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FOOD PROTEIN SUPPLEMENT FROM ANIMAL BY-PRODUCTS

All nutritionists agree that the current world food protein supply is inadequate and that this situation will become worse, particularly in the developing countries. It should be possible to furnish a significant amount of food protein by "up-grading" some of the animal protein that is now utilized only in animal feeds in the form of meat and bone meal. To study this possibility FPRF is supporting research at North Star Research and Development Institute under the direction of Dr. Harold A. Nash.

In the first phase of this study, Dr. Nash and his associates have found that it is feasible to prepare a high protein fraction from meat and bone meal by density separation using a high density liquid such as chloroform or carbon tetrachloride. This confirms results of other investigators who have made similar separations with high density liquids or by air classification.

The separation was quite efficient (Table 1). The protein in the "sink" fraction was undoubtedly largely collagenous, which should result in considerable improvement of the nutritive quality of the protein in the "float" fraction. The essential amino acid content of the "float" fraction confirms this (Table 2) - except for the unexpected low value for lysine.

Compared to FAO standards the protein of the "float" fraction is deficient in tryptophan, methionine and isoleucine. The methionine deficiency could be corrected at very low cost but correction of the tryptophan and isoleucine deficiencies are more difficult and expensive. Combinations of the "float" fraction with

methionine and milk protein (whey or casein) yield products with satisfactory amino acid content but of relatively high cost (15¢ - 20¢ per pound of FAO equivalent protein).

Continuing studies on this project will include feeding trials to confirm calculated amino acid composition, research on the functional behavior of the protein mixtures and palatability of the products when incorporated into different types of foods.

Table 1. Composition of Original Meat and Bone Meal and of Fractions Obtained by Density Separation

	Original	Separated Fractions*	
		Float**	Sink
Moisture, %	5.7	-	-
Fat, %	12.0	-	-
Protein, %	54.0	86.4	32.0
Ash, %	29.2	7.7	61.2

*Defatted and ground before separation.

**57% of the original weight in this fraction.

Table 2. Essential Amino Acid Content of Typical Meat and Bone Meal and of "Float" Fraction (Expressed as grams/16 grams nitrogen)

	Meat and Bone Meal	"Float" Fraction
Tryptophan	.6	.8
Lysine	5.2	4.3
Leucine	5.6	5.7
Isoleucine	2.6	2.8
Methionine	1.2	1.4
Phenylalanine	3.1	3.2
Threonine	2.9	5.0
Valine	3.9	3.9