

# **Effects of Various Dietary Levels of whole Sunflower Seed on Energy and Nitrogen Balance of Broiler Chicks**

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## **SUMMARY**

**In a metabolism trial eighty broiler chicks (Lohmann) were given diets with four levels of whole sunflower seed (WSS) (0, 7.5, 15 and 22.5%). Increasing the dietary level of WSS had no significant ( $P>0.05$ ) effect on nitrogen intake and excretion. However, there was a linear increase ( $P<0.05$ ) in nitrogen retention (g/day and as percentage of intake) with each increment increase in WSS. No significant differences were noted for energy intake, excretion and retention due to the dietary treatment. Inclusion of WSS up to 22.5% in broiler Chicks diet had no significant effect on daily weight gain, feed intake and feed conversion ratio.**

## **INTRODUCTION**

**The nutritional value of sunflower seed in broiler diets has been studied by Dagher et al. (1980) and Ibrahim (1990). The former recommended that in practical type diets sunflower seed should constitute at least 10% of the ration, whereas, the latter suggested that 22% of sunflower seed is the optimum level of inclusion. There is lack of infor-**

mation as to the cause of this difference. The present experiment was carried out to examine the effects of feeding various levels of whole sunflower seed on nitrogen and energy balance in broiler chicks.

## MATERIALS AND METHODS

### *Experimental Birds :*

Unsexed broiler chicks of a commercial strain (Lohmann) were reared in a tier brooder for seven days from day old. They were then transferred to battery cages to acclimatise before being selected for the experiment on the basis of body weight. Birds were caged singly for the experiment with free access to feed and water.

Four approximately isonitrogenous and isoenergetic diets were formulated from locally available feedstuffs (Table 1). The diets contained increasing levels of whole sunflower seed (0, 7.5, 15 and 22.5%). Each diet was given to twenty birds according to a randomised block design.

### *Measurement and feed analysis :*

The experiment commenced when the chicks were fourteen days old and lasted for forty two days. Body weight was recorded at the beginning and the end of the experiment. Feed intake was monitored weekly and deaths were recorded daily. Apparent metabolizable energy and nitrogen retention of the experimental diets were determined using a Parr oxygen bomb calorimeter. Nitrogen of the diets and excreta was analysed by standard methods (AOAC 1980).

**Table (1) : Experimental diets and their calculated and determined nutrient-content**

<b>Ingredients %</b>	<b>A</b>			
Sorghum	59.14	54.85	51.28	47.35
Groundnut meal	15.00	13.80	12.24	10.85
Sesame meal	15.00	13.80	12.24	10.85
Full fat sunflower seed	0.00	7.50	15.00	22.50
Super concentrate*	5.00	5.00	5.00	5.00
Vegetable oil	2.82	2.04	1.20	0.40
Oyester Shell	2.00	2.00	2.00	2.00
Vitamins and minerals	0.20	0.20	0.20	0.20
Common salt	0.30	0.30	0.30	0.30
L- lysinemonohydro chloride	0.48	0.46	0.47	0.48
Di-methionine	0.06	0.06	0.07	0.07
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Calculated composition (%)</b>				
<b>(fresh weight basis)</b>				
Crude protein	22.20	22.30	22.22	22.21
Metabolizable energy (MJ / kg)	12.76	12.76	12.76	12.76
Calcium	1.10	1.11	1.11	1.11
Phosphorus	0.62	0.62	0.59	0.58
L-lysine	1.20	1.20	1.20	1.20
Di-methionine	0.46	0.46	0.46	0.46
Crude fiber	4.48	5.42	6.26	7.18
<b>Determined composition (%)</b>				
Dry matter	93.60	93.84	93.90	94.00
Crude protein	22.62	22.75	22.60	22.62
Ether extract	4.60	5.20	6.30	7.50
Ash	10.85	10.95	10.30	10.50
Crude fiber	4.20	5.00	6.30	7.10

\* Superconcentrate supplied the following as percentage :  
 2.52 Crude fiber 4.80 Phosphours 1.37 Threonine  
 37.94 Ash 12.30 calcium 0.86 Starch  
 41.00 Protein 0.36 Methionine  
 1.76 Fat 1.73 Methionine + Cystine 8.37 Metabolizable  
 2.00 Lysine energy (MJ / kg)  
 0.22 Linoleic acid

*Statistical analysis :*

Data collected were subjected to analysis of variance and regression analysis (Steel and Tonic 1960).

## **RESULTS AND DISCUSSION**

The effect of various levels of whole sunflower seed (WSS) on energy and nitrogen balance are shown in Table 2. Inclusion of whole unprocessed sunflower seed (WSS) in broiler chicks diets up to 22.5% had no significant effect ( $P>0.05$ ) on nitrogen consumption and excretion. Nitrogen retention g per day and as percentage of intake increased ( $P<0.05$ ) with increasing the dietary level of unprocessed sunflower seed (WSS). However, nitrogen retention as percentage of intake has been shown to decrease with increasing the dietary level of sunflower seed meal (Ibrahim and Elzubeir 1990). Chlorogenic acid of sunflower seed meal was suggested as a cause of this reduction because it has been reported to inhibit trypsin activity (Milk glmil. 1968). The increase in nitrogen in chicks given WSS indicates that the form in which chlorogenic acid is found in WSS is activated by the processing method employed for oil extraction and/or the processing method has a destructive effects on protein quality of the meal.

Energy consumed, excreted and retained (g per day and % of intake) were not significantly affected ( $P>0.05$ ) by the dietary treatment as were daily weight gain, feed intake and feed conversion ratio (Table 3).

Table (2) ;  
Nitrogen and energy balance of chicks fed on diets containing various levels of whole sunflower seed (WSS)

Treatments	0% WSS	7.5% WSS	15% WSS	22.5% WSS	SEM	Linear effect (t-value for significance)
<b>Nitrogen :</b>						
Intake (g day <sup>-1</sup> )	3.63	3.58	4.02	3.74	± 0.0056	1.908
Excreted (g day <sup>-1</sup> )	2.58	2.48	2.67	2.39	± 0.0055	-0.871
Retained (g day <sup>-1</sup> )	1.05	1.10	1.35	1.35	± 0.0054	2.851*
Retained (as % of intake)	28.92	30.72	33.58	36.09	± 0.1326	2.467*
<b>Energy :</b>						
Intake (MJ day <sup>-1</sup> )	1.89	1.80	2.15	2.85	± 0.0066	0.974
Excreted (MJ day <sup>-1</sup> )	0.59	0.50	0.59	0.50	+ 0.0032	1.102
Retained (MJ day <sup>-1</sup> )	1.38	1.30	1.56	1.35	± 0.0037	0.780
Retained (as % of intake)	73.02	72.22	72.56	72.56	± 0.1025	-1.104

Values are average of 20 chicks / treatment ± standard error of the mean SEM

\*P<0.05

**Table (3) :**

**Performance of broiler chicks fed on various levels of whole sunflower seed (WSS)**

<b>Treatment</b>	<b>0% WSS</b>	<b>7.5% WSS</b>	<b>15% WSS</b>	<b>22.5 WSS</b>	<b>SEM</b>
<b>Weight gain (g / birds / day)</b>	<b>36.53</b>	<b>35.10</b>	<b>40.60</b>	<b>38.77</b>	<b>± 0.82</b>
<b>Feed intake (g / birds / day)</b>	<b>73.88</b>	<b>75.92</b>	<b>81.84</b>	<b>80.</b>	<b>+ 2</b>
<b>Feed conversion ratio</b>	<b>2.02</b>	<b>2.16</b>	<b>2.02</b>	<b>2</b>	<b>± 0.16</b>

Values are means of 20 birds / treatment ± standard error of the mean SEM

None of means are statistically significant (P>0.05).

**In conclusion it appears that WSS given at levels up to 22.5% of the diet had no adverse effects on broiler performance and improved nitrogen retention.**

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