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AMINO ACIDS AND VITAMINS IN ANIMAL PROTEIN MEALS

Animal by-product protein meals contain significant amounts of minerals, some of the B-vitamins and essential amino acids. To determine the composition of these materials a large number of samples were collected from more than 50 producers and subjected to extensive laboratory analyses. A summary of the data obtained from the proximate analyses and the calcium and phosphorus determinations has been presented (see "Director's Digest, No. 36, June 20, 1967).

Amino acid analyses were made on sixteen individual samples of 50% protein meat and bone meal, four composite samples of 50% protein meat and bone meal and single composite samples of 45% protein meat and bone meal, 53-55% protein meat and bone meal, 60% protein tankage and poultry by-product meal. The data (Table 1) show that there are significant differences in the levels of some of the amino acids in different samples of the same product and, of course, highly significant differences in the various animal protein meals. It is gratifying to note, however, that the amino acid values found here generally agree with published values obtained from studies with much smaller numbers of samples.

Lysine, cystine and methionine determinations were made on 34 samples of hydrolyzed feather meal from eleven plants. The following values were obtained:

Methionine	3.7-5.8	mg./g.
Cystine	30-60	mg./g.
Lysine	12-22	mg./g.

Analyses for some of the B-vitamins on composite samples gave the results shown in Table 2. Again these values generally agree with published levels of these vitamins in the various protein meals.

All of these data should be helpful to feed manufacturers in formulating feeds containing animal by-product meals.

TABLE 1. AMINO ACID CONTENT OF ANIMAL BY-PRODUCT MEALS

	45% M&B Meal Compos. %	50% M&B Meal Individ. Samples %	50% M&B Meal Compos. Samples %	53-55% M&B Meal Compos. %	60% Tankage Compos. %	Poultry By-Product Composite %
Lysine	2.3	2.2-3.0	2.6-2.9	3.2	4.4	2.8
Histidine	1.0	1.0-1.3	1.2-1.4	1.4	2.7	1.6
Arginine	3.2	2.8-4.2	3.4-3.8	3.9	3.5	4.2
Aspartic	3.3	3.4-4.3	3.5-3.9	4.1	5.8	4.7
Threonine	1.3	1.4-2.1	1.5-1.6	1.8	2.3	2.1
Serine	1.5	1.5-3.1	1.8-1.9	2.1	2.6	2.5
Glutamic	5.4	4.5-6.5	5.0-6.2	6.8	6.6	7.0
Proline	4.3	3.5-5.2	4.0-4.5	4.4	4.0	4.3
Glycine	6.9	4.8-8.6	6.2-7.0	6.7	5.8	6.3
Alanine	3.8	3.5-4.5	3.6-4.8	4.8	5.9	4.1
Cystine	.3	.2- .9	.3- .5	.8	.4	.8
Valine	1.7	1.8-2.3	2.0-2.1	2.3	1.1	2.7
Methionine	.6	.3- .9	.6- .7	.8	.7	1.1
Isoleucine	1.4	1.1-1.7	1.3-1.4	1.6	1.1	2.0
Leucine	2.4	2.6-3.3	2.8-3.2	3.3	5.9	3.8
Tyrosine	.9	.9-1.3	1.1-1.2	1.3	1.4	1.7
Phenylalanine	1.4	1.4-1.9	1.6-1.7	1.8	3.2	2.1
Tryptophan	.2	.2- .4	.3	.4	.7	.6
Hydroxyproline	3.8	2.5-4.5	2.8-4.0	3.2	1.7	3.0

TABLE 2. VITAMIN CONTENT OF ANIMAL PROTEIN MEALS

	Vit. B-12 mg/g	Pantothenic mg/g	Niacin mg/g	Riboflavin mg/g
45% M & B Meal	.03	6.9	41	2.4
50% M & B Meal (1)	.16	9.6	52	4.7
50% M & B Meal (2)	.08	6.0	48	4.3
50% M & B Meal (3)	.10	11.8	57	4.6
50% M & B Meal (4)	.11	8.6	62	5.5
53-55% M & B Meal	.16	13.5	63	5.6
60% Tankage	.04	5.5	40	1.7
Poultry By-Product	.31	21.7	106	11.6

(Multiply these values by 0.45 to convert to mg./lb.)