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**OF THE**  
**ANIMAL SCIENCE ASSOCIATION OF NIGERIA**

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**CHALLENGES OF CLIMATE CHANGE IN**  
**ANIMAL AGRICULTURE**  
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## Performance of broiler chickens fed varying levels of differently processed desert date (*Balanites aegyptiaca*) seed meal diets at starter phase

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Target Audience: Animal Scientists, Poultry Farmers, Researchers

### Abstract

The performance of broiler chickens fed graded levels of differently processed desert date (*Balanite aegyptiaca*) was investigated. One hundred and fifty day-old Ross 308 were assigned to five treatment groups each replicated three times with ten chickens per replicate in a completely randomized design. Chickens in treatment one was fed the control diet while other treatments were fed graded levels of differently processed desert date seed meal (DDSM). The *Balanite aegyptiaca* was boiled and roasted separately before incorporation in the diet at 10 and 20 % for Treatments two to five respectively. The performance of the birds significantly declined in broiler birds fed 10 % boiled, 20 % boiled and 20 % roasted at starter respectively. The control had the highest feed intake of 710.04 g. Treatment 4 with 10% roasted desert date had comparable body weight gain and final body weight with the control (Treatment 1, without desert date inclusion in the diet). However, the feed conversion ratio was not significantly ( $p>0.05$ ) different among dietary treatments. The study concluded that a 10 % inclusion level of roasted *Balanite aegyptiaca* in broilers diet is preferable as it did not negatively affect the final weight, body weight gain, feed intake and feed conversion ratio.

**Keywords:** Desert date; growth performance; starter phase; roasting; boiling

### Description of Problem

The high cost of conventional feed ingredients used in poultry feed formulation has necessitated the search for alternative feedstuffs in most developing countries. This is because soybean and groundnut which are conventionally consumed by man as plant protein are the major protein sources used in poultry feed formulation [1]. As a result, the inclusion of these nonconventional feed ingredients in poultry feed formulation can cause a reduction in the cost of poultry feeds as well as simultaneously contribute to available poultry products such as meat and eggs [2]. There are several legumes and oil seeds whose nutritional and economic values could be determined and exploited for commercial feed formulation [4], one of such legumes is *Balanites aegyptiaca* fruit meal, also known as desert date in English. The plants are found to contain alkaloids, flavonoids, phenols, saponins, tannins, oxalate, terpenoids, steroids etc. which confers the ability to function as an antimicrobial, anti-inflammatory, antiviral, antioxidant, anti-ulcer and anthelmintic agents [5]. To this effect, there is a need to investigate the influence of feeding graded levels of differently processed desert date (*Balanite aegyptiaca*) seed meal on the performance of broiler chickens at the starter phase.

### Materials and Method

This study was conducted at the Poultry Unit of Animal Production Teaching and Research Farm, School of Agriculture and Agricultural Technology, Federal University of Technology Minna, Niger

State. Minna is found in the Southern Guinea Savannah region of the agroecological zone which lies between a Latitude of 9° 30' and 6° 45' North and a Longitude of 06° 30' and 06° 45' East of the equator. The average rainfall and temperature of Minna range from 1100-1600 mm and 21°C-35°C respectively [3].

### Processing of desert date seed

The desert dates were carefully sorted and cracked before being processed. Two kilograms (2kg) of desert date was boiled in 2 litres of water for 60 minutes and allowed to cool and oven-dried at 60 °C. The raw desert date was ground with a hammer mill, and 250 g of milled raw desert date was roasted using a gas cooker with constant stirring to enhance the even distribution of heat. The roasting was done for about 10 minutes until a sweet aroma and pale brownish colour was obtained.

### Experimental Design and Management of Birds

One hundred and fifty day-old, Ross 308 broiler chicks were used for this study. The chicks were weighed and randomly allotted to five treatments with three replicates per treatment in a completely randomized design (CRD). Each replicate had 10 birds which were raised on deep litter. Five broiler starter diets were formulated which were isonitrogenous and isocaloric. The test ingredient; desert date seed meal (DDSM) was not included in the control (T1) Treatment diet. T2 contained 10% boiled DDSM, T3 contained 20% DDSM, T4 contained 10% roasted DDSM and T5

contained 20% DDSM. The proximate analysis of DDSM was carried out according to the method outlined by [6]. Feed and water were provided *ad-libitum* during the experiment which lasted for 4 weeks. Management practices ideal for broiler chickens were strictly adhered to. The parameters measured were initial weight, final weight, feed

intake and average weight gain. The feed conversion ratio was calculated. Data obtained from this experiment were subjected to analysis of variance (ANOVA) using a linear model procedure of IBM SPSS computer package version 23.0. Duncan's Multiple Range Test was used to separate the means.

**Table 1: Proximate composition of raw and processed desert date seed meal**

Parameters (%)	Raw	Boiled	Roasted
Dry matter	86.20	90.40	97.20
Crude protein	32.90	35.00	36.40
Ether extract	29.86	30.47	33.00
Crude fibre	5.00	8.50	3.50
Ash	3.50	3.70	5.50
Nitrogen free extract	14.94	12.73	18.80

**Table 2: Performance of broiler chickens fed graded levels of differently processed desert date meal diets**

Parameters	Treatments					SEM	P-value
	T1	T2	T3	T4	T5		
IBW (g)	60.37	60.03	59.83	58.77	60.20	0.35	0.70
FBW (g)	529.69 <sup>a</sup>	461.17 <sup>b</sup>	471.05 <sup>b</sup>	512.04 <sup>ab</sup>	446.69 <sup>c</sup>	9.95	0.01
BWG (g)	469.32 <sup>a</sup>	401.13 <sup>c</sup>	411.21 <sup>bc</sup>	453.27 <sup>ab</sup>	386.49 <sup>c</sup>	9.23	0.01
TFI (g)	710.04 <sup>a</sup>	617.38 <sup>ab</sup>	558.75 <sup>b</sup>	640.08 <sup>ab</sup>	603.73 <sup>ab</sup>	17.79	0.04
FCR	1.51	1.54	1.36	1.41	1.57	0.03	1.94

**Keys:** abc= Means with different superscripts on the same row differs significantly ( $P < 0.05$ ), IBW = initial body weight, TFI = total feed intake, FBW = final body weight, BWG = body weight gain, FCR = feed conversion ratio, SEM = standard error of mean and P-value = probability value, T1 = 0 % of desert date, T2 = 10 % of boiled desert date, T3 = 20% of boiled desert date and 20%, T4 = 10 % of roasted desert date and T5 = 20 % of desert date.

### Results and Discussion

The proximate composition of raw and processed desert date seed meal is presented in Table 1. The proximate compositions of the raw seed are as follows; dry matter 86.20 %, crude protein 32.90 %, ether extract 29.86 %, crude fibre 5.00 % and nitrogen-free extract 14.94 %. There was a slight influence of processing methods on proximate composition between the raw and differently processed DDSM. The crude protein was increased in boiled (35.0 %) and roasted (36.4 %) compared to the raw (32.9 %). The dry matter observed for raw desert date (86.20 %) is lower than the 95.5 % reported by (6). The crude protein found to be 32.90 % is higher than the 17.98 % reported by [7]. [8] reported 17.33 % as crude fibre content for raw *Balanite aegyptiaca*, which is higher than the 5.0 % obtained in this study. The Nitrogen-free extract of 14.94 is lower than 45.47 % reported by [9]. The performance characteristics of broilers fed graded level of desert date meal is presented in Table 2. It was observed that chickens fed T5, T3 and T2 had significantly ( $p \leq 0.05$ ) lower values in final body weight and final body weight gain compared to the control. Similarly, chickens fed a 20 % graded level of boiled DDM recorded the least

total feed intake (558.75 g). However, the feed conversion ratio was not significantly ( $p > 0.05$ ) influenced by the different treatment groups. The most probable explanation for the observed reduced performance in chickens fed T2, T3 and T5 may be due to the incomplete elimination of anti-nutritional factors such as; tannins, saponins, phytates and oxalate [9] which would have constituted a hindrance to bio-availability of some of the nutrients for the birds at those levels of inclusion in the diets. Tannin for instance forms a complex linkage with protein hence poor digestibility leads to loss of protein and consequently poor growth [10]. Phytic acid makes minerals unavailable for metabolic processes as it chelates with them [10] thus resulting in poor growth. However, chickens fed the T4 diet recorded ( $p > 0.05$ ) similar values in final body weight and final body weight gain. The reduction in feed intake observed by chicks fed 20 % graded level of boiled DDSM diets could also be attributed to its astringent taste which may result from the tannin content. [11] found by quantification that high levels of saponins, phytate, tannins and nitrites were present in unprocessed desert dates, processing only reduces some fraction of it thereby affecting feed intake and weight gain. In this study, it was

observed that roasting as a processing method for desert date was more effective than boiling. [12] reported similar observations when diets containing differently processed roselle seeds were fed to broiler chickens. However, the similarity observed in the feed conversion ratio which was not significantly affected ( $p > 0.05$ ) by the processing methods and inclusion levels is not clear as the literature is inconsistent in this regard as reported by [9]. This result is in agreement with the findings of [13].

### Conclusion and Application

This study concluded that the performance of broiler chickens fed 10 % inclusion of roasted desert date diets were comparable with broiler chickens on the control treatment. It was observed that roasting as a processing method for desert date was more effective than boiling. Other methods could be employed in processing desert date.

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