

To Whom It May Concern:

Please find my responses for the NOAA and USDA questions regarding the public comment on aquaculture feeds.

1. The Federal government should focus its research efforts on all aspects of the use of alternative protein ingredients in fish and crustacean species that are currently, or have potential to be, commercially important in the U.S. and globally. These research efforts should include ingredients that can be processed by different methods so as to improve and enhance the protein/amino acid content, such as processing methods for soybean protein concentrates, barley, and distiller's dried grains with solubles. The only areas of research that I feel that should not be addressed are ingredients that are proprietary in nature. These ingredients may rely on a specific, patented processes for ingredient enhancement that would not be available to feed mills and/or could raise the cost of the ingredient so as to make it prohibitively expensive in use for aquaculture diets (for example, some of the processed yeast products from commercial nutraceutical companies that are more expensive than marine fish meal.

2. While all current and potential alternative protein and oil sources should be evaluated for nutrient composition and suitability in aquaculture diets, it must be realized that many ingredients will have limitations for use in diets for certain aquaculture species (especially carnivorous fish and crustacean species). Many fish species evolved to consume other fish and high-protein animal foods. Thus, use of plant-protein sources may have nutrient limitations, such as deficiency in levels of one or more essential amino acids. This may be especially true for carnivorous species (walleye, trout, salmon, and numerous marine species) that tend to utilize plant-protein ingredients and carbohydrates poorly. However, formulation of diets that have complimentary protein sources, whereby two or more protein sources are used so as to mask any deficiency in any one ingredient, has been utilized for many years and research to determine the appropriate combination of protein ingredients needs to be conducted.

While the use of alternative protein sources in future aquaculture diets is essential to reduce diet costs and possibly allow for profitability and industry expansion, this investigator cautions against the use of all-plant protein diets. While research should be conducted and funding for this research should be allocated, I do not feel that this area should be the sole area of research focus. While great strides have been made into nutrient balance of all-plant diets for some fish and crustaceans, there are still limitations on use of these diets due to many factors, such as reduced diet palatability, reduced digestibility of protein and essential amino acids, anti-nutritional factors present in the ingredients, etc. Use of diets containing a mixture of animal and plant proteins is still the most reliable to ensure proper growth and health of aquacultured organisms.

4. I may be the only person who has this opinion on the subject of omega 3 fatty acids in seafood and potential human health impacts, but I feel that the case for addition of omega 3 highly unsaturated fatty acids (HUFA) is overstated, unless the organism being cultured has a requirement for a dietary source of these HUFA. The most popular seafood consumed by Americans are shrimp, tilapia, tuna, salmon, and catfish. Only salmon have high levels of omega 3 HUFA. However, citizens of the U.S. have become increasingly overweight and the incidence of heart disease continues to increase each year. We

consume approximately 16 pounds of seafood each year per person. No matter how much omega 3 HUFA was present in all the seafood consumed in the U.S., it would not be of consequence to our overall health. Further, as I stated, most seafood consumed in the U.S. have little omega 3 fatty acids present.

The USDA, aquaculture industry persons, health and nutrition agencies, and all other interested groups should promote fish and seafood as a low fat food that, when coupled with a healthy lifestyle (which includes exercise, limiting alcohol consumption, and no tobacco use) could lead to a reduction in heart diseases. The notion that eating a fish with ?heart healthy? omega 3 HUFA maybe a great marketing ploy, but it does nothing for improving the health of our citizens. This can be seen by analyzing data from the past 20 years and the increase in obesity and heart disease in our population.

Less emphasis should be on research that replaces one expensive oil with HUFA (such as marine fish oil) with an expensive, commercially-produced oil with HUFA (such as some of the algal oils). Only if the organism being cultured requires omega 3 HUFA for proper growth and health (such as marine fish species, hybrid striped bass, etc) should research focus on alternative sources of oils with high percentages of HUFA. If plant oils (without omega 3 HUFA) can be used to grow a species successfully, it should not matter if the consumer obtains these fatty acids. Humans are land-based mammals that require arachidonic acid (a fatty acid with 20 carbons, 4 double bonds, and is of the omega 6 family of fatty acids). Humans probably require very low dietary levels of omega 3 HUFA. Emphasis should be placed on promoting fish as a low-fat food, not if it contains a ?magic bullet? fatty acid (because it doesn?t).

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