EVALUATION OF SERUM BIOCHEMICAL INDICES OF WEST AFRICAN DWARF RAMS TREATED WITH AQUEOUS EXTRACTS OF NEEM PLANT PARTS

Mustapha, T. B.., Adeaga, L. S., Adebisi, I. A., Ogunbode, A. A., Oloko, A. B., Adams, T. O. and Maruf, N. B.

Department of Animal Health and Production, Faculty of Animal and Fisheries Technology, Oyo State College of Agriculture and Technology, P.M.B 10, Igboora, Oyo State, Nigeria

Corresponding author: mustaphathaofik@gmail.com

ABSTRACT

The experiment was carried out to investigate the effects of aqueous extracts of neem leaf and neem bark on serum metabolites of West African dwarf rams at the Teaching and Research Farm of Oyo State College of Agriculture and Technology Igbo-ora, Nigeria. Twelve (12) apparently healthy WAD rams of age6-12 months with body weight of 10.00 - 20.00kg were randomly selected and allocated to three treatments with four rams each and 2 rams per replicate in a completely randomized designed. The compared treatments administered were: T_1 (2ml dextrose saline) represent the control, T_2 (5mg/kg body weight of the aqueous neem leaves) and T_3 (5mg/kg body weight of the aqueous neem bark) treated for each individual ram at day 0, day 3 and day 7 while blood sample was collected at day 12.The results revealed that there were no significant (p>0.05) differences in all parameters examined. Ram drenched with dextrose saline (T_1) had the highest Total protein (8.10g/dl), while the lowest value (6.03g/dl) for TP was recorded on ram drenched with T_3 (ANB). Ram administered with T_1 (DES) recorded least albumin (2.60g/dl) while highest albumin (2.85g/dl) was recorded in ram administered with T_2(ANL). However, ram drenched with T_2(ANL) were observed to have the highest cholesterol value of 66.00g/dl while those drenched on T_3 (ANB) had the lowest value of 61.50g/dl. Based on the results obtained, the extract could be used in treatment of ram without any deleterious effects in serum metabolites of the WAD ram.

Key words: Neem (*Azadirachta indica*), *WAD rams, Serum biochemical indices.*

INTRODUCTION

Ruminant animals play an important role in the economic development of Nigeria in terms of feeding the steadily growing population and providing the investible resources for national development (Bolaji *et al.,* 2016). Most commonly reared ruminants in Nigeria include cattle, sheep and goat. Neem is a common tropical multipurpose evergreen tree that grows very rapidly (Mridha and Al-Suhaibani, 2014). The different parts of neem e.g. leaf, seed, bark, flower, fruit and root are traditionally well known for its medicinal value, showing various biological activities and therapeutic potential (Brahmachari, 2004) and are utilized for variety of purposes in animal agriculture. Neem is regarded as a promising tree species that can be utilized in various ways to benefit agricultural communities throughout the world (Tinghui 2001). It has been described as a promising potential feed ingredient with considerable attempts made at rendering it suitable for livestock. This therefore can help in bridging the gap between supply and demands of the feeding stuff during periods of scarcity. Blood indices are important indicators of farm animal's physiological stages, as they show the link between nutrition and health status of the animal (Jiwuba *et al.,* 2016). Based on this traditional and other uses of neem, this study was aimed at evaluating the serum indices of West African dwarf rams treated with aqueous extract of neem plant parts.

MATERIALS AND METHODS

Experimental Animals and their Management

The experiment was conducted at the Sheep and Goat Unit, Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora. Twelve (12) apparently healthy rams of between 10.00 -20.00 kg and 6 – 12months of age were randomly selected at the sheep unit. The rams were managed under semi-intensive system where allowed to graze freely on their own for a period of 6 hours per day and later served concentrate after returning from grazing and routine management of the experimental pen was carried out on daily bases.

Preparation of aqueous extracts of neem leaves and neem bark

Fresh neem leaves and neem bark were collected within the college premises and sun-dry for 6hours per day for 10 days, the neem bark was chopped into pieces for easy drying. The dried neem leaves and neem bark were grinded separately using mortar and pestle to a powdered form.200g of grinded leaves and back were later soaked in 800ml of distil water in different conical flask for 72 hours. The conical flasks were sealed up and incubated at temperature of 40^{o}C. The mixtures were filtrated to obtained aqueous extract solution of leaf

and bark separately while the residues were dried and weighed; these gave approximate concentration of 10mg/ml of neem leaves and neem bark respectively.

Experimental layout, design and aqueous extract administering procedure

Rams in treatment 1 (T_1) which is the control were administered with 2ml of normal saline while treatment (T_2) and treatment (T_3) were administered with 0.5ml /kg live weight aqueous extract of neem leaves and neem bark respectively at day 0, day 3 and day 7 while blood sample was collected at day 12 post experiment. All animals in treated groups were closely observed for sign(s) of toxicity and other physical reactions.

Collection of blood samples and analysis

Blood samples was collected at 12th day of the experiment by raising up the head of the ram and straight the neck to the desired side then the neck region was sterilized with swamp. The jugular vein was punctured to withdrawn blood from the vein. The collected blood was transferred in to different labeled plain bottles. Sample collected were transported to the laboratory for serum biochemical analysis. The obtained data on serum biochemical indices were subjected to one-way analysis of variance (SPSS Statistic version 23), while differences among the means were separated using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

The result of serum biochemical indices on rams treated with aqueous extract of neem leaves and neem bark was shown in Table 1.The values obtained from all the parameters examined were not significantly (P> 0.05) difference across the treatments. Ram drenched with dextrose saline (T_1) had the highest Total protein (8.10g/dl), while the lowest value (6.03g/dl) for TP was recorded on ram drenched with T_3 (ANB). Ram administered with T_1 (DES) recorded least albumin (2.60g/dl) while highest albumin(2.85g/dl) was recorded in ram administered with T_2 (ANL). Serum biochemical indices were used to determine the level of liver damage and to evaluate protein quality and amino acid requirements in animals as reported by (Harper *et al.* 1979). Aqueous neem leaf and neem bark extract tended to have no impact on the blood glucose level of the rams and the cholesterol level. The blood sugar level was maintained across the treatment. Rams generally maintain a high and relatively constant blood sugar level even in low treatment (Liukkonen-Anttila, 2001). The decline in cholesterol level in treatment with aqueous extract of neem leaf and neem as reported by Ogbuewu *et al*. (2008), this is in disagreement with the findings of this research that shows no significant effect on serum cholesterol when treated with aqueous extract of neem leaf and bark. Results from this research might be as a results of low dosage of the test materials (neem leaf and neem bark) used. Serum total protein steadily decreased with the treatment with aqueous extract of neem leaf and neem bark although the differences were not statistically significant (P>0.05). Serum albumin and globulin did not show much consistency with the treatment of aqueous extract of neem leaf and neem bark. Serum albumin and globulin depend on availability of treatment protein. This means that the proteins of the treatments T_1-T_3 were similarly available to the rams, confirmed the earlier observation by Hoffenberg *et al*. (1966). A reading of albumin less than the normal physical value of albumin usually indicates hypoalbuminemia (Alttman, 1979). Creatinine was not affected by the treatments, the values obtained is within the normal range for apparently healthy sheep in both the treated and the control group ranges within (1.40- 1.65 g/dl). This is an indication that the proteins in the treatment were effectively utilized. High creatinine is indicative of poor protein and amino acid metabolism that can lead to impaired renal function and cardiac infarction (Gray and Howarra, 1980).

Table 1: Serum biochemical indices of WAD rams treated with dextrose saline and aqueous extract of neem plant parts

Parameters	**T_1 DES**	**T_2 ANL**	**T_3 ANB**	**SEM (±)**	**P-value**
Total protein(g/dl)	8.10	6.80	6.03	0.20	0.21
Albumin (g/dl)	2.68	2.85	2.60	0.07	0.33
Globulin (g/dl)	3.43	3.95	3.43	0.13	0.19
A/G.ratio	0.79	0.72	0.77	0.20	0.35
Bunirubin (g/dl)	11.98	13.63	12.10	0.71	0.62
Creatinine (g/dl)	1.50	1.65	1.40	0.70	0.37
Glucose (g/dl)	52.25	58.55	51.00	3.03	0.66
Cholesterol (g/dl)	63.50	66.00	61.50	2.27	0.76
Triglyceride (g/dl)	10.68	11.05	10.18	0.25	0.40

$^{a\,b\,c}$ *Means on the same row with different superscript are significantly different (P< 0.05*).

CONCLUSION

Results obtained from this study revealed that aqueous extract of neem leaf and neem bark can be included in the treatment of WAD rams to reduce stress and boost production performance of the animal without any deleterious effect on the serum biochemical constituents.

RECOMMENDATION

Aqueous extract of neem leaves and neem bark is hereby recommended for inclusion in treatment of WAD rams at 0.5ml/kg. Further studies on dosage review and blood characteristics of rams are suggested with the treatment of aqueous extract of neem leaves and neem bark.

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