POULTRY BY-PRODUCT MEALS COMMERCIALISED IN SPAIN MAY VARY CONSIDERABLY IN THEIR PROTEIN VALUE AND FAT QUALITY

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1.- OBJECTIVE

Among the meat by-products, those coming from poultry are usually considered as excellent sources of protein. However, different grades of rendered poultry products are available and its composition and nutritional value can be quite variable depending on carcass, head, feet, viscera and even feather proportions in raw material, and on rendering process.

This work shows the variation on amino acids and fatty acids content of different products commercialised in Spain as poultry by-product or poultry meals.

2.- MATERIALS AND METHODS

The proximate chemical composition, hydroxyproline/collagen and amino acids content, the *in vitro* crude protein (CP) digestibility in pepsin-HCL and the total fatty acid (FA) content and its profile were analysed in four poultry by-product meals commercialised in Spain by different suppliers.

3.- RESULTS

Table 1. Chemical composition of studied poultry by-products meals.

Product	% DM	%DM			Collagen (%CP)	*In vitro* digestibility
		Ash	CP	Fat		
Supplier 1 (SL)	93.57	13.77	68.03	15.64	10.29	93.45
Supplier 2 (G)	96.17	14.67	67.81	17.24	10.36	86.17
Supplier 3 (S)	98.69	15.62	64.35	17.27	21.53	77.00
Supplier 4 (SG)	98.22	22.01	59.22	17.12	15.39	87.16

Ash, protein and fat contents varied from 13.8 to 22.0, 59.2 to 68.0 and 15.6 to 17.3 % of dry matter, respectively. CP and ash content were negatively correlated. The content of collagen was very variable (from 10.3 to 21.5 %CP) and negatively correlated with the *in vitro* digestibility of CP (Table 1).

Table 2. Essential amino acids content of studied poultry by-product meals.

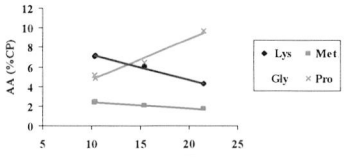
Essential AA	Essential AA (%CP)			
	Supplier 1	Supplier 2	Supplier 3	Supplier 4
HIS	2.94	3.07	1.78	2.28
ARG	5.90	6.41	7.72	7.85
THR	4.86	4.76	4.41	4.21
VAL	2.40	2.40	2.60	2.18
MET	2.38	2.44	1.71	2.05
ILE	4.31	4.40	3.94	4.02
LEU	8.60	8.97	6.89	7.06
PHE	5.37	5.23	4.32	4.20
LYS	7.07	7.17	4.27	6.00
Total	43.83	44.85	37.40	39.85

* Tryptophan analysis is not include in the table.

The content of essential amino acids varied from 37.4 to 44.8 %CP, particularly that of lysine (from 4.3 to 7.2 %CP) and methionine (from 1.7 to 2.4 %CP) (Table 2).

The content of lysine and methionine was closely and negatively correlated with the collagen content (r=-0.99), which was in turn positively correlated with the glycine and proline content (r= 0.94 and 0.98, respectively) (Figure 1), amino acids known to be presented in high proportions in collagen.

Figure 1. Correlation between collagen and Lysine, Methionine, Glycine and Proline.

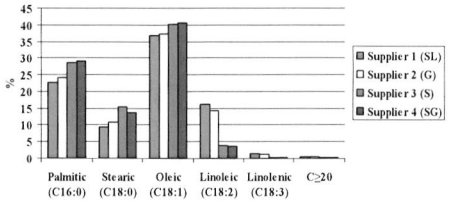


Fatty acids profile was also very variable. The ratio unsaturated to saturated FA was 1.76, 1.57, 1.14 and 1.09 for each one of four samples (Table 3).

Table 3. Total, saturated and unsaturated fatty acids (FA) of studied poultry by-product meals.

Product	Total FA	Saturated FA	Unsaturated FA	Unsat/Sat
Supplier 1 (SL)	12.89	36.22	63.78	1.76
Supplier 2 (G)	14.55	38.94	61.06	1.57
Supplier 3 (S)	13.10	47.95	52.05	1.09
Supplier 4 (SG)	12.44	46.75	53.25	1.14

Figure 2. Percent of palmitic, stearic, oleic, linoleic, linolenic and more than 20 carbon atoms FAs of studied poultry by-product meals.



The two samples with the lowest levels of unsaturated FA (< 55% of total FA) showed as well very low levels of linoleic acid (less than 4% compared with 16.2% and 14.2% in the other two samples (Figure 2).

4.-DISCUSION

Studied samples showed great differences in the content of some essential and generally limiting amino acids related to differences in collagen content, which would reflect differences in the proportion of connective tissue, viscera and probably feet. All samples showed lower levels of polyunsaturated FA than expected, and particularly low levels of the essential linoleic acid. Both, different proportions of chicken parts in raw material and fat composition of poultry diets may be the origin of the differences in FA profile.

5.-CONCLUSION

The differences on amino acid composition, particularly in lysine and methionine, and in fatty acid composition, particularly in linoleic acid content, highlight the need of considering the amino acid and fatty acid profile of poultry by-product meals in the formulation of pet foods.

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