



# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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THE DIRECTOR'S DIGEST

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## COMPOSITION OF ANIMAL BY-PRODUCT MEALS

The data obtained from the analysis of nearly 300 samples of animal by-product protein meals have now been subjected to careful statistical evaluation. This in no way changes the conclusions that have been given previously (see Director's Digest No. 36, June, 1967 and No. 44, February, 1968) but does assist in a more critical and precise interpretation of the data.

The results of the proximate analyses and the calcium and phosphorus determinations on the samples show rather wide variations in the composition of the various protein meals studied (Table 1) as indicated by the high values for the standard deviation in each case. The data are not given here, but it is interesting that the maximum standard deviation values for individual plants exceed the total standard deviation values given here in almost every case. This indicates clearly that the wide range in the values found is the result of great variation in a few plants rather than wide variation in composition in all plants.

To determine the validity of the values for pepsin digestibility, vitamin content and amino acid content of the composite samples (see Director's Digest No. 44, February, 1968), individual samples of 50% meat and bone meal were analyzed and four composite samples were also analyzed for the same components. The results (Table 2) show close agreement for the mean values in most cases and only slightly greater variability for the individual samples. Thus the mean values found for the composite samples of all the protein meals should be dependable within the limits shown by the standard deviation for individual samples of 50% meat and bone meal. As expected the feather meal samples showed wide variations in protein digestibility, but variations in lysine, methionine and cystine were comparable to those of 50% meat and bone meal.

The complete results from this study are being prepared for publication and distribution. This should be most helpful to producers of the animal by-product protein meals and to feed manufacturers who use these products in formulated feeds.

Table 1. The Composition of Animal By-Product Meals  
(Mean Value and Standard Deviation)

	45%		50%		53-55%		60%		Poultry		Feather	
	No. of Plants	M&B Meal	No. of Samples	M&B Meal	No. of Samples	M&B Meal	No. of Samples	Tankage	By-Product	No. of Samples	Meal	
No. of Plants	10		39	15	13		4			11		
No. of Samples	35		127	48	44		14			34		
Protein - %	46.5±2.84		51.6±2.32	54.4±2.84	61.7±2.59		60.7±3.75			86.4±2.12		
Moisture - %	5.3±1.56		5.2±1.22	5.4±1.98	6.9±3.15		5.2±2.04			6.0±2.22		
Fat - %	10.3±3.36		10.1±3.07	8.8±3.46	7.5±2.18		15.6±2.15			4.4±2.26		
Ash - %	35.5±4.09		28.7±3.59	27.5±4.23	19.2±4.75		15.3±3.27			2.8±1.27		
Calcium - %	10.7±1.41		8.8±1.32	8.2±1.60	5.5±1.72		4.4±1.15			---		
Phosphorus - %	5.4±0.55		4.4±0.55	4.2±0.82	2.9±0.82		2.5±0.51			---		

Table 2. Pepsin Digestibility, Vitamin Content and Amino Acid Content of 50% Meat and Bone Meal and Feather Meal Samples (Mean Value and Standard Deviation)

	50% M&B Meal		Feather Meal
	<u>Individual Samples</u>	<u>Composite Samples</u>	<u>Individual Samples</u>
No. of Plants	4	-	11
No. of Samples	16	4	34
Pepsin Digestibility - %	91.4 $\pm$ 1.65	90.9 $\pm$ 0.48	78.5 $\pm$ 5.92
Pantothenic acid - $\mu$ g/g	8.2 $\pm$ 3.65	9.1 $\pm$ 2.41	
Vitamin B-12 - $\mu$ g/g	0.19 $\pm$ 0.18	0.11 $\pm$ 0.035	
Riboflavin - $\mu$ g/g	4.4 $\pm$ 1.10	4.8 $\pm$ 0.52	
Niacin - $\mu$ g/g	60.1 $\pm$ 11.53	54.7 $\pm$ 6.16	
Lysine - %	2.6 $\pm$ 0.28	2.8 $\pm$ 0.14	1.7 $\pm$ 0.31
Histidine - %	1.1 $\pm$ 0.06	1.3 $\pm$ 0.06	
Arginine - %	3.4 $\pm$ 0.29	3.7 $\pm$ 0.20	
Valine - %	2.1 $\pm$ 0.14	2.1 $\pm$ 0.07	
Methionine - %	0.6 $\pm$ 0.15	0.7 $\pm$ 0.04	0.47 $\pm$ 0.052
Isoleucine - %	1.4 $\pm$ 0.15	1.4 $\pm$ 0.05	
Leucine - %	3.0 $\pm$ 0.24	3.0 $\pm$ 0.15	
Tyrosine - %	1.1 $\pm$ 0.11	1.1 $\pm$ 0.07	
Phenylalanine - %	1.6 $\pm$ 0.16	1.6 $\pm$ 0.06	
Tryptophan - %	0.3 $\pm$ 0.07	0.3 $\pm$ 0.02	
Hydroxyproline - %	3.2 $\pm$ 0.52	3.4 $\pm$ 0.50	
Aspartic Acid - %	3.8 $\pm$ 0.24	3.8 $\pm$ 0.17	
Threonine - %	1.6 $\pm$ 0.15	1.6 $\pm$ 0.06	
Serine - %	2.0 $\pm$ 0.44	1.9 $\pm$ 0.06	
Glutamic Acid - %	6.0 $\pm$ 0.28	5.8 $\pm$ 0.54	
Proline - %	4.3 $\pm$ 0.44	4.3 $\pm$ 0.19	
Glycine - %	7.0 $\pm$ 0.75	6.7 $\pm$ 0.37	
Alanine - %	4.0 $\pm$ 0.31	4.1 $\pm$ 0.47	
Cystine - %	0.3 $\pm$ 0.20	0.4 $\pm$ 0.07	4.3 $\pm$ 0.61
Protein - %		51.9 $\pm$ 1.07	
Moisture - %		7.5 $\pm$ 1.02	
Fat - %		9.9 $\pm$ 2.03	
Ash - %		27.9 $\pm$ 3.18	