

PRESENT STATUS OF THE FISH MEAL QUALITY RESEARCH UNDERTAKEN TO MEET THE NEEDS OF THE INDUSTRY

Until recently, all poultry nutritionists, although with some reservations, had accepted fish meals as an essential source of animal protein. There has now arisen the matter of effects of processing conditions on vitamin content and on nutritive value in general. Then too, there has been a marked improvement in the quality of the principal competitor to fish meal--soybean meal. An intensive and effective research and quality improvement campaign has made the latter product very acceptable in poultry rations.

It behooves the fish meal industry to justify their position in the poultry nutrition field by establishing similar improvements in its products. These improvements should include a standardized product on which detailed information is available.

For about five years the Nutrition Council of the American Feed Manufacturers Association has urged studies designed to insure the following desirable characteristics in fish meal:

1. Uniform color.
2. Uniform particle size.
3. Uniform quality (believed to be largely related to protein).

The fish meal and oil producers group, a very substantial part of our nation's fishing industry, have utilized a double-barreled technique in working toward these objectives. Individual processors have studied methods to improve their own products. In addition, they worked to obtain adequate funds for study of the factors contributing to these admittedly desirable goals by the Federal Government's fisheries products research agency, the Technological Section of the U. S. Fish and Wildlife Service. Such funds were made available through the Saltonstall-Kennedy Act of 1954.

A broad program of research was planned by the Service administrative personnel in concert with competent industry scientists, to elucidate: (1) Those characteristics of fish meal which are related to one or more of such supposedly quality-affecting factors as condition of raw material, processing variables of time, equipment and temperature, and of meal storage conditions; (2) the establishment of the relation of these processing variables to the nutritive values of the resulting fish meals as measured by (a) practical poultry (broiler) feeding tests; (b) estimations of effect on "growth factor" and on the amount and rate of availability of the principal amino acids in the fish meal protein; and (c) any variability in residual content of the essential vitamins.

The research so laid out has been under way for more than two years at several universities considered entirely capable in their respective fields of effort, as well as at the several Service technological laboratories.

UNIFORM COLOR: The color of fish meal, as a result of these studies, has been judged to be: (1) a function of the material in the digestive tract of the fish at the time of meal preparation, (2) a function of the size and the size range distribution of the fish meal particles delivered to the feed mixer, and (3) the degree of chemical alteration resulting from oxidation and reaction between oil and protein components of the meal which occurs during drying and especially during curing and subsequent storage.

UNIFORM PARTICLE SIZE: The studies referred to above indicated that particle size and the uniformity thereof, as delivered to the feed mixer, can be adjusted within rather broad limits, by appropriate control of such related but variable factors as condition of raw material, cooking and pressing times and temperature, conditions of drying and curing, and grinding including blending of scrap from the curing pile. In this connection, it may be pertinent to mention that the bone particles, sometimes concentrated in the exterior and bottom portion of the curing pile, were found to have very nearly as high protein nutritive value as the non-bone body protein portions. In fact, protein partition studies have shown markedly little variability in the amounts or types of desirable protein available regardless of the considerable variability in any and all of the several factors under study.

UNIFORM QUALITY: This particular phase of the fish meal controversy has been attacked from several angles. It must, therefore, be considered first as to the progress in each, and second in terms of the over-all aspects. The elements of quality studied were four: (1) the amounts of unknown growth factors delivered in the fish meals under study; (2) the effects of the processing or handling variables investigated on the vitamin content of the fish meals; (3) the evaluation of small differences in amount and rate of availability of the principal amino acids of these fish meals and consequent quality of the protein as a function of the growth response when measured under certain stress conditions; and (4) variability in rate of gain of weight and in feed efficiency as measured by a practical commercial ration on chickens in battery-lot tests of broilers from one day old to 10 weeks of age.

The reports contained in this Supplement are to be considered Progress Reports on research now under way on the over-all question of fish meal quality.



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Madison, Wisc.