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Effect of Aqueous Extract of Moringa Oleifera on Serum Protein of Trypanosoma Brucei- Infected Rats

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ABSTRACT

We have investigated the effect of aqueous extract of Moringa oleifera leaves on the serum protein of trypanosome —infected rats. Sixty Parasite free-albino rats were used, which were divided into four groups. Two groups of rats were intraperitoneally injected with Trypanosoma brucei. One group was administered with the aqueous extract in drinking water; the remaining infected group was left untreated. Data from these groups were compared with those of two groups of healthy rats, one of which was similarly treated with the aqueous extract. The experiment was terminated 16 days post-infection (pi). Analyses of the sera using Bradford method and cellulose acetate electrophoresis showed that aqueous extract of Moringa oleifera influenced the state of hypoproteinaemia in the trypanosome infected rats. This was manifested by a positive increase in the level of total serum protein concentration, albumin and beta-globulin.The extract also delayed the proliferation of the parasites associated with trypanosomiasis. Our results support the potent antioxidant activity of aqueous extract of Moringa oleifera which adds one more positive attribute to its known pharmacological importance.

Keywords: *Moringa oleifera, Trypanosoma brucei, Hypoproteinaemia, Rattus norvegicus.*

1. INTRODUCTION

Moringa oleifera lam is the known and most widely distributed species of *Moringaceae* family, having an impressive range of medicinal uses with high nutritional value throughout the world. Native to Western and sub-Himalayan tracts, India, Pakistan. Asia and Africa[1;2], this plant is well distributed in the Philippines, Cambodia, America and the Caribbean Islands[3].

Besides culinary and other domestic uses, several biological properties ascribed to various parts of this tree have been reviewed in the past[4;5]. 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[6]. The extract has been used to combat malnutrition, especially among infants and nursing mothers for enhancing milk production[7] and also regulate thyroid hormone imbalance[8].

Trypanosomiasis in rats is associated with a decreased serum protein as infection progressed. Improvement on host's nutrition is important in moderating the severity of pathophysiological effect of trypanosomiasis and also influences the rate of recovery[9]. It was discovered that supplementary feeding significantly reduces the severity of trypanosomiasis[10;11].

Various parts of the plants and their constituents are known to possess diverse biological activity, however, little is known scientifically about the antioxidant potential of leaves of *Moringa oleifera*. Therefore, the present study investigates the aqueous extract of *M. oleifera* on serum protein profile of trypanosome-infected rats.

2. MATERIALS AND METHODS

Animals: Twenty adult albino rats were obtained from Our Saviour Research Institute, Awka, Nigeria. The animals were acclimatized to the laboratory conditions and a commercial pelleted poultry Grower's mash-diet was given to the animals for 2 weeks before commencement of the experiment. The animals were then divided into four groups of rats each and treated as follows.

Group A (Extract control): This group consisted of five uninfected rats that were given, ad libitum, *Moringa oleifera* aqueous extract as drinking water.

Group B (Infected and Extract-treated group): the rats in this group were each intraperitoneally infected with about 10^6 Trypanosoma brucei in 0.5m1 of cold saline diluted tail-blood from a donor rat and maintained, ad-libitum on *Moringa oleifera* aqueous extract as drinking water.

Grou**p C (uninfected control):** The five rats in this group were neither infected nor treated with the extract.

Group D (infected control): Five rats were each intraperitoneally infected with about 10^6 *Trypanosoma brucei* in 0.5m1 of cold saline diluted tail-blood from a donor rat. Each experimental set up was replicated three times.

The parasite: The *Typanosoma brucei* used for this study was obtained from the Veterinary Medicine Faculty,

University of Nigeria Nsukka. Each of the recipient animals was inoculated with 10^6 *T. brucei*.

Determination of Serum Total Protein and Differentials

5m1 of the blood of the rats were collected in each experimental day which was four days intervals for sixteen days of the experimental period to determine the total serum protein using Bradford method and serum fraction using cellulose acetate electrophoresis. The collected blood was allowed to clot for about 30minutes at room temperature. Then each sample was centrifuged at 3,000 rpm for 10 minutes and the serum was removed. The sera were used immediately for total serum protein and serum protein fractions determination using Braford method. The absorbance of the solutions was read at 520nm- wave-lengths using spectrophotometer.

Statistical analysis: the change in total serum concentration and serum protein fractions was determined using 2-way ANOVA and data obtained were reported as mean concentration.

3. RESULT AND DISCUSSION

The result obtained indicated that administration of aqueous extract of *Moringa oleifera* influenced the serum protein of trypanosome-infected rats. There was an increase in the total serum protein, raised albumin and beta globulin in the extract-treated rats. This was shown in tables 1, 2 and 3. Table 1 shows the level of total serum protein concentration of the experimental rats. The lowest level of total serum protein of 49.27 g/l, 17.85 g/l albumin and 3.46 g/l beta-globulin was observed in infected and untreated rats, which was group D. Followed by 50.79 g/l total serum protein, 20.77g/l albumin and 5.1 5g/l beta globulin observed in infected and extract-treated group, which was group B. Then the rats, which were neither infected nor treated with the extract, had 52.2 g/l of total serum protein, 22.99g/1 albumin and 5.36-g/l beta globulin, which was group C. The highest level was seen in rats of Group A which had 60.99g/l total serum protein, 32.24g/l albumin and 8.26g/l beta globulin.

Several scientific researches have been done on trying to identify and standardize active food supplement that would be active in treatment of trypanosomiasis. Safety evaluation studies showed that aqueous extract of *Moringa oleifera* leaves was well tolerated by experimental animals. A high positive correlation was observed among the in vitro and in vivo assays for antioxidant properties.

In addition, our results support the potent antioxidant activity of aqueous extract of *Moringa oleifera* which adds one more positive attribute to its known pharmacological properties and hence its use in traditional system of medicine.

Table 1: Total surum (g/l) of the experimental rats with the length of post-infection (PI)

Length of post-infection	Group A (Extract control)	Group B (Infected & extract-treated group)	Group C (Uninfected control)	Group D (Infected control)
4	60.63	59.80	59.82	59.53
8	59.84	55.88	56.24	54.04
12	61.65	50.83	52.46	40.79
16	61.86	36.67	40.31	34.71
Total	234.98	203.18	208.83	199.07
Mean	60.99	50.79	52.21	49.27

Table 2: Albumin (g/l) of the experimental rats with the length of post-infection (PI)

Length of post-infection	Group A (Extract control)	Group B (Infected & extract-treated group)	Group C (Uninfected control)	Group D (Infected control)
4	32.68	30.02	30.21	27.40
8	30.93	20.43	24.62	16.51
12	32.69	19.75	21.06	15.73
16	32.65	12.37	16.09	11.74
Total	128.94	93.07	91.98	71.38
Mean	32.24	20.77	22.99	17.85

Table 3: Beta-globulin (g/l) of the experimental rats with the length of post-infection (PI)

Length of post-infection	Group A (Extract control)	Group B (Infected & extract-treated group)	Group C (Uninfected control)	Group D (Infected control)
4	7.88	6.45	6.92	5.84
8	8.66	5.18	5.77	3.19
12	8.16	4.21	4.86	2.68
16	8.35	4.76	3.91	2.12
Total	33.05	20.60	21.46	13.83
Mean	8.26	5.15	5.36	3.46

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