

# Compositions of Poultry Offal Meals from Various Processing Plants

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**ABSTRACT** A study was conducted to determine amino acid compositions, proximate analyses and calcium and phosphorus concentrations of poultry offal meals obtained from three processing plants.

Average lysine concentration was 2.127% and average methionine plus cystine content was 2.950%. Average arginine concentration was 3.588%. Calcium concentration was 1.63% and phosphorus concentration was 1.06%.

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## INTRODUCTION

Acker *et al.* (1959) and Potter and Fuller (1967) presented evidence to indicate poultry offal meal could be used as an animal feed or fed to supplement protein. Partial analyses of poultry offal meal were performed by Mitchell *et al.* (1926, 1931) and Morris (1946). Wisman *et al.* (1957) showed proximate analyses and calcium and phosphorus contents of poultry offal meals.

Potter and Fuller (1967) reported the proximate analyses and digestible protein of several poultry offal meal samples. Burgos *et al.* (1974) determined amino acids contents of 11 samples of feather meal and poultry offal meal that had been cooked separately and blended, but failed to indicate separate amino acid analyses of poultry offal meals. Acker *et al.* (1959) presented a brief analysis of raw poultry meals but failed to present analyses of the finished poultry offal meals. Also, samples were taken from only one processing plant.

Potter and Fuller (1967) stated poultry offal meals may vary in composition as a result of variations in proportions of starting materials. Therefore, it would seem likely that the final product composition of poultry offal meal may

vary from one processing plant to another.

Previous research has not shown amino acid composition of poultry offal meals. Therefore, the purpose of this study was to determine the amino acid compositions and proximate analyses of poultry offal meals from three processing plants.

## EXPERIMENTAL PROCEDURE

Six poultry offal meals in each plant were prepared in three processing plants by the procedure described by Binkley and Vasak (1950) and Bhargava and O'Neil (1975). This procedure is essentially a wet cooking procedure in which feathers are treated with saturated steam at pressures of 40 to 60 pounds per square inch gauge for 30 to 60 minutes with constant agitation and then cooked 3 hours to reduce the moisture content to approximately 7 to 8%.

Proximate analyses of poultry offal meals were determined by the procedures of Association of Official Agricultural Chemists (1965). The macro-Kjeldahl procedure was used for total protein equivalent determinations. Amino acid compositions were determined on a Technicon<sup>1,2</sup> amino acid analyzer. Three replicates of each sample were prepared for amino acid analysis by the procedure of Roach (1966). Calcium and phosphorus concentrations were determined on the Beckman Atomic Absorption Spectrophotometer<sup>2,3</sup>

## RESULTS AND DISCUSSION

Table 1 shows proximate analyses and calcium and phosphorus concentrations of poultry offal meals obtained from three processing

<sup>1</sup>Technicon Industrial Systems, Tarrytown, N.Y. 10591.

<sup>2</sup>Mention of a trade name, or proprietary product, or specific equipment does not constitute a guarantee or warranty by the U.S. Department of Agriculture and does not imply its approval to the exclusion of other products that may be suitable.

<sup>3</sup>Beckman Instruments, Inc., Fulton, CA. Model No. 485.

TABLE 1.—*Proximate analyses and calcium and phosphorus concentrations of poultry offal meals*

Analysis <sup>1</sup>	Poultry offal meal composition, %			Mean
	Processing plant <sup>2</sup>			
	1	2	3	
Crude protein	53.99	53.10	54.01	53.70
Crude fat	25.34	25.20	24.70	25.08
Ash	5.52	5.96	6.06	5.85
Moisture	11.15	11.01	9.98	10.71
Crude fiber	4.00	4.73	5.25	4.66
Calcium	1.46	1.65	1.78	1.63
Phosphorus	1.00	1.08	1.10	1.06

<sup>1</sup> Crude protein (total N × 6.25) and crude fat are expressed as percentage of wet weight.

<sup>2</sup> Each figure represents the average of six samples.

plants. Each offal meal was analyzed separately, but only average values are reported.

Crude protein and fat values in the present test were lower than those reported by either Wisman *et al.* (1957) or Potter and Fuller (1967). Crude protein averaged 53.70%. Crude fiber ranged from 4.00 to 5.25% with an average of 4.66%.

Moisture was higher on poultry offal meals in the present study than for those reported by

Potter and Fuller (1967). Calcium and phosphorus concentrations of poultry offal meals averaged 1.63 and 1.06%, respectively. Calcium concentrations were very similar to and phosphorus concentrations lower than those reported by Wisman *et al.* (1957).

Concentrations of lysine and of methionine plus cystine were high, with an average of 2.127 for the lysine and 2.950% for the methionine plus cystine (Table 2). Most of the sulfur amino

TABLE 2.—*Amino acid composition of poultry offal meals*

Amino acid	Composition, % <sup>1</sup>			Mean
	Processing plant			
	1	2	3	
Aspartic acid	4.080	3.815	4.252	4.049
Threonine	2.467	2.264	2.471	2.400
Serine	3.528	3.799	3.700	3.676
Glutamic acid	7.273	6.712	7.158	7.048
Glycine	5.415	5.091	5.482	5.329
Alanine	3.369	3.347	3.329	3.348
Valine	3.141	3.205	3.541	3.296
Cystine	2.377	2.051	2.174	2.201
Methionine	0.664	0.926	0.659	0.750
Isoleucine	2.200	2.258	2.415	2.291
Leucine	4.055	3.885	4.216	4.052
Tyrosine	1.406	1.447	1.381	1.411
Phenylalanine	2.482	2.375	2.487	2.448
Ornithine	2.294	2.480	2.350	2.375
Lysine	1.968	2.201	2.212	2.127
Histidine	0.542	0.620	0.516	0.559
Arginine	3.658	3.482	3.624	3.588
Methionine + cystine	3.041	2.977	2.833	2.950
Total amino acids	50.919	49.958	51.967	50.949

<sup>1</sup> Compositions are expressed as percentage of wet weight of poultry offal meal and each figure represents the average of six samples.

acids were in the form of cystine. Arginine contents of poultry offal meals averaged 3.588%. Tryptophan is not reported because of destruction by acid hydrolysis procedures used in amino acid analysis.

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