Cooked sun-dried blood meal a potential source of lysine
II- Effect on broiler performance

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SUMMARY

The effect of feeding increasing levels of dietary cooked sun-dried blood meal as a source of lysine was studied in broiler chicks. Graded levels of L-lysine 0.0, 0.1, 0.2, 0.3 and 0.4% derived from 0.0, 1.45, 2.9, 4.35 and 5.8% blood meal was used as treatments. Results showed that increasing the dietary level of derived lysine, significantly ($p < 0.01$) increased weight gain and improved efficiency of feed utilization. Dressing percentage on hot and cold carcass bases, carcass protein and fat paralleled the trend in weight gain. However, fat was significantly ($p < 0.01$) reduced in chicks fed the ad-eqate level of 0.4% derived lysine. Energy and nitrogen retained in the body significantly ($p < 0.01$) increased with blood meal addition.

INTRODUCTION

Blood meal as .a source of lysine and the effect of methods of processing on lysine availability was extensively studied. (Squibb and Braham, 1955; Kratzer and Green, 1957; Waibel et. al., 19-74; Hamm and Searcy, 1976; Waibel et. al., 1977; Sally et. al., 1984 and Elzubeir and Elamin, 1990). Several methods have been used for processing in these studies, based on temperature and time of heating. Among these methods, vat-dried, ring-dried and spray-dried were used.

The conclusion of these investigations was that blood meal was not

particularly sensitive to heat damage in controlled heating tests. As the temperature and time of cooking decreases, available lysine increases.

Since poultry diets in the Sudan are based on sorghum grains (low in lysine), cheap source of lysine are needed. Hence, the aim of this study was to detect the effect of lysine derived from one sample of blood meal on broiler performance.

MATERIALS AND METHODS

One sample of sheep blood was prepared and used in this study as described by Elzubeir and Elamin (1990). One hundred and fifty day-old unsexed broiler chicks (Lohmann) were randomly allocated to one of 5 dietary treatment groups, each consisting of 30 chicks (10 per replicate). The chicks of each replicate were housed in pens (1 meter square) in an open-sided deep litter poultry house. The light was continuous throughout the experimental period of 7 weeks. Chicks were group weighed at weekly intervals and feed consumption by each group was determined at the time of weighing. The diets, fed ad. libitum, were the control diet and 4 other diets supplemented with cooked sun-dried blood to provide 0.1, 0.2, 0.3 and 0.4% added lysine.The formulation chemical composition of the control diet and rate of inclusion of blood meal has been given by Elzubeir and Elamin (1990).

At the end of the experimental period 3 birds from each replicate were sacrificed. Hot and cold carcass weight was measured. The carcasses were frozen pending, protein, ash, ether extract and moisture analysis. Another **20 birds (4 per treatment) were selected and kept in metal cages for determination of apparent metabolizable energy by total collection method. Excreta were collected over 3 days. Gross energy was determined by a Parr oxygen bomb calorimeter. Proximate analysis of the meat and excreta were determined by methods of the Association of Official Analytical Chemists (AOAC, 1975).**

The results were subjected to analysis of variance and pair-wise comparison (Snedecor and Cochran, 1967).

RESULTS and DISCUSSION

The results of the present study are presented only for the 7 week old chicks. The data obtained weekly were very similar to those for 7 weeks, indicating similar response to dietary lysine addition derived from blood meal. The average gain, feed intake and feed conversion are given in table I. Liveweight gain and feed utilization were significantly ($p < 0.01$) increased with lysine addition. However, not all the differences were significant. Feed intake tended to increase with increasing the level of lysine. These findings, agree with those of Kratzer and Green (1957) and Hamm and Searcy (1976), indicating that mild heating has no destructive effect on lysine avaliable in blood meal. Result of improved feed utilization disagrees with those of Slinger et. al. (1955) and Hassan et., al. (1974). The disagreement may presumably due to the destructive effect of their processing methods on_ lysine availablility.

Table 1: Growth performance of 7-week old chicks:

	L-lysine addition%					
	0.0	01 b	0.2 b	0.3 b	0.4 b	S.E.
Liveweight ain (g/ bird)	912 a	1279	1378	1431	1576	± 112
Feed intake bird)	3434	3667	3803	3700	3940	± 84
Feed conversion ratio (feed/ gain)	2.17 a	1.84b	1.81 b	1.72b	1.74b	±0.23

a,b means within the same row with different super scripts differ significantly ($p < 0.01$).

Dressing percentages on hot and cold carcass base were significantly

(p < 0.01) increased, due to dietary treatment. Bone to meat ratio and tibia ash, were not significantly affected by dietary treatment (table 2).

Table 2: Dressing percentage, bone meat ratio and tibia ash of chicks given increasing levels of blood meal.

	L-lysine addition%					
	0.0	0.1	0.2	0.3	0.4	S .E.
Dressing(hot)	66.82 a	[illegible] b	[illegible] b	68.64 b	70.43 b	± 0.90
Dressing (cold)	b 64.17 a	67.88 [illegible]	[illegible]	[illegible] b	67.43 b	± 0.92
Bone/ meat rano	0.33	0.36	0.37	0.36	0.30	± 0.02
Tibia ash	53.08	51.96	51.14	50.01	53.28	± 0.79

a.b means within the same row with different super scripts differ significantly (p < 0.01).

Proximate analysis of meat is given in table 3. Moisture was not significantly affected by dietary treatment. Protein and fat were significantly (p < 0.01) increased with addition of derived lysine. However, fat content was significantly (p < 0.01) lower in chicks given the adequate level of 0.4% derived lysine. These findings are in line with those of Velu et. al. (1972); Sibbald and Wolynetz (1986). Ash content of meat was not affected by dietary treatment.

Data given in table 4 show that energy intake, nitrogen intake and proportion of energy and nitrogen retained (as % of intake) were significantly (p < 0.01) increased in chicks given blood meal.

Table 3: Proximate analysis of meat of the experimental birds.

	L-lysine addition%					
	0.0	0.1	0.2	0.3	0.4	S.E.
Moisture**	65.43	63.32	67.84	65.68	64.14	± 1.22
Protein**	58.20 a	57.25 a	68.00 *u*	64.34 c	63.41 c	± 3.18
Ether extract**	29.36 a	33.50 *u*	31.00 c	30.73 c	31.12 c	± 1.11
Ash**						0.02
						0.02
						0.02
						0.02
						0.02 ± 0.00

* data are expressed on dry matter base.

** values are means of two replicates per treatment.

a,b,c means within the same row with different superscripts differ significnatly ($p < 0.01$).

Table 4: Energy and nitrogen balance* of the experimental chicks.*

	L-lysine addition%				
	0.0	0.1	0.2	0.3	0:4
Energy intake (MJ/ day)	1.392	2.426	2.415	2.929	3.208
Energy excreted/ day)	0.454	0.411	0.397	0.419	0.502
Energy retained (MJ/ day)	0.937	1.931	2.018	2.510,	2.705
Retained% of intake	67.320 a	79.600 b	83.540 b	85.670"	84.330
Nitrogen intake W. day)	2.660	4.520	5.330	5.320	5.410
Nitrogen excreted (g/ day)	1.660	1.570	1.500	1.420	1.400
Nitrogen retained (g/ day)	1.000	2.950	3.830	3.900	4.000,
Retained% of intake	37.590 a	63.300	71.860	73.310 b	73.940 u

* = values are means of two replicates per treatment.

a,b = means within the same row with different superscripts differ significantly ($p < 0.01$).

REFERENCES

Association of Official Analytical Chemists (1975). *Officical methods of analysis.* 12th ed. Washington, D. C.

Elzubeir, E. A. and Elamin, M. M. (1990). Cooked sun-dried blood meal a potential source of lysine: I- Available lysine determined by chicks assay. *Sudan J. Anim. Prod.,* 3: 37 - 43.

Hamm, D. and Searcy, G. K. (1976). Some factors which affect the availability of lysine in blood meals. *Poultry Sci.* 55 (2): 481 - 487.

Hassan, D.E. M.; Mukhtar, A. M. S. and Nasir, M. E. A. (1974). The use of blood meal in tropical broiler diets. *Trop. Anim. Hlth. Prod.* 6: 179 - 182.

Kratzer, F. H. and Green, N. (1957). The availability of lysine in blood meal for chicks and poults. *Poultry Sci.* 36: 562 - 585.

Sally, L. N.; Waibel, P. E. and Behrends, B. R. (1984). Available lysine content of blood meals determined by turkey bioassay of flourodinitrobenzene assay. *Poultry Sci.* 63: 144 - 152.

Scott, M. L.; Nesheirn, M. C.; Young, R. T. (1982). *Nutrition of the chickens.* 3rd. ed.M.L. Scott and Associates. Ithaca, N.Y.

Sibbald, I. R. and Wolynetz, M. S. (1986). Effect of dietary lysine and feed intake on energy utilization and tissue synthesis by broiler chicks. *Poultry Sci.* 65: 98 - 105.

Slinger, S. T.; Pepper, W. F. and Hill, D. C. (1955). The use of keratine products in poultry rations. *Poultry Sci.* 34: 919 - 922.

Snedecor, G. W. and Cochran, W. G. (1967). *Statistical methods* 6th. ed. Iowa State Univ. Press, Ames.

Squibb, R. L. and Braham, J. E. (1955). Blood meal as a lysine supplement to all vegetable protein rations for chicks. *Poultry Sci.* 34: 1050 - 1053.

Velu, J. G.; Scott, H. M. and Baker, D. H. (1972). Body_ composition and nutrient utilization of chicks fed amino acid diets, containing graded amounts of either isoleucine or lysine. *J. Nutr.* 102: 741 - 748.

Waibel,'P.E.; Carpenter, K. J. and Behrenal, B. R. (1974). Nutritional availability of lysine in blood meal. *Federation Proceeding* 33 No. 3: 567.

Waibel, P. E.; Cuperlovric, M.; Hurel, R. F. and Carpenter, K. J. (1977). Processing damage to lysine and other amino acids in the manufacturing of blood meal. *J. Agric. and* *Food Chem.* 25: 171 - 175.