietary inclusion level of between 20 and 25%. The diets were supplemented with methionine and dietary soybean meal levels were increased from 16% to between 20 and 25%. Cost savings were between 5.7 and 7.9% compared to a similar diet containing 8% fishmeal and 2% squid meal. Hydrolyzed feather meal up to an inclusion level of 5% and spray dried blood meal up to an inclusion level of 2.5% of the total diets resulted in similar cost savings.

This project was completed in 2009 and previously reported.

Effects of Biogenic Amines on Broiler Performance

Melanie Friday, Jeffre Firman, and Alex J. Bermudez, University of Missouri

This study was designed to determine whether the biogenic amines phenylethylamine, putrescine, cadaverine, and histamine, alone or in combination, if added at levels above those commonly found in complete mixed rations containing animal by-product meals, would cause lesions or reduce performance in broilers. Originally, this study was to use purposely abused raw materials (stored over the weekend during summer months) in order to elevate the levels of naturally induced biogenic amines. However, tests on such material revealed amine levels were not elevated. Thus, diets were spiked. The levels of biogenic amines used were double those that have been previously reported to cause problems for broilers. Data collected on performance, gross pathology, and histopathology at 3 and 6 week indicated no significant differences in production parameters among amine treatments. No significant gross lesions or histopathologic changes were evident. This study suggests that the four studied biogenic amines are of little concern to the broiler industry when fed at or below amounts utilized.

This project was completed in 1999 and previously reported by FPRF and in the Journal of Applied Poultry Research, 8:408-413.