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THE EFFECTS OF GRADED LEVELS OF WILD SUNFLOWER MEAL ON GROWTH AND BLOOD PARAMETERS IN WEANER RABBITS

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ABSTRACT
The study was undertaken to know the effects of graded levels of wild sunflower meal (WSM) on the growth and haematological changes in thirty-six (36) weaner rabbits. Six (6) rabbits were placed on each of the 6 dietary treatments containing 0, 5, 10, 15, 20 and 25% wild sunflower meal. The average daily feed intakes for the dietary treatments were 55.86 ± 1.70, 52.77 ± 2.20, 50.42 ± 1.6, 48.33 ± 1.20, 46.29 ± 1.60 and 43.29 ± 1.50, respective. The daily weight gains were 12.64 ± 0.58, 14.80 ± 0.66, 12.04 ± 0.59, 13.06 ± 0.63, 12.90 ± 0.55 and 11.34 ± 0.5g/d for 0, 5, 10, 15, 20 and 25% (WSM) inclusions, respectively. No significant differences were observed amongst all dietary treatments for the growth parameters considered (P>0.05). The blood parameters equally did not show any significant difference (P>0.05) except for RBC values (P>0.05). It is therefore concluded that weaner rabbits can tolerate up to 25% wild sunflower meal (WSM) inclusion in their diets without negatively affecting the growth and haemotological parameters.

KEYWORDS- Weaner rabbit, wild sunflower meal, haematology, growth parameters

INTRODUCTION

The keen interest of farmers and consumers in rabbit production in Nigeria has provoked research into ways of increasing production, and exploiting various ways to meet the needs of Nigeria's teeming population. Various plants and agricultural policies have been formulated at one time or the other to combat the acute shortage of animal protein supply. High cost of feed ingredients and other costs associated with production had accounted for the failure of the plans and policies. These have resulted into farmers looking for various alternatives to replace the expensive feeding which accounts for over 70% of the total cost of producing livestock intensively (Ogunfowora 1984). Energy source is largely restricted to maize while protein source has centered on groundnut cake, soybean meal and fish meal.

An array of substitutes however abound to satisfy the need for these vital components of livestock feed. In the face of diminishing, and high costs of, conventional sources, venturing into these alternative sources is most economical (Tewe 1986). Sunflower as a possible source of food of good nutritive quality has been almost entirely overlooked until recently when researchers decided to probe into its usefulness. Sunflower seed is a potential protein supplement due to its good nutritional content and absence of anti-nutritional factors (Wan *et al*., 1972). Feeding studies by Waldroup *et al*., (1970) showed that sunflower meal can be used effectively in rabbit ration to replace 50% soybean meal.

The objective of this study was to evaluate the growth and haematological performance of rabbits placed on diets containing graded levels of wild sunflower meal.

MATERIALS AND METHODS

Freshly cut wild sunflower leaves at flowering stage were obtained from Ladoke Akintola University of Technology (LAUTECH) Farm plots. The leaves were air – dried until practical dryness was achieved. Dried leaves were then milled at LAUTECH feed mill.

Thirty-six (36) weaner rabbits of mixed breeds and litter mates were randomly grouped into six test diets (Table 1), each group containing six rabbits of nearly equal weights. Proximate compositions of milled leaves and experimental diets were determined using standard method (AOAC 1990) (Tables 2 and 3). The following

levels of wild sunflower meal (WSM) were added, 0, 5, 10, 15, 20 and 25% to other basic ingredients to balance the ration (Table 1). The rabbits were weighed initially and weekly thereafter. They received weighed amounts of diets daily, and feed consumption was measured as the difference between while those on 25% WSM diet had the lowest value. The value is lower than 25.50 to 31g/day reported by Deblas and Carvey (1975). It would be noticed that for all growth parameters considered in this experiment, dietary treatment 6 (i.e. 25% inclusion of WSM) consistently showed the lowest values.

The packed cell volume (PCV) value increased from control diet 1` to diet 3 (10% inclusion) and decreased to 33.2%, 30.6% and 30.5% for dietary treatments 4, 5, and 6, respectively. The same trend followed for the amount offered and left-over portions which were weighed 24 hours later. The experiment lasted 50 days.

Performance parameters were taken and calculated. At the end of the trials, blood samples were collected separately into tubes, containing anti-coagulant (EDTA) solution, to analyse various blood parameters. Data obtained were analysed by simple mean and analysis of variance as described by Steel and Torrie (1980).

RESULTS AND DISCUSSION

From Table 2, crude protein content for diet 3 was the highest, diet 1 (control) was the lowest while others were isonitrogenous. Crude fibre contents were almost the same for all dietary treatments ranging from 8 to 12% of the dry matter. The proximate composition of wild sunflower meal (WSM) under investigation contained 90% dry matter and 18.38, 12.0, 5.0, 14.0 and 50.62% of crude protein, crude fibre, ether extract, ash and nitrogen-free extract of the dry matter respectively (Table 3). The crude protein content was higher than 16.61% reported by Odunsi *et al*., (1996). The crude fibre content of 12.0% was similar to the value reported by Odunsi *et al*., (1996) for wild sunflower forage meal, much higher than 2.4% reported for unshelled seed meal, but lower than 16.57% (senesced leaf) and 20.67% (inflorescence) reported by Ajayi *et al*., (2007).

Final live weight was highest for rabbits on diet 1 (control) while rabbits on 25% inclusion of WSM had the lowest value. However, there was no significant difference amongst dietary treatments ($P>0.05$). Similarly, both the daily feed intake and weight gain were not significantly affected ($P>0.05$) although the control diet group had the highest value for daily feed intake (Table 4); and this is lower than the average of 150g/d recommended by Lebas (1986). Rabbits on 5% inclusion of WSM had the highest weight gain haemoglobin concentrations as was observed for PCV (Table 5). These values fall within the range of 9 to 15g/d1 for rabbit. Mean corpuscular haemoglobin concentration (MCHC) remained approximately the same for all dietary treatments. Mean corpuscular volume (MCV) fell within the range of 60 to 68μ^3 for rabbit. The values for red blood cells, white blood cells and mean corpuscular heamoglobin also fall within the ranges of 3 to 6 x $10^3/mm^3$, 5 to 7 x $10^6/mm^3$ and 19 to 125µg/g, respectively, for the rabbits.

This study showed that the haematological parameters considered for this experiment under different dietary treatments had no significant difference except for RBCs ($P<0.05$). Similarly, growth parameters were not significantly influenced by different inclusions of wild sunflower meals at 5, 10, 15, 20 and 25% graded levels. It is therefore concluded that inclusion of wild sunflower meal at 25% level, which was the highest in this experiment, will not adversely affect the growth and haematological changes/parameters in rabbits.

Table 1: Composition of experimental diets (kg)

	Experimental diets					
Ingredients	1	2	3	4	5	6
Maize	20.0	17.5	15.0	12.5	10.0	7.5
Maize bran	15.0	22.5	20.0	17.5	15.0	12.5
Sunflower	-	5.0	10.0	15.0	20.0	25.0
GNC	18.0	18.0	18.0	18.0	18.0	18.0
PKC	23.0	23.0	23.0	23.0	23.0	23.0
Fish meal	1.5	1.5	1.5	1.5	1.5	1.5
Bone meal	3.0	3.0	3.0	3.0	3.0	3.0
Premix*	2.0	2.0	2.0	2.0	2.0	2.0
Salt	0.5	0.5	0.5	0.5	0.5	0.5
Oil	4.0	4.0	4.0	4.0	4.0	4.0
Molasses	3.0	3.0	3.0	3.0	3.0	3.0

Vit. A, 8,000iu; Vit. D3, 1,500iu; Vit. E, 3g; Vit. K, 32g; Calcium D Pantothenate, 3g; Vit. B6, 0.3g; Vit. B12, 8mg; Mn, 10g; Zn, 4.5g; Cu, 0.2g; I, 0.15g; Co, 0.02g; Sc, 0.01g; GNC = Groundnut Cake

Table 2: Proximate Composition of Experimental Diets (%)

Constituents	1	2	3	4	5	6
Dry Matter	92.00	94.00	94.00	92.00	92.00	92.00
Crude Protein	15.75	19.75	20.13	18.34	19.25	19.25
Crude Fiber	10.00	8.00	8.00	8.00	11.00	12.00
Ether Extract	4.00	2.00	6.00	4.00	2.00	6.00
Ash	10.00	8.00	14.00	14.00	14.00	10.00
NFE	60.25	62.75	51.87	55.62	53.75	52.75

Table 3: Proximate Composition of Wild Sunflower Meal

Constituents	%
Dry Matter	90.00
Crude Protein	18.38%DM
Crude Fibre	12.00
Ether Extract	5.00
Ash	14.00
NFE	50.62

Table 4: Mean Values for Growth Performance of Rabbits Fed on Graded Levels of Wild Sunflower Meal

	Experimental diets					
Parameters	1	2	3	4	5	6
Initial live weight (g)	1233.22±25.41	1050.65±25.49	1008.34±13.12	987.52±17.71	1022.58±11.51	887.38±12.44
Final live weight (g)	1865.22±10.34	1790.65±22.78	1610.341±17.84	1640.52±26.78	1667.58±23.15	1454.38±29.32
Daily feed intake (g)	55.86±1.71	52.77±1.70	50.42±1.68	48.33±1.68	46.29±1.60	43.29±1.50
Weight gain (g/d)	12.64±0.58	14.80±0.66	12.04±0.59	13.06±0.63	12.90±0.58	11.34±0.05

Table 5: Mean Values for Haematological Parameters of Rabbits Fed on Graded Levels of Wild Sunflower Meal

Parameters	Experimental diets					
	1	2	3	4	5	6
PCV (%)	27.0±0.2	27.8±0.3	34.0±0.5	33.2±0.3	30.6±0.4	30.5±0.4
HGB (g/dl)	9.0±0.7	9.3±0.6	11.3±0.2	11.4±0.4	10.2±0.2	10.1±0.2
MCHC (%)	33.3±0.1	33.4±0.1	33.4±0.1	33.3±0.1	33.4±0.1	33.4±0.1
MCH (µg/g)	20.1±0.1	20.4±0.2	20.0±0.1	19.8±0.3	20.0±0.1	20.0±0.2
MCV (μ^3)	60.2±0.1	60.5±0.2	59.6±0.2	59.2±0.1	59.8±0.3	59.7±0.1
RBCs x 10^6 (cells/mm^3)	4.48±0.20	4.56±0.12	5.66±0.12	7.60±0.15	5.10±0.11	5.08±0.14
WBCs (x 10^3/mm^3)	4.18±0.4	4.73±0.1	5.80±0.7	4.86±0.6	4.43±0.6	4.31±0.6

PCV = Packed cell volume, HGB = Haemoglobin, MCHC= Mean corpuscular haemoglobin concentration, MCH = Mean corpuscular haemoglobin , MCV = Mean corpuscular volume, RBC = Red blood cells and WBC = White blood cells

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