FPRF Technical Services Newsletter

OCTOBER 24, 2011

VOLUME 1, NUMBER 1

"Make sure you don't lose the customers you've spent so much energy to acquire."

President's Column

As this is my inaugural issue for the new FPRF Technical Services Newsletter, I wanted to share my ideas regarding the newsletter. First and foremost, I welcome all members to submit ideas or articles for publication, and I would be keen on to see other members share their expertise.

Second, I want to provide members with a resource that will increase their knowledge base regarding current issues within FPRF. While Dr. Meeker has his biweekly newsletter, my goal will be more research oriented. Furthermore, this newsletter will be bimonthly. I hope to include in every issue, a President's column, a Country focus, a R&D update, an ACREC column and a Noteworthy Article, which I anticipate can be used to stay abreast on FPRF ongoing research efforts, and help educate colleagues and customers.

Third, I would like the newsletter to be a positive representation of the foundation mission and goals. Past issues of the Technical Services Bulletin have been a great way for members, new and old, to interact and learn about new ideas within the area of the Rendering Industry. I hope to continue this during my time as Newsletter Editor.

It is of the utmost importance that this newsletter begins to put forth informative and helpful research and materials. We will have some new contributors to this newsletter, which is welcome and exciting. I have encouraged other members of NRA, FPRF and ACREC to submit material and ideas to be included in future newsletters. It is only through the sharing of information amongst ourselves that we can ensure a free flow of knowledge for the benefit of all.

Sergio F. Nates, Ph.D.

Country Focus (by German Davalos – Regional Director Latin America)

After reaching a 10 year record of U.S. protein meals exports to Mexico in 2005 (113,222 MT worth US$38,234,139), the National Renderers Association is trying to gain more access to the Mexican market by working with the local industry to encourage the Mexican Government to allow more access to imported non ruminant protein meals.

Currently, Mexico requires that only US companies who have NO ruminant product at their facilities are eligible to export non ruminant proteins (poultry and porcine origin). This requirement prohibits many US facilities from exporting to Mexico. Currently, NRA is working towards full acceptance of ruminant proteins in Mexico. A

step along that path is to first allow plants to export non ruminant proteins to Mexico, as long as they follow the proper procedures as outlined by FDA. There has been progress made in this regards and we hope to see this implemented this summer. Due to the strong and growing demand for animal proteins in Mexico by the growing poultry and aquaculture industries, Mexico has become the most important market for the North American rendering industry. Following are US export statistics that show the importance of the market.

United States Export Statistics

Commodity: 230110 Animal Protein Meals

Full Year Data: January – December

Partner Country	Unit	Quantity			% Share			% Change
		2003	2004	2005	2003	2004	2005	2005/2004
World	T	505,671	136,932	193,857	100.00	100.00	100.00	41.57
Mexico	T	61,576	59,750	113,222	12.18	43.63	58.40	89.49

United States Export Statistics

Commodity: 230110, Animal Protein Meals

Year To Date: January – March

Partner Country	Unit	Quantity			% Share			% Change
		2004	2005	2006	2004	2005	2006	2006/2005
World	T	23,374	42,881	46,386	100.00	100.00	100.00	8.17
Mexico	T	6,873	21,801	27,089	29.40	50.84	58.40	24.26

In 2005 Mexico imported nearly twice the amount of animal proteins as it did before BSE was found in North America (2003). Mexico is by far the largest importer of US animal protein meals as shown in both of the above charts as importing over half of total US exports. However, all of these imports into Mexico are non ruminant proteins. Hence, it is important that restrictions begin to be eased in order for the rendering industry to be able to meet this increased demand. The first step towards this direction will be to ease the restrictions on imports of non ruminant products and the next would be to ease the restrictions further to allow ruminant protein meals.

R&D Update

Under project 05-B1 “Comparative Study on the Capacity in Utilizing Rendered Ingredients as Dietary Protein Sources Between Fast-Feeding and Slow Feeding Marine Fish Species”, Dr. Wan Yang, will initiate a feeding trial at Nanao, Shanghai University. The experimental design consists of a single factor with nine treatments. Eight isonitrogenous and isocaloric diets have been formulated to contain 49% crude protein and 9% lipid. The control diet will include 50% steam dried fish meal. In seven diets, fish meal has been replaced with 25%, 50%, 75% poultry meal, 25% and 50% meat and bone meal, and 25% and 50% feather meal respectively. In addition, one raw fish diet will be used as a reference diet. Proximate composition of the ingredients and test diets are shown in Table 1, 2 and 3.

The feeding trial will be carried out in net pens. The grouper will be weaned to the control diet for two weeks before the start of the feeding trial. During the trial, the fish will be fed two meals per day at full ration. The fish will be weighed at intervals of 4 weeks to avoid the risk of fish death, and to determine ending time of the trial (8 weeks, 12 weeks or 16 weeks). At the start and end of the trial, fish will be sampled for determination of carcass composition. Tissues will also be collected from liver and digestive tract for histology check. Weight gain, feed intake, feed conversion ratio, nitrogen efficiency and condition factor will be examined using one-way ANOVA. A second trial will be conducted to determine digestibility of the ingredients by the fish, and a test diet will be formulated based on digestible protein and energy basis.

Table 1 Proximate composition of the ingredients (% wet or kJ/g wet)

Ingredients	Moisture (%)	Protein (%)	Lipid (%)	Ash (%)	Energy (kJ/g)
Fish meal	8.9	65.9	9.5	15.7	19.11
Meat and bone meal	4.7	56.8	13.3	22.7	18.76
Blood meal, whole, spray-dry	9.2	86	2.4	2.1	23.1
Feather meal	7.5	87.7	4.9	1.2	22.84
Rapeseed meal	10.5	41.8	1.4	6.8	17.71
Soybean meal	11.6	43.3	0.9	5.7	17.31
Poultry by-product meal	3.6	69.2	11.7	13.1	21.11
Wheat middling	11.5	17	3.6	3	17.06

Table 2 Amino acid profile of the ingredients (% wet)

	Met	Cys	Lys	Thr	Isl	His	Val	Leu	Arg	Phe	Tyr
Fish meal	1.98	0.31	6.01	2.89	2.95	2.4	3.06	4.94	3.87	2.81	2.15
Poultry by-product meal	1.44	0.55	4.32	2.67	2.73	2.21	3.07	4.78	4.78	2.68	1.96
Meat and bone meal	0.97	0.27	3.29	2.16	2.01	1.69	2.4	3.85	3.9	2.09	1.39
Bloodmeal,whole, spray-dry	1.18	0.48	7.21	4.09	2.65	4.88	5.31	9.33	4.72	5.47	2.75
Soybean meal	0.38	0.26	2.78	1.81	2.05	1.34	1.93	3.36	3.15	2.27	1.5
Feather meal	0.56	3.23	1.93	4.26	4.22	1.1	5.87	7.02	6.63	4.38	2.38

Table 3 Formulation and proximate composition (% wet or kJ/g wet) of the test diets

	Control	PM1	PM2	PM3	MBM1	MBM2	FEM1	FEM2
Fish meal	0.500	0.375	0.250	0.125	0.375	0.250	0.375	0.250
Meat and bone meal					0.145	0.290		
Rapeseed meal	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Blood meal, whole, spray-dry	0.057	0.055	0.053	0.051	0.061	0.064	0.051	0.045
Feather meal							0.094	0.188
Soybean meal	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Poultry by-product meal		0.119	0.238	0.357				
Starch, gel.	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Wheat flour	0.149	0.159	0.170	0.180	0.132	0.116	0.179	0.210
CaHPO4	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Met	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Vitamin premix	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Mineral premix	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Fish oil	0.034	0.032	0.029	0.027	0.027	0.020	0.041	0.047
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DM	90.7	91.3	91.9	92.5	91.3	91.9	90.9	91.0
CP (%)	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Lipid (%)	9.0	9.0	9.0	9.0	9.0	9.0	9.1	9.0
Ash (%)	11.6	11.2	10.9	10.5	12.9	14.2	9.8	8.1
Gross energy (kJ/g)	18.6	18.7	18.9	19.1	18.5	18.3	18.9	19.3

ACREC Update

The study by Dr. Igor Luzinov on “Plastics and polymer blends from proteins produced by animal co-products industry” has been initiated. Below is a brief description of the project in his personal words.

“Significance of eco-friendly/biodegradable materials based on easily renewable natural resources, and the finite nature of petrochemical resources, has necessitated the development of polymers from agricultural processing by-products. The truly biodegradable plastics are only those that can be consumed by micro-organisms and reduced to simple compounds. Important way to produce the biodegradable plastics is by using natural polymers based on starch, proteins and cellulose. This is why soy protein has been considered recently as an alternative to petroleum polymer in the manufacture of adhesives, plastics, and various binders. It was shown that plastics and polymer blends made from the soy protein have high strength and good biodegradable performance.

In the proposed research we plan to test and evaluate possibilities to translate the methodology of making plastics and polymer blends from soy proteins to the proteins produced by the rendering industry. In brief, we will prepare and characterize the polymeric materials employing the proteins obtained from animals. The plastics will be fabricated by compression molding at various moisture levels and molding temperatures. Polymer blends, where the proteins will be mixed with industrially produced biodegradable polymer (polycaprolactone), will be also prepared and tested.

The morphology and mechanical behavior of the samples will be thoroughly characterized. Specifically, mechanical properties will be measured using dynamic mechanical analysis, thermal mechanical analysis, and impact, fatigue and stress-strain testers. Scanning electron microscopy, transmission electron microscopy and atomic force microscopy will be used to analyze the structure of initial and fractured samples. Differential scanning calorimetry and dynamic mechanical analysis will be employed to detect temperature transitions in the materials. The data generated in the research will be compared with those obtained for the soy proteins. Similarities and differences in the material’s properties will be identified. Recommendations derived from the proposed study will suggest efficient directions for further investigations in manufacturing/fabrication of polymeric materials with improved characteristics employing the animal proteins as a component”.

Noteworthy Article

Bellagamba F., S. Comincini, L. Ferretti, F. Vafre and V.M. Moretti. (2006) Application of quantitative real-time PCR in the detection of prion-protein gene species-specific DNA sequences in animal meals and feedstuffs. J. Food Prot. 69(4):891-6.

This study describes a method for quantitative and species-specific detection of animal DNA from different species (cattle, sheep, goat, swine, and chicken) in animal feed and feed ingredients, including fish meals. A quantitative real-time PCR approach was carried out to characterize species-specific sequences based on the amplification of prion-protein sequence. Prion-protein species-specific primers and TaqMan probes were designed, and amplification protocols were optimized in order to discriminate the different species with short PCR amplicons. The real-time quantitative PCR approach was also compared to conventional species-specific PCR assays. The real-time quantitative assay allowed the detection of 10 pg of ruminant,

swine, and poultry DNA extracted from meat samples processed at 130 degrees C for 40 min, 200 kPa. The origin of analyzed animal meals was characterized by the quantitative estimation of ruminant, swine, and poultry DNA. The TaqMan assay was used to quantify ruminant DNA in feedstuffs with 0.1% of meat and bone meal. In conclusion, the proposed molecular approach allowed the detection of species-specific DNA in animal meals and feedstuffs.

Pledge Reminder

The activities of FPRF are changing ahead with several new efforts and we need to get all members pledges in as the 2005-2006 fiscal year ending is approaching fast. We also need to plan for next year and we want your organization to be involved.

This year, it is more important than ever that your company play a part in our effort. FPRF's agreement with Clemson University's Animal Co-Products Research & Education Center (ACREC) will advance the science and technology of animal co-products and the rendering process. In addition, the Center will work to ensure the microbial safety of rendered products for animal feeds and consumer protection; it will promote environmentally sound practices and will develop new market opportunities for our rendering industry. Our commitment and the continuing funding for ACREC will depend on your contribution to FPRF.

I really do believe that there is an obligation on all of us in positions of leadership to try and offer a progressive example to everyone in the industry. This leading example can be capitalized through your support, and I want to thank you for your pledge to FPRF. We will be sending out reminder cards and a stamped return envelope. All pledges must be received at least 30 days prior to the end of the fiscal year (August 30, 2006) to be considered for the fiscal year.

We look forward to hearing from you at your earliest convenience.

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