

RESPONSE OF RABBITS FED DIETS CONTAINING GRADED LEVELS OF ROASTED DATE PALM (*PHOENIX DACTYLIFERA L*) SEED MEAL

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ABSTRACT

An experiment was conducted to assess the part replacement of maize with roasted date palm seed meal. The experimental diet was fed to weaner rabbits at different dietary treatment levels of 0 %, 5 %, 10 %, 15 %, and 20 % respectively. A total 45 rabbits of mixed sexes of ages of 5-6 weeks and average initial weights of 555.67-600g were used for the experiment for a period of 12 weeks in a CRD. The rabbits were randomly allocated to five (5) treatments with 9 rabbits. Each treatment was replicated thrice with three (3) rabbits each. A known quantity of feed and water were provided ad-libitum and record of daily feed intake and weekly body weights were taken. At the end of the 12 weeks feeding period the result showed that there were significant differences ($p < 0.05$) in the final weights, total weight gain, average daily weight gain, nutrient digestibility, cost analysis of the rabbits across the dietary treatments. Final weights of rabbits ranged between 1664g to 1738.89g. The result suggests that rabbits have the capacity to utilize roasted date palm seed meal effectively and could perform better even up to 20 % inclusion in diet.

Keywords: Date palm seed meal, rabbits, weight gain, digestibility.

INTRODUCTION

Date palm seeds are discarded in tons as waste daily by the date processing industries and individual consumers leading to environmental pollution (Chandrasekaran and Bahkali, 2013). The authors felt that, there is the need to find suitable applications for this waste and that there is also an urgent need for alternative feedstuff that is less competitive to replace the conventional feed to reduce competition between man and animals. The authors observed that this will help in the reduction of reliance on maize and competition with man for cereals and help in reducing environmental pollution, hence the use of date palm seeds which is of no use to man but could meet the nutritional requirements of livestock. Date palm seed is high in carbohydrates and low in protein and fat, and for best feed efficiency, it has to be supplemented (Date palm products 2012), and as an energy source of feed, it could become an important feed resource for rabbits. The high content of Nitrogen Free Extract (NFE) in date seeds (Biglari *et al*, 2009) has attracted the attention of researchers to evaluate its potential use in animal feed.

The objectives of this research work include to evaluate the growth response of rabbits fed diets containing graded levels of roasted date palm seed meal and also to determine the nutrient digestibility of rabbits fed diets containing graded levels of roasted date palm seed meal

MATERIALS AND METHODS

This experiment was conducted at the Rabbitry unit, behind Niger State Veterinary Centre, Minna, Niger State. The date palm seed is a hard coated seed and this makes the seed difficult to be processed and also makes the seed components difficult to digest. The seeds were roasted in open frying pan with sand at bottom of the pan to reduce the hardness and antinutritional content and ground to pass through 0.5mm wire mesh sieve to remove large particle sizes so that it will bind well when pelleted. A Complete Randomized Design (CRD) was used in this experiment. The rabbits were randomly allocated to five (5) treatments. Each treatment was replicated thrice (3) with each replicate having three (3) rabbits and nine (9) rabbits per treatment. The rabbits were fed with the diets that contained inclusion of different levels of roasted date palm seed meals. Treatment one (T1), the control, contained 0 % roasted date palm seeds

meal (RDPSM). T2 5 % RDPSM, T3 10 % RDPSM, T4 15 % RDPSM and T5 20 % RDPSM. During the last week of the feeding trial, digestibility study was carried out. Two rabbits were removed from each of the replicates and placed in metabolism cages. The rabbits were allowed to acclimatize in the metabolic cage for a period of 3 days before the collection of the faeces, which lasted for another 4 days. This involves feeding the animals daily with a known quantity of feed followed by faecal collection for a period of 4 days. The faeces collected daily were weighed on the wet basis and oven dried at 105°C for 24 hours and then weighed again to determine the moisture content. The Apparent Nutrient Digestibility was calculated using the formula of (Isikwenu *et al.* 2010).

$$\text{Apparent nutrient digestibility} = \frac{(\text{Nutrient intake}) - (\text{Nutrient in dropping})}{\text{Nutrient intake}} \times 100 \%$$

Parameters measured are; Feed intake, Body Weight, Weight Gain, Digestibility Trial.

The data collected were subjected to one way analysis of Variance (ANOVA). Significant difference between treatments means were separated using Duncan's multiple range test.

Table 1: Composition of the Experimental Diets

Ingredient (%)	Dietary Levels of Roasted Date Palm Seed Meal (%)				
	0%	5%	10%	15%	20%
	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5
Maize	51.49	48.92	46.34	43.77	41.19
RDPSM	0.00	2.57	5.15	7.72	10.30
SBM	16.39	16.39	16.39	16.39	16.39
Rice Bran	17.04	17.04	17.04	17.04	17.04
GNC	7.08	7.08	7.08	7.08	7.08
Fish Meal	3.00	3.00	3.00	3.00	3.00
Bone Meal	1.00	1.00	1.00	1.00	1.00
Limestone	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Values (%)					
ME (Kcal/Kg)	2700.05	2676.96	2653.80	2630.72	2607.55
Crude protein	18.00	18.00	18.00	18.00	18.01
Crude fibre	9.66	11.07	12.49	13.90	14.32
Ether extract	6.46	6.59	6.72	6.85	6.99
Methionine	0.32	0.30	0.31	0.30	0.30
Lysine	0.85	0.88	0.90	0.91	0.94
Calcium	1.64	1.73	1.82	1.90	2.00
Phosphorus	0.93	1.13	1.33	1.55	1.75

*Premix supplied the following per kg diet: vit. A, 10000 I.U; vit. D, 2000 I.I; vit. E, 25 mg; vit. K, 2 mg; Thiamine B1, 1.8 mg; Riboflavin B2, 5 mg; Pyridoxine B6, 3.5 mg; Niacin, 28 mg; vit. B12 0.015 mg; Pantothenic acid, 7.5 mg; Folic acid, 0.75 mg; Biotin, 0.06 mg; chlorine chloride, 300 mg; Manganese, 40 mg; Zinc, 30 mg; Antioxidant 1.25mg Iron, 20 mg; Copper, 3 mg; Iodine, 1 mg; Selenium, 0.2 mg; Cobalt, 0.2 mg.

Key: RDPSM – Roasted date palm seed meal, SBM - Soya bean meal, GNC- Ground nut cake, ME - Metabolizable energy

RESULTS

The growth performance result shows that there were significant differences ($P < 0.05$) in final weight, total weight gain and average daily weight gain among all treatments. No significant differences ($P > 0.05$) were

recorded in the total concentrate intake, total forage intake, total feed intake, average daily feed intake and feed conversion ratio (FCR) among all treatments. The result of the final weight shows a significant difference ($P<0.05$) among treatment means, treatment 2 (5 % RDPSM) recorded the highest final weight of 1758.89g. This was followed T1 (0 % RDPSM) 1738.89g, T4 (15 % RDPSM) 1685.55g, T3 (10 % RDPSM) 1671.11g and T5 (20 % RDPSM).

Dry matter and apparent nutrient digestibility coefficient of diets containing varying levels of roasted date palm seed meal was shown on table 3. Significant differences ($P<0.05$) were observed in the digestibility coefficient values of dry matter, crude protein, Ash, Ether extract and Nitrogen free extract in all treatments. The RDPSM used in this study improved dry matter digestibility in a linear manner with the inclusion of roasted date palm seed meal.

Table 2: Performance characteristics of Rabbits fed different levels of varying roasted date palm seed meal (g)

Parameter	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	SEM	P/Value	L/S
Initial weight	555.56	583.33	600.00	588.89	588.89	5.26	0.06	NS
Final weight	1738.89 ^{ab}	1758.89 ^a	1671.11 ^c	1685.55 ^{bc}	1664 ^c	11.82	0.03	*
Total weight gain	1183.33 ^a	1188.89 ^a	1071.11 ^b	1096.67 ^b	1075.55 ^b	16.22	0.02	*
Avg dly wt gain	13.15 ^a	13.21 ^a	11.90 ^b	12.18 ^b	11.95 ^b	0.18	0.02	*
Total conc intake	8642	9308	7939	9313	8073	420.96	0.80	NS
Ttl forage intake	2712.2	2689.6	2322.8	2710	2376.4	130.42	0.80	NS
Total fd intake	11354	11998	10263	12024	10443	549.31	0.80	NS
Avg dly fd intake	126.15	133.31	114.03	133.51	116.03	6.10	0.80	NS
FCR	9.58	10.06	9.55	10.93	9.66	0.43	0.87	NS

a, b, c = means on the same row with different superscript differ significantly ($P<0.05$)

Conc. = Concentrate

Table 3: Dry matter and apparent nutrient digestibility coefficient of diets containing varying levels of roasted date palm seed meal (%)

Dietary treatments						
Parameter	Treatment 1 0%RDPSM	Treatment 2 5%RDPSM	Treatment 3 10%RDPSM	Treatment 4 15%RDPSM	Treatment 5 20%RDPSM	LS
Dry matter	80.55 ^a	81.68 ^a	78.02 ^b	77.91 ^b	75.44 ^c	*
Crude protein	76.46 ^b	79.35 ^a	74.51 ^{bc}	76.46 ^b	73.03 ^c	*
Crude fibre	79.38 ^{ab}	78.01 ^b	81.19 ^a	72.80 ^c	69.98 ^d	*
Ash	42.32 ^{ab}	35.95 ^b	35.85 ^b	42.42 ^{ab}	52.52 ^a	*
Ether extract	81.62 ^a	79.40 ^b	76.49 ^c	83.20 ^a	77.69 ^{bc}	*
NFE	85.34 ^a	85.64 ^a	82.22 ^b	84.39 ^{ab}	80.97 ^b	*

a, b, c = means on the same row with different superscript differ significantly ($P<0.05$)

NFE= Nitrogen Free Extract.

DISCUSSION

The dry matter, crude protein, crude fibre, ether extract and NFE were digested well above 70% digestibility. The value of dietary crude fibre obtained in this study was 64.5 %. This was in agreement with (Omowunmi and Ayoade, 2013) who highlighted that high dietary fibre is known to influence digestion and absorption processes in the small intestine. Therefore, since the crude fibre value of date palm seed meal is high, if consumed it will aid digestion and absorption processes in rabbits. Cust, Skitton and Van (2009) evaluated that high crude fibre in diet decreases the absorption of cholesterol from the gut in addition to delaying the digestion and conversion of starch to simple sugars. The CP percentage was higher in control treatment and decreased as the level of RDPSM increased within the recommended 15-18 percent (Aduku, 1992). The metabolizable energy of all experimental test diets were within the recommended 2,500 - 2,700 ME (kcal/kg) for weaners and growers (Aduku, 1992). The growth performance in this study was in line with (Iyhege-Erakpotobor, 2007) who reported that growth rate does not exceed 5-10g during grower phase under tropical condition. The average daily feed intake of 114.03 - 133.5g was quite high compared to the values of 77.64 - 87-51g reported by Adejinmi *et al*, (2013) and Iyhege-Erakpotobor (2007) had values of 102.6g – 104.8g/day in their research work on effects of concentrate and forage type on performance of growing rabbits. The RDPSM used in this study improved dry matter digestibility in a linear manner with the inclusion of roasted date palm seed meal. This was in agreement with Al-Bowait and Al-Sultan (2007) who reported that the use of sodium hydroxide (NaOH) in the treatment of date palm seeds improved dry matter and organic matter digestibility of the seeds.

CONCLUSION

The ultimate result of incorporating RDPSM in rabbit diet showed that rabbits on Treatment 2 (5 % RDPSM) replacement of maize had a better CP digestibility than the control and other treatments which have also translated to a better final weight gain. Inclusion of roasted date palm seed meal in the diet of rabbits also showed higher values of nutrient digestibility in all treatments, an indication that the utilization of RDPSM was well digested.

RECOMMENDATION

Based on this research, I therefore recommended replacement of maize up 5% Roasted date palm seed meal in the diet of rabbits for optimum growth performance. However further researches can be carried out using higher levels of inclusion and other processing techniques of date palm seed.

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