

Effect of feeding sunflower seed meal on skin colour and carcass chemical composition of broiler chicks

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SUMMARY

One hundred and twenty, 8 - week old broiler were selected at random from chicks given increasing levels of sunflower seed meal (SSM) (0, 10, 20 and 30%). They were then slaughtered and the effects of dietary sunflower seed meal on skin colour and carcass chemical composition of broiler chicks was examined. Feeding sunflower seed meal to broiler chicks had no effect on skin colour. Carcass moisture and ash content were reduced. whereas pro- tein and ether extract were not affected.

INTRODUCTION

Egg shell stains are a management problem that has been associated with feeding sunflower seed meal based diets to laying hens (Rose, et. al., 1972). In spite of the increase of incorporation sunflower meal in broiler diets, (Wldroup et. al., 1970; and Daghir et. al., 1980), no attempts have been made to study its effect on broiler skin colour. Skin colour of broiler is a fac- tor that affects consumer acceptance of the commodity. Thus a change in skin colour may probably create a problem for the use of sunflower seed meal in broiler feeding.

Attempts have been made to evaluate the nutritional value of SSM, pro- duced locally for broiler chicks (Ibrahim and Elzubeir, 1990). The present study was initiated to investigate the effects of sunflower on skin colour and carcass chemical composition of broiler chicks.

MATERIAL AND METHODS

At the end of the feeding period (7 weeks) described previously (Ibrahim and Elzubeir, 1990), one hundred and twenty birds (24/ treatment) were se- lected at random and used in the present study.

Immediately after being slaughtered skin colour of breast and thigh was measured using Hunterlab Tristimulus colorimeter model D 25 M .2 which was calibrated against Hunter lightness (L), redness (a) and yellowness (b) were recorded. The rest of carcass was minced and analysed for moisture, protein, ether extract and ash according to Association of Official Analytical Chemist Methods (A.O.A.C., 1980).

Composition of the experimental diets is given in table 1. The data were subjected to analysis of variance and L. S. D. (Steelrand Torrie, 1960).

RESULTS AND DISCUSSION

Hunter L, a and b colour scale components are shown in table 2. Feeding sunflower seed meal based diets had no significant effect on breast and thigh redness (a) and thigh whiteness (L) values. However, breast and thigh yellowness (b) values of birds fed sunflower seed meal diets were significantly reduced ($p < 0.01$) compared to the high fibre control. Also chicks given 10% sunflower seed meal diets had low breast whiteness (L) values ($p < 0.05$) compared to the high fibre control. These differences could be due to inclusion of Barseem (*Medicago sativa*) in high fibre control. From Hunter L, a and b colour scale components it can be inferred that feeding sunflower seed meal based diet to broiler chicks caused no change in skin colour. Similarly Omer (1989) reported that feeding sunflower seed meal as the main source of plant protein compared to sesame, groundnut and cottonseed meal had no effect of broiler skin colour.

Inclusion of sunflower meal in the diet reduced carcass moisture ($p < 0.05$) but not all the differences were significant (table 3). Carcass protein and ether extract were not affected by the dietary treatment.

Table 1: Experimental diets and their calculated and determined nutrient content.

Ingredients	0% SSM	0%SSM Control	10%SSM	20%SSM	30%SSM
Sorghum	59.14	18.11	54.63	50.62	46.41
Groundnut meal	15.00	19.41	12.15	9.10	6.10
Sesame meal	15.00	10.00	12.15	9.10	6.10
Sunflower seed meal (SSM)	-	-	10.00	20.00	30.00
Dried Barroem (<i>Mulicaps sativa</i>)	-	6.40	-	-	-
Wheat bran	-	28.00	-	-	-
Super concentrate *	5.00	5.00	5.00	5.00	5.00
Vegetable oil	2.82	10.10	3.10	3.30	3.57
Oyster shell	2.00	2.00	2.00	2.00	2.00
Common salt	0.30	0.30	0.30	0.30	0.30
L-lysine monohydrochloride	0.48	0.38	0.43	0.38	0.32
DL-methionine	0.06	0.10	0.04	0.00	0.00
Minerals and vitamins supplement **	0.20	0.20	0.20	0.20	0.20
Calculated composition: (fresh Wt. basis)					
Crude protein%	22.20	21.76	21.20	22.22	22.21
Metabolizable energy (MJ/kg)	12.76	12.76	12.76	12.76	12.76
Calcium %	1.12	1.14	1.10	1.14	1.14
Phosphorus %	0.62	0.60	0.60	0.60	0.58
L-lysine %	1.10	1.10	1.10	1.10	1.10
DL-methionine %	0.46	0.46	0.46	0.46	0.46
Crude fibre %	4.48	8.35	6.11	7.80	8.52
Determined composition:					
Dry matter %	95.40	93.50	93.75	93.68	93.98
Crude protein (% N X 6.25)	22.62	22.62	21.75	22.75	22.87
Ether extract %	4.60	6.50	4.80	5.30	6.50
Crude fibre %	4.20	8.10	5.95	7.50	8.20
Ash %	10.85	11.20	10.50	10.68	10.25

* Super concentrate supplied (%):

2.52 crude fibre, 37.94 ashes, 41.00 protein, 1.73 fat, 4.80 phosphorus, 12.30 calcium, 0.36 methionine, 1.73 methionine + cystine, 2.00 lysine, 0.22 linoleic acid, 1.37 threonine, 0.86 starch, 8.37 metabolizable energy (MJ/kg).

** Minerals and vitamins supplied by Bladel, Farvet Laboratories, Holland.

Table 2: Skin colour of chicks given diets containing different levels of sunflower seed meal (SSM).

		0% SSM	0% SSM Control	10% SSM	20% SSM	30% SSM
L	Breast	57.23 ± 0.83 ^a	57.03 ± 1.59 ^a	50.83 ± 3.60 ^b	59.43 ± 0.24 ^a	59.17 ± 0.93 ^a
	Thigh	58.67 ± 2.32 ^a	57.73 ± 1.62 ^a	54.77 ± 2.49 ^a	58.00 ± 1.91 ^a	55.40 ± 0.95 ^a
a	Breast	6.70 ± 0.62 ^a	7.20 ± 0.95 ^a	8.80 ± 0.50 ^a	6.47 ± 0.09 ^a	6.37 ± 0.61 ^a
	Thigh	5.90 ± 0.40 ^a	6.53 ± 1.20 ^a	7.97 ± 0.78 ^a	5.83 ± 0.49 ^a	7.63 ± 0.52 ^a
b	Breast	10.90 ± 0.43 ^a	17.07 ± 0.74 ^b	10.47 ± 1.86 ^a	12.67 ± 0.35 ^a	9.53 ± 0.77 ^a
	Thigh	10.37 ± 0.74 ^a	15.77 ± 0.46 ^b	9.20 ± 0.78 ^a	9.06 ± 1.47 ^a	10.30 ± 0.51 ^a

L = degree of whiteness, a = degree of redness, b = degree of yellowness.

Values are means of 24 birds/ treatment ± standard error (SE).

a, b = means in the same row with different letters differ significantly ($p < 0.05$).

Table 3: Meat chemical composition of chicks fed sunflower seed meal (SSM) diets.

	0% SSM	0% SSM Control	10% SSM	20% SSM	30% SSM
Moisture %	64.89 ± 0.36 ^a	65.82 ± 0.16 ^b	65.74 ± 0.33 ^b	64.37 ± 0.33 ^a	64.01 ± 0.14 ^a
Protein (N X 6.25)%	21.43 ± 0.25 ^a	20.06 ± 0.26 ^a	20.12 ± 0.51 ^a	20.99 ± 0.62 ^a	21.65 ± 0.43 ^a
Ether extract %	10.98 ± 0.69 ^a	10.31 ± 0.25 ^a	11.52 ± 0.96 ^a	11.64 ± 0.10 ^a	12.47 ± 0.31 ^a
Ash %	2.37 ± 0.08 ^a	3.03 ± 0.15 ^b	2.26 ± 0.07 ^a	2.15 ± 0.10 ^a	2.13 ± 0.06 ^a

Values are means of 4 samples ± standard error (SE).

a, b = means in the same row with different letters differ significantly ($p < 0.05$).

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