

Effect of feeding different levels of sunflower seed meal on laying hens performance.

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SUMMARY

An experiment was conducted to determine the effect of feeding various levels of sunflower seed meal (SSM) on hens performance of laying and on egg quality. Four dietary treatments of four levels of SSM (0, 10, 20 and 30%) were used. Each treatment was assigned randomly to a group of 60 birds. The birds were raised in battery cages for 13 weeks. Parameters measured were rate of lay, feed intake, feed conversion ratio (FCR), mortality, egg weight, shape index, shell thickness and egg yolk colour. Results showed that feeding different levels of SSM had no significant effect ($p > 0.05$) on the parameters measured except feed conversion and egg yolk ($p < 0.05$). The results of this study suggest that up to 30% SSM can be included in laying hens diet without adverse effect on performance or egg quality.

INTRODUCTION

Conventional protein supplements in the tropics are the by-products of oil seed industry. These include groundnut, sesame and cotton seed meals. New protein sources are becoming available as a result of policies of agricultural intensification and industrialization (Mohammed and Idris, 1991). One of these by-products is sunflower seed meal. Positive growth response of broiler chicks was observed when feeding sunflower SSM (Thomas d al., 1965; Wessel, 1967; Omer, 1989; Ibrahim and El Zubeir, 1991; Musharaf, 1991). However, few studies have dealt with the value of SSM in laying ration (Hale and Brown 1957; Rose et al., 1972; Karuanjeewa et al., 1989).

Therefore, this study was undertaken to investigate the response of feeding different levels of SSM on laying performance and egg quality characteristics of Single Comb White Leghorn hens under Sudan condition.

MATERIALS AND METHODS

Experiment was conducted using 240 Single Comb White Leghorn hens (32 weeks old) in a complete randomized design. Each group of sixty birds were randomly assigned to one of the four dietary treatments containing different levels of SSM i. e. 0, 10, 20 and 30%. Hens were placed at random in standard cages and were fed a diet formulated to meet or exceed the nutrient requirements of hens as NCR (1984) recommendation. The diets were isocaloric and isonitrogenous. Diet composition are shown in Table 1. Feed and water were provided ad libitum . Lighting was provided for 16 hours daily.

The birds were weighed individually at the start and the end of the experimental period. The birds were given a control diet for one week adaptation period.

Egg production in each group was recorded daily and feed consumption was measured weekly, mortality was recorded as it occurred.

Eggs were collected on two consecutive days every two weeks, then weighed and feed conversion was calculated as kg feed per kg eggs. Four eggs were selected at random from each experimental unit (16 eggs/treatment). For measurement of shape index, albumin height, yolk colour and shell thickness.

Samples of SSM and the experimental diets were analysed for proximate composition according to the method of A. O. A. C. (1980) (Tables 2 and 3). Calcium and total phosphorus were carried out in atomic absorption spectrophotometer (Model Perkin Elmer 2380) according to Chemical Analysis of Ecological Material (1989).

The data **were** subjected to analysis of variance using the microstat computer programme. The significant differences between means were determined using **the Least Significant Difference (L. S. D.) as outlined by Steel and Tonic (1960).**

Table 1: The composition of the experimental diets.

Ingredients	Diet composition %			
	0	10	20	30
A				
Sunflower seed meal	0	10	20	30
Sesame meal	17	14	12	10
Sorghum	66.67	59.58	51.67	43.77
Wheat bran	7	7	7	7
Oyster shell	7.41	7.55	7.65	7.73
Bone meal	1.18	1.08	0.91	0.79
L. Lysine-MonoHcl	0.30	0.20	0.08	0.00
Salt	0.24	0.24	0.24	0.24
Vitamins & minerals *	0.20	0.20	0.20	0.20
Filler (sand)	0.00	0.15	0.25	0.27
Total	100.00	100.00	100.00	100.00

Supervitamins (FARVET). Supplied per kg of diet : 7500.00 IU vit A, 500.000 IU vit 1)3, 3.00 IU vit E, acetate, 1.500 mg vit K3, 2.500 mg vit B2, 300 mg vit B6, 6 mg vit B12, 3.000 mg calcium pan to thenic, 8.000 mg Nicotinamide, 11.200 mg vit C, 15.000 mg Iron Sulphate, 25.000 mg Manganese Sulphate, 2.500 mg Copper Sulphate, 300 mg Potassium Iodide and 10.000 Zink Sulphate.

Table 2: Proximate analysis of sunflower seed meal.

	%
Dry matter	95.78
Crude protein	30.62
Crude fibre	10.50
Ether extract	11.53
Ash content	7.69
Metabolizable energy *	
(MJ / Kg)	11.63
Calcium	0.50
Total phosphorus	0.40

* Calculated from chemical composition using the equation of Lodhi et al. (1967).

Table 3: The calculated and determined analysis of the experimental diets.

Calculated analysis	0	Level of SSM % 10	20	30
Crude protein (%)	17.03	17.20		17.08 17.16
Crude fibre (%)	4.08	4.07		4.11 4.19
Metabolizable energy	12.13	12.13		12.13 12.13
(MJ / Kg)				
Calcium (%)	3.40	3.40		3.40 3.40
Available phosphorus (%)	0.32	0.32		0.32 0.32
L. Lysine (%)	0.64	0.64		0.63 0.68
DL-methionine (%)	0.33	0.35		0.37 0.42
Determined analysis :				
Dry matter (%)	91.50	93.62		93.80 95.78
Crude protein (%)	18.25	17.85		18.25 18.15
Crude fibre (%)	4.50	4.00		4.50 5.00
Ether extract (%)	5.71	4.52		4.96 5.25
Ash content (%)	13.18	12.20		11.91 15.33
Metabolizable energy				
(MJ / Kg)	10.92	11.40		11.26 10.83
Calcium (%)	2.70	2.90		2.40 2.60
Total phosphorus (%)	0.47	0.50		0.36 0.50

RESULTS AND DISCUSSION

Chemical composition of SSM revealed that it had 30.6% crude protein, 10.5% crude fibre, 11.5% ether extract and 7.7% ash. Similar crude protein value was reported by Ibrahim and El Zubeir (1991) and Musharaf (1991). In the present study, ether extract and crude fibre content were higher than the values reported by Omer (1989). However, the different values of the chemical composition of SSM could be related to geographical location, climate and soil condition and the methods of extraction of oil. Laying performance is shown in Table 4. None of the treatments had significant effect on rate of lay or feed intake (Table 4). It appeared that the inclusion of SSM at level up to 30% had no adverse effect on laying performance. Similar findings were reported by Hale and Brown (1957) and Karunajeewa et al., (1989). However, FCR was affected by dietary level of SSM ($p < 0.05$). Birds given diet containing 0% or 10% had a better feed conversion (kg feed/kg eggs). Similar observations were reported by Musharaf (1991) in broiler chicks when birds were fed SSM up to 25% level. However, the dietary levels of SSM had no adverse effect on egg weight, shape index, albumin height or shell thickness (Table 5). Egg yolk colour showed low value ($p < 0.05$) compared to the other treatments. There was no response on yolk colour by increasing the level of

SSM. The lack of negative response of laying hens to dietary SSM may indicate that SSM is satisfactory for egg production and egg quality.

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Table 4 : Effect of dietary level of sunflower seed meal on laying performance of white leghorn hens (between 32 – 45 weeks age).

	SSM (%)	Rate of (%)	Feed intake hen gd ¹	FCR kg feed kg-1 eggs	Mortality (%)	Body weight change (kg)
	0.0	60.16	70.22	2.36a	4.58	– 0.077
8						
A	10	59.54	68.11	2.48a	5.46	– 0.085
	20	56.69	73.43	2.78b	3.28	– 0.140
	30	56.94	73.21	2.75b	2.30	– 0.128
o	±SEM	1.14	2.19	0.09	1.69	0.07
	L.S.D.					
	(P=0.05)	3.50	6.74	0.28	5.20	0.022

a-b = Values within a column with different superscripts are significantly different (p 0.05).

SEM = Standard error of treatment mean.

Table 5 : Effect of dietary level of sunflower seed meal on egg quality characteristic of white leghorn hens (between 32 – 45 weeks of age).

SSM (%)	Average of egg weight	Shape index	Shell thickness (mm)	Albumin height (mm)	Yolk colour (colour)
0.0	49.27	74.69	0.45	6.40	1.08a
10	48.73	75.78a	0.46	6.62	1.53b
20	48.99	74.25	0.47	5.98	1.53b
30	50.33	75.12	0.48	6.39	1.53b
tSEM	0.71	0.51	0.01	0.18	0.05
L.S.D.					
(P=0.05)	2.18	1.58	0.03	0.55	0.17

a-b = Values within a column with different superscripts are significantly different

(p = 0.05).

SEM = Standard error of treatment mean.

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