FATS AND PROTEINS
RESEARCH FOUNDATION, INC.
2720 DES PLAINES AVENUE • DES PLAINES, ILLINOIS 60018
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THE DIRECTOR'S DIGEST
D. M. DOTY
TECHNICAL DIRECTOR

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No. 103

CATFISH DIETS CONTAINING MEAT AND BONE MEAL GIVE EXCELLENT PERFORMANCE

Professor C. W. Deyoe and his associates at Kansas State University, with grant support from FPRF, have been studying the use of meat and bone meal in catfish diets (see The Director's Digest, November, 1971, No. 89). During the summer of 1972 diets containing meat and bone meal were compared with diets containing fish meal (or whole ground fish) and with all vegetable protein diets using either cage culture or pond culture.

With caged channel catfish, a 35% protein diet containing 18.4% meat and bone meal in floating pellets performed better than diets containing whole ground fish, diets containing both meat and bone meal and fish meal, or commercial catfish feeds (Table 1.

Channel catfish were fed five different diets (Table 2) in pond culture. Six different dietary treatments were used, each replicated three times in ponds with a surface area of 0.1436 acres each. The results (Table 3) show that the best overall performance was obtained with diet Z-58 fed at the 3% (fish weight) level daily for the entire season. Although the fish fed Z-58 at the 5% level until they had grown to 27.4 grams then fed at the 3% level gained slightly more, feed conversion rates were lower. Other differences due to diet at the 3% level of feeding can be seen from the data.

It is clear from the data that meat and bone meal and dried blood are excellent sources of protein for growing catfish. At the current level of catfish feed production, at least 15,000 tons of meat and bone meal could be effectively used in feed for catfish. Fish meal is <u>not</u> a necessary ingredient for catfish feed.

Table 1. The Performance of Channel Catfish Fed Different Diets in Cage Culture

Diet Containing	18.4% M&B Meal	10% Whole Ground Fish (Dry Basis)	5% Fish Meal, 5% M&B Meal	Commercial Feed
% Total Protein	35	35	30	-
No. of Fish	4000	4000	4000	74,290
Wt. Gain, lbs.	929	862	663	-
Feed/Gain	2.33	2.96	3.11	3.62

Table 2. Major Protein Components* in Diets Fed Channel Catfish in Pond Culture

Diet:	Z-51	Z-57	Z-58	Z-61	Z-62
Protein %	25	22	30	30	40
S. B. Meal (50%), lbs./ton	184	-	-	-	187
S. B. Meal (44%), lbs./ton	-	187	517	727	-
Alfalfa Meal, lbs./ton	200	322	-	186	-
M&B Meal, lbs./ton	132	216	304	-	39
Fish Meal, lbs./ton	176	-	-	100	45
Wheat Bran, lbs./ton	808	291	-	-	-
Wheat Midds, lbs./ton	-	727	385	9	-
Dried Blood, lbs./ton	36	-	61	-	-
Single Cell Protein, lbs./ton	-	-	-	200	-
Met. energy, Kcals/kg.	1870	1650	2220	2220	1990

*Minerals, vitamins, fat, grains, and (in some diets) methionine and lysine were used in the computer-formulated diets to meet nutritional requirements.

Table 3. The Performance of Channel Catfish Fed Different Diets in Pond Culture

	Z-58 3%	Z-58 5 & 3%*	Z-58 Z-51**	Z-62 Z-51**	Z-57 Z-51**	Z-61 3%
Total feed, kg.	158	171	158	158	158	158
Total protein, kg.	47	51	41	40	39	47
Fish produced, kg.	148	150	133	126	117	129
Feed/Gain	1.07	1.14	1.18	1.25	1.35	1.22
G. Protein fed Kg. fish produced	320	342	303	337	332	366
Kcals fed Kg. fish produced	2372	2536	2265	2365	2481	2712

*5% level to 27.4 g. fish weight then 3% level.
**Z-51 fed after 27.4 g. fish weight. 3% feeding level.

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No. 104

EQUIPMENT AND TECHNIQUES DEVELOPED FOR A DYNAMIC SENSORY METHOD FOR ODORS

IIT Research Institute, under contract with FPRF, has been evaluating various systems for controlling odors in rendering plants (see Director's Digest, No. 91, January, 1972). During this investigation it became apparent that no simple, dependable technique was available for the sensory measurement of odor in the field. Also, pending regulations from EPA on rendering odors will probably specify the ASTM method as the field test compliance method. Many odor experts feel that this method is cumbersome and of questionable reliability and reproducibility.

Consequently, Dr. Andrew Dravnieks of IITRI, with the cooperation of Mr. William Prokop, National Renderers Association, has designed, constructed and tested a dynamic dilution olfactometer for the determination of odor levels in rendering plant exhausts. The results from the investigation have been presented in a recent report and excerpts from the report are presented below.

> "The evaluation principles utilized were those in common use in the sensory quality control in industry: use of forced choice triangle method in the sample presentation (two blanks and one diluted effluent), double-blind sample presentation (neither the panelist nor the panel leader knows the correct choice), and elimination of positional, numerical, or other sample designation clues. A dynamic dilution triangle olfactometer with push-button signalling of the panelist choices was constructed for implementing the above principles. Effluent sampling, storage and delivery to the olfactometer was accomplished by a combination of peristaltic pump, utilizing a disposable tubing element, with a generally available thick-wall collapsible polyethylene 5 gallon container.

"The dynamically diluted effluents were presented in an ascending concentration order, increasing the concentration by a factor of 3 per step, with three concentration steps available on a continuous stand-by basis during the evaluation. The device permitted covering the odor unit range from 60 to 70,000; easy in-field changes can extend this to 30 to 500,000 units. Evaluation of one sample was routinely completed by a panel of 9 within less than 15 minutes.

"On the average, the dynamic triangle method gave slightly higher (7 percent) odor value than the syringe dilution test when applied to rendering effluents and some single odorant vapors. In the sample containers used, the rendering effluent samples, and diluted hydrogen sulfide and valeraldehyde vapor samples, could be stored without statistically significant change in the odor level for at least 48 hours."

It is expected that further testing will confirm the superiority of this dynamic sensory technique over the ASTM syringe dilution method. Further, it is hoped that regulatory officials will accept the technique as an alternative to the ASTM method for compliance testing.