

## EFFECT OF SUPPLEMENTATION OF SODOM APPLE (*Calotropis procera*) FLOWER ON HAEMATOLOGY AND SERUM CHEMISTRY OF MONGREL RABBIT IN SAHEL SAVANNA ZONE

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### ABSTRACT

This experiment was conducted to determine the effect of supplementation of Sodom apple (*Calotropis procera*) flower on haematology and serum chemistry of mongrel rabbit. The experiment was carried out using 16 grower rabbits with a weight range of 1.5-1.9 kg. The animals were allotted to four dietary treatments in a Randomized Complete Block Design (RCBD), which were replicated three times. The diets comprised of four treatments, designated as: T<sub>1</sub> with 0% Sodom apple, T<sub>2</sub> with 5% Sodom apple, T<sub>3</sub> with 10% Sodom apple and T<sub>4</sub> 15% of Sodom apple. The experiment period lasted for 6 weeks and experimental diets were fed 3% of the experimental animal's body weight. Significance differences ( $P < 0.05$ ) were observed on the performance parameters (weekly weight gain, total weight gain, feed intake and feed left over). Significance differences ( $P < 0.05$ ) also was observed in all the haematological indices. It can be recommended that supplementation of Sodom apple up to 15% on performance and haematological indices is recommended for mongrel rabbits.

**Keywords:** Haematology, Mongrel Rabbit, Serum Chemistry, Sodom Apple.

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### INTRODUCTION

In most developing countries like Nigeria, there is insufficient intake of animal protein due to low animal productivity. This has necessitated the need to intensify the production of fast maturing animal like rabbits. Rabbit has been identified as an economic livestock that can adequately meet the animal protein requirement of Nigerians due to its ability to convert feeds that are not directly utilized by man, it has short generation interval and rapid growth rate (Kalio *et al.*, 2008; Wafar *et al.*, 2018). According to Kehinde *et al.*, (2006) feed is the most important input in a profitable livestock production; it accounts for 60-80% of the total cost of production. High cost of feeding has continued to remain a major impeding factor in intensive animal production. Therefore, it is imperative to exploit the use of non-conventional feedstuffs that are cheap and readily available (Yakubu and Wafar, 2014). Studies have shown that non-convention feedstuffs offer least cost of feeding in livestock production when included in the diet (Ani, 2008; Shaahu *et al.*, 2017; Wafar *et al.*, 2018). One of these non-conventional feedstuffs considered in this study is *Calotropis procera* flower. Rabbits have potential as meat producing animals in the tropics due to characteristics such as small body size, short generation interval, rapid growth rate and ability to utilize forages or agricultural by-products. Rabbits could contribute significantly to solving the problem of meat shortage (Lebas, 1997). Ruiz-Feria *et al.* (1998) reported that rabbits could subsist on inexpensive diets based on forages under small-scale farm conditions in arid and tropical regions. Agricultural by-products, foliages and weeds such as sugar cane, cassava root meal, rice bran, natural grasses and *Leucaena* can be used as dietary ingredients for rabbits (Lukefahr, 2009). To develop balanced and economical feeds to compliment and possibly replace the scarce supplies from the expensive conventional sources, there is the need to search for alternative and readily available cheaper feed stuffs that are not directly consumed by man. Therefore, it is imperative to exploit the use of non-conventional feedstuffs that are cheap and readily available like *Calotropis procera* flower.

### MATERIALS AND METHOD

#### Study Area

The research was conducted at Hadejia local government area. Hadejia town is the capital of Hadejia and is located in the central part of the emirate. Hadejia lies between 10°10'E longitude and between 12° 25'N and 12°30'N latitude.

#### Source and Preparation of Sodom Apple (*Calotrophis procera*) Flower

Fresh Sodom apple (*Calotrophis procera*) flowers were harvested from the bush, around the premises of the Yamidi village and some local government areas close to Hadejia like Malam-Madori and Auyo. The Sodom apple (*Calotrophis procera*) flowers were dried under a well-ventilated room for 3 - 5 days until they became crispy to touch while retaining their colouration. Samples of the air-dried flowers were taken to the laboratory for chemical composition analysis and phytochemical using standard procedure of AOAC (2005).

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### Experimental Diets

Four (4) experimental diets were formulated with *C. procera* flowers meal at 0, 5, 10 and 15% dietary levels designated as Treatment T<sub>1</sub> (control diet), T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> respectively. The diets were formulated to satisfy the nutrients requirements of rabbits as recommended by National Research Council (NRC, 1998).

### Experimental Animals and their Management

Sixteen (16) grower rabbits of 10 - 12 weeks with average body weight of 1,320 g  $\pm$  20 g were used for the study. The animals were sourced from Hadejia market and raised under Teaching and Research Farm of Animal Health and Production Department, Binyaminu Usman Polytechnic Hadejia, Jigawa State. Rabbits were housed individually in a wire-mesh cage in an indoor pen under similar management and environmental condition.

The experimental rabbits were treated against internal and external parasites using Ivermectin injection (Kepromec®). They were also given anti-coccidial as prophylaxis using Embazin-Forte at dose rate of 30 g / 50 litres of drinking water for 3 days, and Oxytetracycline powder (Samoxine). The rabbits were initially fed control diets *ad libitum* for one (1) week of physiological adjustment. Fresh, clean, and cool water were supplied *ad libitum* throughout the experimental period.

### Haematological Parameters Determination

The Blood samples in ethylene diaminetetraacetic acid (EDTA) bottles were stored in an insulated container and immediately taken to Aminu Kano Teaching Hospital diagnosis laboratory and were analysed for haemoglobin (Hb) content using cyametHaemoglobin method (Coles, 1986). Packed cell volume (PCV), red blood cells (RBC), white blood cells and its differentials (neutrophils, basophils, eosionophils, monocytes, and lymphocytes) counts were also determined according to the methods described by Coles (1986). Mean corpuscular volume (MCV), Mean corpuscular haemoglobin concentration (MCHC) was calculated according to the formula stated in the Merck Veterinary Manual (1998) as  $MCV = PCV\% \div RBC \times 10$ ;  $MCH = Hbg/dl \div RBC \times 10$  and  $MCHC = Hbg/dl \div PCV \times 100$ .

### Data Analysis

Data obtained from the study was tested using Analysis of variance (ANOVA) for RCBD using SAS, (2003) at  $p = 0.05$ . Differences between means were separated by the Duncans Multiple Range Test (DMRT) of the same software.

## RESULTS AND DISCUSSIONS

There was no significant ( $P > 0.05$ ) difference observed across all the treatments values recorded on initial and final weight gain. Also, there was no significant ( $P > 0.05$ ) difference observed across all the treatments values recorded on average daily weight gain. Significant ( $P < 0.05$ ) difference was observed across all the treatments values recorded on weekly weight gain except T<sub>1</sub> (62.495) and T<sub>2</sub> (68.748) which showed no significant ( $P > 0.05$ ) difference. Similarly, there was no significance ( $P > 0.05$ ) difference observed across all the treatments values recorded on feed conversion ratio and feed intake except T<sub>3</sub> (2155.00) and T<sub>4</sub> (2140.00) which showed significant ( $P < 0.05$ ) increase. The findings agreed with earlier reports of Jokthan *et al.* (2006) and Osofowora *et al.* (2006) who reported that high fibre diets tend to increase feed intake in rabbits.

**Table 1. Performance of mongrel rabbit supplemented with *Calotropis procera* flowers**

Parameters	Treatments				SEM
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	
Initial weight gain	1300.0 <sup>a</sup>	1450.0 <sup>a</sup>	1575.0 <sup>a</sup>	1525.0 <sup>a</sup>	111.5
Final weight gain	1550.0 <sup>a</sup>	1725.0 <sup>a</sup>	1700.0 <sup>a</sup>	1625.0 <sup>a</sup>	106.5
Average daily weight gain	13.839 <sup>a</sup>	12.50 <sup>a</sup>	12.50 <sup>a</sup>	12.50 <sup>a</sup>	0.393
Weekly weight gain	62.495 <sup>a</sup>	68.74 <sup>a</sup>	31.24 <sup>b</sup>	24.99 <sup>b</sup>	3.803
Total weight gain	387.50 <sup>b</sup>	431.25 <sup>a</sup>	425.00 <sup>a</sup>	406.25 <sup>b</sup>	26.62
Feed conversion ratio	1.8440 <sup>a</sup>	1.6918 <sup>a</sup>	1.6825 <sup>a</sup>	1.7618 <sup>a</sup>	0.106
Feed offered	2800 <sup>a</sup>	2800 <sup>a</sup>	2800 <sup>a</sup>	2800 <sup>a</sup>	0.985
Feed intake	2247.25 <sup>a</sup>	2224.2 <sup>a</sup>	2155.0 <sup>b</sup>	2140.0 <sup>b</sup>	10.73
Left over	552.75 <sup>b</sup>	575.75 <sup>b</sup>	645.00 <sup>ab</sup>	660.0 <sup>ab</sup>	10.73

Rabbits have been reported to adjust their feed intake voluntarily to meet their energy requirements NRC (1998). *Calotropis procera* flower have been reported to affect voluntary feed intake (Yakubu and Wafar, 2014; NRC 1998) depending on the nature of the fibre. The higher weight gains of rabbits on T<sub>1</sub>, T<sub>3</sub> and T<sub>4</sub> diets could be due to efficient utilization of nutrient by the animals. Alawa and Amadi, (1991) reported that the ability of rabbits to

utilize highly fibrous diets may depend on the level of supplementation of *Calotropis procera* flower, nature of the fibre source, age of the rabbit and length of the adaptation period of their digestive system to the fibre source.

The haematological response of Rabbit supplemented with *Calotropis procera* flower was presented in Table 2. The result shows dietary supplemented with *Calotropis procera* flower at 5% level of supplementation significantly affect the treatments on HB and PCV parameters measured even though, the values were higher than the values of 23.00 to 27.82 x 10<sup>2</sup>/mm<sup>3</sup>, 23.60 to 25.97g/dl recorded by Saad *et al.* (2017) for male and female New Zealand rabbits. MCV values of 19.27-36.5g/dl were within the normal range values of 27 to 37g/dl report by RAR (2009). The RBC and MCH range between 11.00 to 21.00g/dl and 25.27 -36.55 were in line with the report by Medona *et al.* (2007) who reported the RBC and MCH ranges of 11 – 29 and 21 – 30 respectively. The WBC range values of 19.42 to 37.00 x10<sup>3</sup>/mm<sup>3</sup> and 8.45 to 15.84 x 10<sup>3</sup>/mm<sup>3</sup> for male and female New Zealand rabbits reported by Saad *et al.* (2017). The Neutrophils platelets and Lymphocytes values differed significantly (P>0.05) among the dietary treatment groups. According to Gillet (1994) the proportion of Neutrophils platelets and Lymphocytes should be ration 1:1, variation is an indication of fed 5% supplemented with *Calotropis procera* flower of the test ingredients indicates that immune system might have been challenged probably due to anti nutritional factors associated with higher content of the test ingredient, the range values of 13.25 to 17.75% and 4.50 to 5.50% recorded for neutrophils and Tran valid in this study fell within 9.00 to 17.5% and 4.3 to 8% reported for rabbits. The low levels of platelets recorded in rabbit supplemented with *Calotropis procera* flower may be attributed to physiological reaction to anti nutrient. According to Saad *et al.* (2017) low level of platelet may be attributed to allergic reaction, massive bleeding, anaplastic anemias, systematic bacterial and fungal infection and storing sample for long time before it's analysed .

**Table. 2 Effect of *Calotropis procera* supplementation on Haematology of Mongrel Rabbit**

Parameters	Treatments				SEM
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	
HB	8.8 <sup>b</sup>	6.5 <sup>c</sup>	12.00 <sup>ab</sup>	16.0 <sup>a</sup>	0.812
PCV	26.10 <sup>b</sup>	27.733 <sup>ab</sup>	23.00 <sup>b</sup>	46.5 <sup>a</sup>	3.362
RBC	11.00 <sup>b</sup>	49.233 <sup>a</sup>	21.00 <sup>b</sup>	39.50 <sup>a</sup>	2.632
MVC	31.00 <sup>b</sup>	19.27 <sup>b</sup>	36.5 <sup>ab</sup>	64.00 <sup>a</sup>	4.870
MCHC	34.3 <sup>a</sup>	24.00 <sup>a</sup>	34.5 <sup>a</sup>	40.7 <sup>a</sup>	3.912
MCH	45.1 <sup>a</sup>	25.27 <sup>b</sup>	40.00 <sup>a</sup>	36.00 <sup>ab</sup>	4.193
WBC	15.76 <sup>d</sup>	18.5 <sup>c</sup>	40.00 <sup>b</sup>	47.5 <sup>a</sup>	0.375
Neutrophils	19.00 <sup>a</sup>	7.00 <sup>b</sup>	17.5 <sup>b</sup>	15.26 <sup>a</sup>	0.976
Lymphocytes	41.76 <sup>a</sup>	16.26 <sup>b</sup>	17.00 <sup>b</sup>	15.00 <sup>b</sup>	1.380
Monocytes	11.8 <sup>b</sup>	29.667 <sup>a</sup>	25.5 <sup>ab</sup>	29.26 <sup>a</sup>	2.771
Platelet Count	25.00 <sup>a</sup>	18.5 <sup>a</sup>	27.5 <sup>a</sup>	38.5 <sup>a</sup>	4.587
Eosin	21.26 <sup>b</sup>	23.00 <sup>b</sup>	70.5 <sup>a</sup>	23.00 <sup>b</sup>	3.556
Basophil	15.76 <sup>b</sup>	16.5 <sup>b</sup>	44.00 <sup>a</sup>	47.00 <sup>a</sup>	2.564
Lymph	5.5 <sup>b</sup>	5.5 <sup>b</sup>	7.5 <sup>a</sup>	7.5 <sup>a</sup>	0.167

## CONCLUSION

It can be concluded that Sodom apple can be used to supplement mongrel rabbit in their diets. Treatment T<sub>2</sub> with 5% supplementation of Sodom apple yields better result on haematological parameters evaluated.

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