



Online copy available at

www.patnsukjournal.net/currentissue

Effects of *Moringa oleifera* leaves on Body weight and Haematological parameters of Rabbits infected with *Trypanosoma congolense*.

Hassan, D. I.^{1*}, V. E. Aya¹, A. I. Alaku³, Musa, S. I.², R. E. Barde¹, M. M. Adua² and N. D. Yusuf¹

¹Department of Animal Science, College of Agriculture P.M.B. 033 Lafia, Nasarawa State, Nigeria.

²Department of Animal Science, Faculty of Agriculture, Nasarawa State University Keffi, Shabu-Lafia Campus, Nigeria

³Department of Basic Science, College of Agriculture P.M.B. 033 Lafia, Nasarawa State, Nigeria.

*corresponding author: E-mail: idris022@yahoo.com

danladiidrishassan@gmail.com

+234 8038003993

Abstract

The effects of *Moringa oleifera* leaves on the body weight and haematological parameters of infected rabbit with *Trypanosoma congolense* were investigated. The chinchilla breeds of rabbit (n50) with the average weight of 637.5g were used in the study. The rabbits were divided into five groups with four rabbits in each group. One group act as the control and the remaining were denoted as treatment one (trt1), treatment two (trt2), treatment three (trt3) and treatment four (trt4). Body weight of rabbits inoculated with *Trypanosoma congolense* (- 0.0155) decreased when compare with rabbits treated with distilled water (0.1150) and *Moringa oleifera* (0.225). The values of PCV, Hb, MCH, MCV and MCHC were highly significant ($P < 0.05$) and increased in the rabbits treated with distilled water and *Moringa oleifera* compare to rabbits inoculated with *Trypanosoma congolense*. There was increase in PCV (41.81%), Hb (14.29g/dl), MCH (8.36pg/cell), MCV (2.45fl) and MCHC (34.17%) while least of those values (25.25%), (6.67g/dl), (3.96pg/cell), (1.53fl) and (26.80%) respectively were recorded in rabbits inoculated with *T. congolense*. This study showed that *Moringa oleifera* leaves have a potential for use in diets to increase the weight of rabbits and in treating *Trypanosoma congolense* without any deleterious effects on haematological parameters.

Keywords: *Moringa oleifera*, *Trypanosoma congolense*, body weight, Haematological parameters.

Introduction

Medicinal herbs as a whole were reported to be used against a wide range of health problems such as cough, cold, cataract, diarrhea, constipation and many other ailments. The use of herbs is an important part of natural medical practiced in Nigeria and elsewhere. (Hassan *et al.*, 2010). The plant *Moringa oleifera* as one of the herbs was reported to prevent effectively, morphological changes and oxidative damage in lens of rabbits by enhancing the activities of antioxidant enzymes, reducing the density of lipid peroxidation and inhibiting generation of free radicals (Sreelatha and Padma, 2009). The extract has been used to combat malnutrition, especially among infants and nursing mothers for enhancing milk production and also regulate thyroid hormone imbalance (Estrella *et al.*, 2000; Pal *et al.*, 1995). The leaves of *M. oleifera* have been reported to be a valuable source of both macro and micro nutrient, rich source of Beta-carotene, protein, vitamin C, calcium and potassium and act as a good source of natural oxidants, and thus enhance the shelf

life of fat containing foods (Siddhuraju and Becker 2003). Safety evaluation studies showed that aqueous extract of *Moringa oleifera* leaves was well tolerated by experimental animals. In addition blood parameter namely. PVC, WBC counts, differentiation of WBC, hemoglobin (Hb) and platelets (PLT) were also found to be positively affected by using this plant (Musa-Azara et al., 2014).

It is well known that rabbit meat is highly value for its nutritional and dietary properties. It is a lean meat with a low-fat content and less saturated fatty acids and cholesterol than other meats. Although rabbit meat offers excellent nutritional and dietetic properties in itself, it can be further fortified with bioactive compounds because rabbits diet manipulation is very effective in increasing level of PUFA, CLA, EPA, DHA, Vitamin E, Selenium and so on (Dalle Zotte and Szendro, 2011). Apart from consumption purposes, rabbit dropping make excellent fertilizer. They contain more nutrients for plant than droppings from other animals and are useful for growing vegetables. Several scientific researchers have been done on trying to identify and standardize active food supplement that would be active in treatment of trypanosomiasis. This study is aim to find out the effect of leaves of this plant (*Moringa oleifera*) on various blood parameters as well as the body weights in rabbits infected with *T. congolence*.

Materials and Methods

Study Area

The experiment was conducted at the rabbitry unit of the livestock complex of Animal Science Department, College of Agriculture, Lafia (Latitude 8.33⁰N and Longitude 8.33⁰E at altitude 181.35m above sea level). The area lies within the Guinea savanna zone of Nigeria with an average rainfall of 1182mm annually (NIMET, 2010).

Preparation of *Moringa oleifera* leaves

The *Moringa oleifera* leaves were striped from the *Moringa oleifera* tree. This was done directly from the branches. The leaves were kept dry at room temperature of 35⁰c- 55⁰c. The dry leaves were pounded with pistil and mortar to a fine particles and sieve. Fine particles of (0.2mm-0.5mm) were dried at 50⁰c for 30minutes to reduce the moisture contents and later used for the study.

Experimental Animals and Design

The chinchilla breeds of rabbit (n50) with the average weight of 637.5g were used in the study. The rabbits were divided into five groups with four rabbits in each group. Random selection method was used in the grouping. One group act as the control and the remaining were denoted as treatment one (trt1), treatment two (trt2), treatment three (trt3) and treatment four (trt4). The rabbits were provided feed and water *ad libitum* twice daily and body weights of the experimental rabbits were taken weekly.

Inoculation of Rabbits with *Trypanosoma congolense*

Drops of blood were collected from the tail of already infected rats. A small amount of distilled water was used to dilute the blood before inoculation 0ml was administered to each rabbit subcutaneously. This was done for 3 consecutive days while the incubation period of one week and the clinical signs manifested in the rabbits to confirm the infection.

The result showed that the rabbits were infected with trypanosomosis (*T. congolense*) and therefore treatment started immediately using *Moringa oleifera* powder.

Pharmacological Protocol

The twenty (50) rabbits with an average weight of 637.5g were randomly grouped into five pens as follows:

PEN A; Control pen were given distilled water.

PEN B: Treatment one (trt1) was given 2g of the powdered *Moringa oleifera* diluted in 10mls of distilled water each.

PEN C: treatment two (trt2) were give 4g of the powdered *Moringa oleifera* diluted in 10mls of distilled water each.

PEN D: treatment three (trt3) were given 6g of the powdered *Moringa oleifera* diluted in 10mls of distilled water each.

PEN E: treatment four (trt4) were given 8g of the powdered *Moringa oleifera* diluted in 10mls of diluted water each.

Moringa oleifera powder was administered in drinking water for the period of 2 weeks (14days) on daily basis for the **PENS B - E**. Blood sample was also collected for laboratory test.

Blood sample collection

Blood samples were collected into labeled Ethylene-deamine tetra-acetic acid (EDTA)treated tubes for haematological evaluation. Evaluation was conducted according to the method already described by (Bitto and Gemade, 2001).

Statistical Analysis

Data were analyzed statistically by application of student's t-test, using the SPSS version 16 software presented as mean and standard error mean (SEM), and values of $P < 0.05$ were considered to be statistically significant.

Results and Discussion

Effect of Treatments on weight gain

There were statistically significant changes in the body weight difference among rabbits treated with distilled water and *Moringa oleifera* compare to rabbits inoculated with *Trypanosoma congolense*. Body weight of rabbits inoculated with *Trypanosoma congolense* (- 0.0155) decreased when compare with rabbits treated

with distilled water (0.1150) and *Moringa oleifera*(0.225) (Fig. 1). The increase in body weight of rabbits treated with *Moringa oleifera* could be due to the androgenic properties of Moringa leaves which possess anabolic activity. The leaves contain high concentrations of crude protein, essential vitamins, calcium and iron (Makkar and Becker, 1997; Gidamiset al., 2003; Odeyinka et al., 2007).

Haematological parameters of rabbits distilled water, inoculated with *T. congolense* and Treated with *Moringa oleifera*.

The values of PCV, Hb, MCH, MCV and MCHC were highly significant ($P < 0.05$) and increased in the rabbits treated with distilled water and *Moringa oleifera* compare to rabbits inoculated with *Trypanosoma congolense* (Table 1). The observed effect of the *Moringa oleifera* leaves from our studies on blood parameters of inoculated rabbits with *Trypanosoma congolense* is attributed to its effect on the haemopoietic system. This argument is supported by the increased PCV (41.81%), Hb (14.29g/dl), MCH (8.36pg/cell), MCV (2.45fl) and MCHC (34.17%) while least of those values (25.25%), (6.67g/dl), (3.96pg/cell), (1.53fl) and (26.80%) respectively were recorded in rabbits inoculated with *T. congolense*. This observation agrees with the finding of Ani and Ugwuowo (2011) who investigated the effect of feeding graded levels of cooked velvet beans (*Mucuna pruriens*) on growth performance and blood of weaner rabbits. The values of PCV (25.25 - 41.81%) and MCHC (26.80 - 34.17%) were within range as reported by Ani and Ugwuowo, (2011) whose values for PCV (33.00 - 41.50%) and MCHC (32.85 - 33.00%) and The values ranged (6.67 - 14.29g/dl) for haemoglobin concentration (Hb) obtained in this study agrees with the report of Musa-Azara et al. (2014) whose values ranged (12.17 - 12.97g/dl). Packed cell volume (PCV) is a measure of the relative mass of blood (Bakers and Kilshaw 1985). who considered the normal PCV of a healthy rabbit to be between 30-50%. The normal PCV value is suggestive of adequate nutritional status of the rabbits Church et al., 1984). This study has provided evidence that *Moringa oleifera* leaves has a potential for influencing the state of anaemia in trypanosome infected rabbits. Even if it cannot destroy the trypanosome, it can at least boost the capacity of the host to fight the invading parasites. Exploring the medical potential of the *Moringa oleifera* leaves will be easy, availability and cheap cost (Edoga et al., 2013).

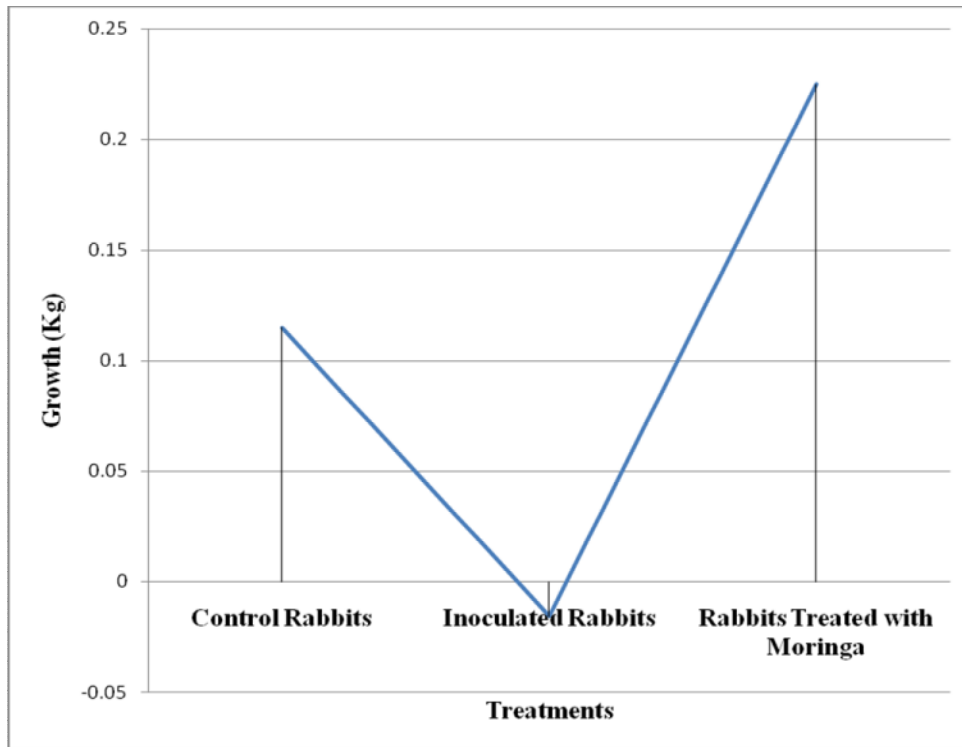


Fig 1: Effect of weight gained on rabbits inoculation with *T. congolence* and treated with *Moringa oleifera*

Table 1: Haematological parameters of rabbit treated with distilled water, inoculated with *T. congolence* and Treated with *Moringa oleifera*.

PARAMETERS	Rabbit treated with distilled water without (<i>T. congolence</i> and <i>Moringa oleifera</i>)	Rabbits inoculated with <i>Typanosoma congolence</i>	Rabbit treated with <i>Moringa oleifera</i>	SEM
RBC (x10 ¹² /l)	17.40	17.20	17.24	0.50
WBC (x10 ⁹ /l)	5575.00	5756.15	5895.55	119.60
PCV (%)	37.82 ^b	25.25 ^c	41.81 ^a	1.17
Hb (g/dl)	12.51 ^b	6.67 ^c	14.29 ^a	0.49
MCH (pg/cell)	7.65 ^b	3.96 ^c	8.36 ^a	0.30
MCV (fl)	2.31 ^b	1.53 ^c	2.45 ^a	0.27
MCHC (%)	33.04 ^b	26.80 ^c	34.17 ^a	0.47

^{abc}: Means with different superscripts on the same row differ significantly (P < 0.05)

Conclusion

Moringa oleifera leaves have a potential for use in diets to increase the weight of rabbits and in treating *Typanosoma congolense* without any deleterious effects on haematological parameters.

Acknowledgements

We sincerely acknowledged the support of all the staffs of Livestock complex of the College of Agriculture Lafia.

References

- Ani, A. O. and Ugwuowo, L. C. (2011). Response of weaner rabbits to diets containing graded levels of processed velvet beans (*Mucuna pruriens*) *African Journal of Biotechnology* Vol. 10(66), pp. 14984-14989. Available online at <http://www.academicjournals.org/AJB>
- Bakers F.J and Kilshaw D. (1985). Introduction of medical laboratory technology 6th ed,
- Bitto I.I and Gemade M. (2001). *Afri. J. Biomed. Res* 9:199-209.
- Church J.P.; Jude J.J.; Young C.W.; Kebay J.I and Kim W.W. (1984). *Amer. J. of clinical Nutr.* 40:1338-1344.
- Dale zottle and Szendro, (2011). Rabbit project development strategies in Subsistence farming system through research applications. *World animal review*, 69; 26-35.
- Edoga C. O.; Njoku O. O.; Amadi E. N and Afomezie P. I. (2013). Effect of Aqueous Extract of *Moringa oleifera* on Serum Protein of *Trypanosoma Brucei*-Infected Rats. *International Journal of Science and Technology*. Vol.3 No.1 pp85- 87.
- Estrella M.C.P.; Manttaring J.B.A. and David G.Z. (2000). A double blind randomized controlled trial on the use of malunggay (*Moringa oleifera*) for augmentation of the volume of breast milk among non-nursing mothers of preterm infants", *the Philippine Journal of Pediatrics*, Vol.49, PP. 3-6.
- Gidamis A. B.; Panga, J. T.; Sarwatt, S. V.; Chove B. E. and Shayo N. B. (2003). Nutrients and anti-nutrient contents in raw and cooked leaves and mature pods of *Moringa oleifera*, *Lam. Ecol. Food Nutri.*, 42: 1-13.
- Hassan D.I., Ogah, D.M.; Yusuf N.D.; Musa M.M. and Saidu G.M. (2010). The effect of acute and chronic (short and long term) Oral administrations of black pepper (*Piper guineense*) aqueous extract on the body weight and haematological values of albino- Wistar rat. *Journal of Medicinal Plant Research* Vol. 4 (12), pp.1122-1125.
- Makkar, H. P. S and Becker, K. (1997). Nutrient and anti quality factors on different morphological parts of the *Moringa* tree. *Journal of Agricultural Science* 128: 31.
- Musa-Azara S.I; Jibrin M.; Hassan D. I. and Yakubu A. (2014). Effects of Oral

Administration of *Moringa oleifera* Seed on Blood Chemistry and Reproductive Performance of Female Rabbits. *Int. J. Agric.Sc&Vet.Med.* 2014

- NIMET (2010). Nigerian metrological Agency Lafia, Nasarawa state.
- Odeyinka S. M.;Torimiro D. O.;Oyedele J. O. and Asaolu V. O.(2007). Farmer's Awareness and Knowledge of *Moringa oleifera* in Southwestern Nigeria: A Perceptonal Analysis. *Asian Journal of plant sciences* 6 (2): 320-325.
- Pal S.K.; Mukherjee P.K. and SahaB.P.(1995). Studies on the anti-ulcer activity of *Moringa oleiferaleaf* extract on gastric ulcer models in rats", *Phytotherapy research*, vol. 9, no.6, PP. 463-465..
- Siddhuraju P. and Becker K. (2003). Antioxidant properties of various solvent extracts of total phenolic constituents from three different agroclimatic origins", *Food Chemistry*, vol.5 1, no.8, PP. 2144-2155.
- SPSS(2010).Statistical Package for the Social Sciences.SPSS Inc., 444 Michigan Avenue, Chicago, IL60611.
- Sreelatha and Padma, (2009). Practical haematology 8th Edition. Longman ltd., London, U.K., pp 22-28.