Performance and Haematological/Serum Characteristics of Rabbits Fed Boiled Castor Seed Cake Based Diet

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Abstract: 30 weaners rabbit of an average weight of 407.8g were employed in a feeding trial lasted 19days to evaluate the effect of inclusion of graded level of boiled castor seed cake (at 0, 10, 15, 20 and 25% inclusion levels) on the growth performance, blood composition and haematological parameters of the animals. The animals were randomly allotted to five treatments of 6 replicates (1 animal per replicate) per treatment. The initial weight, final weight and fed intake were monitored, recorded and analyzed. Two sets of blood samples were also collected from a set of randomly selected animals (in each treatment) and used for the haematological analysis. All data collected were subjected to one-way analysis of variance (ANOVA). No significant (p>0.05) difference was obtained in the average final weight, average daily weight gain, average daily feed intake and feed to gain ratio. However, the daily weight gain decreases as the inclusion level of CSC increase, while the feed to gain ratio increased. HB, PCV, RBC, WBC, Neutrophils, Eosinophils and lymphocytes were not significantly (p>0.05) affected among the dietary treatment. Also the Albumin, Total protein, Bilirubin and Urea were not significantly (p>0.05) different. However, highest values were obtained in diit 1 (0% CSC) except in the case of Bilirubin. It could be seen from all indication that weaner rabbit cannot tolerate Boiled castor seed cake based diet beyond 15% inclusion level. Other processing methods which can detoxify the seed to a better extent are to be considered.

Key words: Castor seed cake · rabbit · growth performance · haematology

INTRODUCTION

Shortage and high cost of some conventional plant protein sources such as cowpea, soybean and groundnut cake due to its ever increasing demand as staple food for man, raw materials in industries and as feed ingredients in farm animals has called for alternative plant materials (legume grains) which are rich in protein and of less industrial use and human preference (Akinmutimi, 2001). Example of such seeds is castor seed. The meal obtained from the oil extraction process contains about 39% CP and other nutrients except lysine and methionine (Davendra, 1988). This deficiency hindered the use of castor meals as the main source of protein in rations of pig, poultry and rabbit.

Another constraint that limitate the utilization of castor seed cake as feedstuff is the presence of ricinene and allergens which are potential toxicants in raw Ricinus Communis (Serkovic Pepovic, 1966). Hence the need for processing before its incorporation into animal feed is highly essential, such processing methods include; cooking, toasting, autoclaving, fermenting, soaking etc. In a situation where the processing method employed do not properly detoxify the anti-nutritional factor(s), it can easily interferes with the haemotological parameters, serum chemistry and growth performance of the animal, (Akinmutimi and Oke, 2002). The objective of this study therefore is to evaluate the effect of boiled castor seed on haematological parameter, serum chemistry and growth performance of rabbit fed boiled, castor seed based diet.

MATERIALS AND METHODS

The study was conducted at the teaching and research farm of University of Ilorin, Ilorin. The castor seed cake used for the experiment was obtained from...
integrated oils mills limited, Kaduna. It was processed by soaking for 12 hrs followed by cooking with fresh water over wood flame for about an hour. It was then cooled, sundried to about 90% DM before grounded and stored till the time of use. Other feed ingredients were obtained from a reputable feed mill outlet.

Thirty growing rabbit (20 females and 10 males) of an average weight of 407.8 g were used for the experiment. The animals were randomly grouped into 5 of 6 animals per group. They were individually housed in a large wooden wire mesh cages measuring 75 x 45 x 45 and 80cm above the ground.

The five experimental diets of an average crude protein of 18% were formulated in which Castor Seed Cake (CSC) were included at rate of 0, 10, 15, 20 and 25 per cent, respectively.

Table 2 below illustrates the percentage composition of the 5 diets.

Feed intake (g) and body weight gain (kg) were monitored and used to determine feed conversion efficiency and average daily weight gain. At the end of the feeding trial, 2 rabbits per treatment were selected and bled at the pinner. A set of blood samples were collected into EDTA (Ethylene diamine tetra-acetic acid) bottle for haematological (PCV, HB, WBC, RRC and leucocytes) evaluation while another set of blood samples were collected into bottles without anti-coagulant for blood chemistry (Protein, bilirubin, albumin and Urea) evaluation as described by Davice and Lewis (1977). Data collected were subjected to analysis of variance (ANOVA) as described by Steel and Torrie (1980) where significant differences were observed, Duncan’s Multiple Range Test (Duncan, 1990) were employed to separate the means.

RESULTS AND DISCUSSION

Average daily feed intake showed no significant (p>0.05) difference on diets 0%, 10% and 15% though control had the highest value. This observation agreed with Oyawoye and Ogunkunle (1998) who fed jack bean to broiler. Similarly, the average daily weight gain and feed to gain ratio were not significantly (p>0.05) affected. However the mortality rate is relatively high to the extent of 33% at 10% and 15% inclusion rate, 100% at 20% and 25% levels of inclusion. This indicates that rabbit cannot withstand high inclusion rate of boiled Castor Seed Cake.

Result of haematological and erythrocyte indices as shown in Table 4 revealed no significant (p>0.05) different among the haemoglobin (HB) values, however, the highest value of 39% was obtained in 0% CSC. It was also found to be paralled with growth performance hence agreed with the study of Anongu et al. (1996) who fed sheabutter cake to rabbit. These data obtained also fall within the normal range reported by Siegmund (1973).

The mean PCV, RBC and WBC Values followed a similar trend with haemoglobin without any significant (p>0.05) difference among the means. This corroborates the report of Olorode et al. (1996) who fed sheabutter cake to pullets. Lymphocytes, Neutrophils and Eosinophils were not significantly (p>0.05) different. Rabbits fed control diet had no Eosinophils. Mean Serum, total protein, albumin bilirubin and Urea were not significantly (p>0.05) different although a higher total protein was obtained in rabbits fed control diet while a
Table 4: Haematological and Serum constituent Response in Rabbits fed diets containing CSC

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Diet I</th>
<th>Diet II</th>
<th>Diet III</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin (%) (Hb)</td>
<td>39.0</td>
<td>38.5</td>
<td>32.5</td>
<td>6.15</td>
</tr>
<tr>
<td>Packed cell volume (PCV) (%)</td>
<td>36.5</td>
<td>35.0</td>
<td>31.0</td>
<td>6.81</td>
</tr>
<tr>
<td>Red blood cell (RBC) (x10¹²)</td>
<td>230.0</td>
<td>221.5</td>
<td>224.0</td>
<td>18.96</td>
</tr>
<tr>
<td>White blood cell (WBC) (x10⁹/l)</td>
<td>3.7</td>
<td>4.3</td>
<td>3.1</td>
<td>1.17</td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>44.0</td>
<td>33.0</td>
<td>34.0</td>
<td>11.09</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>-</td>
<td>0.3</td>
<td>0.1</td>
<td>0.82</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>56.0</td>
<td>64.0</td>
<td>65.0</td>
<td>10.85</td>
</tr>
<tr>
<td>Albumin (g l⁻¹)</td>
<td>34.5</td>
<td>44.0</td>
<td>44.0</td>
<td>3.97</td>
</tr>
<tr>
<td>Total Protein (g l⁻¹)</td>
<td>45.5</td>
<td>30.5</td>
<td>34.0</td>
<td>8.24</td>
</tr>
<tr>
<td>Bilirubin (µmol l⁻¹)</td>
<td>39.5</td>
<td>60.5</td>
<td>47.0</td>
<td>10.75</td>
</tr>
<tr>
<td>Urea (µmol l⁻¹)</td>
<td>3.45</td>
<td>3.30</td>
<td>3.40</td>
<td>0.58</td>
</tr>
</tbody>
</table>

higher bilirubin was recorded from rabbits fed 10% CSC. However all the values obtained from albumin urea and total protein fall within normal ranges as reported by Murray et al. (1988).

CONCLUSIONS AND RECOMMENDATION

The result of this research showed that rabbits cannot withstand 20% inclusion level of boiled castor seed cake at all. Only 15% inclusion level was slightly tolerated. And castor seed, being a good source of protein and a relatively cheap materials, it can proval solution to alleviate the problem of high cost of proteinous feed ingredients. It could therefore be concluded that rabbit cannot effectively utilize boiled castor seed cake. Hence, recommended that other processing method(s) should be adopted as these may effectively and completely detoxify the anti-nutritional factors present in it and safely increase the inclusion level with relatively low mortality rate.

REFERENCES


Davendra, C., 1988. Non-traditional feed resources in Asia and the pacific 2nd ed. FAO Regional Office for Asia and pacific Bangkок, Thailand.


