

Acid Phosphatase Activity In Albino Rats Treated With Aqueous Extracts Of *Revisio Generum*

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Abstract: Medicinal plants have been shown to contain chemical compounds that are toxic to body organs. Thus, this research investigated the effects of aqueous extract of fresh leaves of *Revisio generum* on the prostrate in albino rats. Twenty adult male albino rats were grouped into five (A, B, C, D and E), each consisting of four rats. The animals in groups A, B, C and D were administered orally with aqueous extract of *Revisio generum* with doses 250, 350, 450 and 550mg/kg body weight respectively for seven consecutive days while group E which served as the control was given distilled water and feed only. There was decrease in physical activities in the treated animals compared with the control. The average body weight decreased in the test groups while the control group gained weight. There was a significant increase ($P < 0.005$) in acid phosphatase activity in the treated animals when compared with the control. These observations were found to be dose dependent. The result gotten from this research reveals that the sample may cause harmful effects to the prostate gland as indicated by increase level of acid phosphatase.

Keywords: Acid Phosphatase, *Revisio generum* and medicinal plants.

I. Introduction

Medicinal plants are plants in which one or more of their organs contain substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs (WHO, 1991). There are different medicinal plants in Nigeria which are sometimes implicated in some herbal recipes for treatment of different several diseases in Nigeria (WHO, 1991).

Some of these medicinal plants and their uses include Alfaalfa (*Medicago sativa*) leaves used to lower cholesterol as well as for kidney and urinary tract ailment (Lai, 2004). Alo vera leaves widely used to heal burns, wounds and other skin ailment (Dallat, 2000). Asthma weed (*Euphorbia hirta*) has been used traditionally in Asia to treat Bronchitic asthma and laryngeal spasm (Malcolm, 1987). It is used in the Phillipines for dengue fever (Sol, 2009).

Revisio generum is a forest plant tree described by the German botanist (Carl Ernst Otto Kuntze). It is commonly referred to as "Akpatenyi" in Igbo, "okobo" in Yoruba, "Giyeya" in Hausa, "Kwoli" in Fulani (Keay, 1989). It is distributed throughout the western part of Nigeria. *Revisio generum* is a popular tropical tree widely distributed in the low and rain forest zones and frequently found in villages (Keay, 1989).

Extracts from *Revisio generum* can be administered orally or applied topically on the skin. It can be used in treatment of malaria, fever and skin irritations (Akaneme, 2008).

Acid phosphatase is an enzyme in the liver, used to attached phosphate group from other molecules during digestion. It is a protein molecule of three dimensional globular shapes. Acid phosphatase belongs to the family of hydrolase class which hydrolyzes many types of phosphate esters at an acidic pH. in the presence of zinc and magnesium ions.

Increased levels of acid phosphatase may be associated with a variety of primary and secondary hepatic conditions and disorders of bone (Kaplan, 2000).

Several diseases such as Wilson's disease, aplastic anaemia, pernicious anaemia, can lead to decreased acid phosphatase (ACP) levels (Schiele *et al.*, 2000).

The normal levels of acid phosphatase in adult male is 60-170u/L while in adult female ranges between 73-207u/L (Bassey *et al.* 2000).

II. Aims and Objectives

This research was conducted to investigate the effects of aqueous extract of fresh leaves of *Revisio generum* on the level of acid phosphatase in the prostrate using serum acid phosphatase as an indicator.

III. Materials And Methods

Collection of Plant Material

Fresh leaves of *Revisio generum* were collected in large quantities from Izzi Local Government of Ebonyi State. The fresh leaves were washed thoroughly with water, homogenized with mortar and pestle and then kept in a beaker for the extraction process.

Extraction of Plant Material

The extraction of the active compound in the *Revisio generum* leaves were carried out by soaking method. 100g of the fresh leaves were washed and homogenized and then soaked in 300ml of distilled water for 24 hours. After 24 hours, the soaked leaves were filtered by squeezing in a sieving cloth and then the extract was poured into another clean beaker. The extract was heated with a bursen burner until a 350mls volume of extract was achieved; this is done in order to concentrate the aqueous extract. The extract was allowed to cool and then stored in a bottle for administration.

Collection of Animals

Twenty (20) adult male albino rats of mean body weight 40-160g of both sexes obtained from the Veterinary Medicine Department University of Nigeria, Nsukka (UNN) were used for the study. The animals were acclimatized for 7 days (a week) under standard environmental condition in Ebonyi State University, Presco campus and fed with a regular livestock feed (grower marsh).

The rats were divided into four groups (A, B, C, D and Control) each made up of four rats. They were treated with graded concentrations of (250, 350 450 550mg/kg) of extracts prepared from *Revisio generum* for group A to D rats with none administered to the control cage, which was only fed with normal livestock feed. Also within this period, they were given water.

Collection of Blood from the Animals

After administering the *Revisio generum* leaves extracts to the albino rats for one week (7 days), the animals were starved for a day and then sacrificed. Blood samples were collected by cardiac puncture into clean bottles correctly labeled. 5ml of blood was collected, centrifuged for 1500 revolution for 10 minutes. The serum was obtained carefully to avoid hemolysis and was used for the estimation of ACP level

Determination of total protein concentration

Total protein concentration was determined using Lowry’s 1951 methods.

Measurement of Acid Phosphatase Activity

Acid Phosphatase was determined using Bessey et al., 1946 methods

IV. Results

PHYSICAL OBSERVATION

There was a decrease in the physical activity of the rats. The rats also decreased in their rate of feeding and water intake. The results also showed changes in the weights of the rats.

CHANGES IN THE BODY WEIGHT

There was a decrease in body weight observed in the treated animals which was concordant with the decrease in food intake and water while the weight of the control increased steadily

Table 1: shows the changes in body weight of the animals during seven (7) days of treatment.

Days of Administration	Group A	Group B	Group C	Group D	Group E
1	145 ± 10.00	138 ± 10.30	125 ± 10.00	119± 7.40	116 ± 9.60
2	123± 4.32	121 ± 2.50	104 ± 4.92	86 ± 3.54	102 ± 3.12
3	115 ± 3.20	113 ± 1.93	92 ± 2.06	76 ± 3.77	143 ± 1.81
4	95 ± 9.35	89 ± 7.40	82 ± 2.12	71 ± 3.67	152 ± 3.12
5	82 ± 1.56	77 ± 2.74	74 ± 3.28	62± 1.94	159 ± 1.22
6	74 ± 3.02	68 ± 2.06	68 ± 1.87	55 ± 2.50	160 ± 0.00
7	56 ± 3.76	56 ± 3.67	47± 6.06	42± 2.06	160 ± 0.00

All values are mean (x) Standard deviation. n = 4

LEGEND

- Group A = 250mg/kg body weight
- Group B = 350mg/kg body weight
- Group C = 450 mg/kg body weight
- Group D = 550 mg/kg body weight
- Group E = Deionized water.

Table 2: Results of ACP Activity (μ/L) Obtained From the Experiment

No of Animal	ACP activity				
	A	B	C	D	E
1	8.57	7.23	7.05	4.21	11.20
2	9.67	7.24	6.13	4.33	12.83
3	9.52	7.25	6.40	5.04	10.62
4	10.10	7.05	6.00	5.30	13.70

Table 3: Results of Absorbance of A750nm Obtained from this Experiment

No of Animals	A	B	C	D	E
1	0.754	0.782	0.603	0.440	0.712
2	0.704	0.702	0.701	0.610	0.663
3	0.618	0.663	0.469	0.505	0.719
4	0.589	0.526	0.402	0.489	0.688

Table 4: Standard Curve Table

Absorbance(750nm)	0.280	0.374	0.512	0.630	0.71	0.882
Protein conc.(mg/dL)	0.1	0.2	0.4	0.6	0.8	1.0

Table 5: Summary Table

Parameter/Group	ACP activity (μ/L)	protein conc. (mg/dL)	specific ACP activity
A	9.47 \pm 0.56	0.67 \pm 0.06	14.43 \pm 2.09
B	7.19 \pm 0.11	0.67 \pm 0.09	10.97 \pm 1.48
C	6.40 \pm 0.40	0.54 \pm 0.12	12.28 \pm 2.34
D	4.72 \pm 0.46	0.51 \pm 0.06	9.34 \pm 1.37
E	12.09 \pm 1.23	0.70 \pm 0.02	17.46 \pm 2.2

The summary table of ACP activity (μ/L), protein conc. (mg/dl) and specific ACP activity.

Data are shown as mean \pm S.D (n = 4), p<0.05.

ACID PHOSPHATASE ACTIVITY

The results in table 2 show that there was a significant increase (P<0.05) in acid phosphatase activity in albino rats treated with the extract when compared with the control.

V. Discussion

The observed decreased in physical activity of the treated animals when compared to the control is yet to be understood. However, the reason for this increment observed is still under investigation to unravel the actual mechanism, though, it may be as a result of the chemical composition of the extract administered. The result of this study is in accordance with the work carried out by (Akaneme 2008) on identification and preliminary phytochemicals such as tannin has been attributed to the decrease in physical activity.

The mechanism behind the reported decrease in body weight of the animals is still not known. This could be due to decreased feed and water intake of the body of the animals. It follows that as the dosage of administered extract of *Revisio generum* increased there was a reduction in the body weight of the treated animals which could have been as a result of chemical compounds of the extract. Bioactive components can increase metabolic rate and helps in the reduction of excess body fat. (Tapsel et al., 2006) explained the effect of oral administration of *Cocos nucifera* on metabolic and hematological parameters in albino rats which reported a decrease in weight.

Some of the components of *Revisio generum* include tannins, steroids, flavonoids and Tapenoids. Presence of these phytochemicas in diets for livestock has reported reduced feed intake, growth and body weight (Ellert,2000).

There was a significant increase (P<0.05) in the activity of acid phosphatase of the treated groups when compared with the control. This is in accordance with the analysis carried out by (Adebayo *et al.*,2005) on hematological and serum lipid parameters of aqueous leaves extract of *Bougainillea spectabilis* on albino rats. The significant increase in the activity of acid phosphatase activity of the treated groups when compared with the control may be due to induced enzyme synthesis triggered by certain components of the aqueous extract possibly the metal ions.

VI. Conclusion

In conclusion, *Revisio generum* extract induced a dose dependent significant increase on acid phosphatase which indicated that the extract of *Revisio generum* could be harmful to the prostate gland. It is recommended that more research should be carried out to know the actual mechanism of how the extract increased the level of the enzyme and also to discover how it affects the prostate gland.

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