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Original Research Article

Hepatoprotective potential of the aqueous leaf extract of *Telfairia occidentalis* on the Liver function parameters in Adult Wistar Rats

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ABSTRACT

Leafy vegetables are important items of diet in every home and a number of them are medicinal plants that have been used for curing diseases and have been documented in history of civilization. The current study was aimed at assessing the hepatoprotective potential of the aqueous leaf extract of *Telfairia occidentalis(TO)* on the Liver function parameters in Adult Wistar Rats. The sixteen rats used for this study were randomized into groups A, B,C and D. Rats in groups B, C and D were treated with 150, 300 and 600mg/kg.bwt of the leaf extract respectively by intubation for 28 days while group A served as control. Aspartate amino transferase (AST), alanine amino transferase (ALT), and alkaline phosphatase (ALP) activities were determined using standard laboratory methods. There was a significant reduction in mean body weight ($p<0.05$), and increase in serum activity of AST and ALP respectively ($p<0.05$), but there was no significant difference in the mean serum ALT activity ($p>0.05$) in the treated groups compared with control respectively. Therefore, it could be concluded that aqueous leaf extract of TO has hepatoprotective effect.

1. Introduction

The use of plants as source as an adjust in the treatment of diseases can be traced back to the prehistoric times[1] and the acceptance of herbal remedy is increasing worldwide,[2] with medicinal herbs been increasingly studied by pharmacological researchers.[3] This has lead to the use of herbs for therapeutic purposes such as headaches, cancer, liver diseases.[4] Following the recent trends, medicinal plants would be the best source to obtain a variety of drugs. Therefore, such plants should be investigated for better understanding of their properties, safety and efficacy.[5] Interestingly, a number of plant source have been shown to exhibit potential therapeutic effects on liver diseases and *Telfairia occidentalis* (TO) is one such plants to reckon with. TO is a popular vegetable cultivated widely in Nigeria and belongs to the family Cucurbitaceae.[6] Phytochemically, it contains tannins, alkaloids, terpenoids, and flavanoids, saponins.[7–9] This vegetable may sometimes contain a lot

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of heavy metals as a result of contamination by heavy metal pollutants. Amah et al. earlier documented the heavy metal contents of this vegetable in south eastern Nigeria.[10] TO seems to have so much acclaimed benefits on health. It has been reported to have useful potentials in the management and amelioration of anemia,[11–15] Diabetes,[16–18] hyperlipidemia,[19] Reproductive and fertility issues,[20,21] and inflammatory conditions.[22] [22] to mention only a few. A number of studies have shown the hepatoprotective potentials of TO[23–28] in various countries including other parts of Nigeria but researches in this regards seems to be scanty in the South Eastern part of Nigeria and hence the study.

2. Materials and Methods

2.1. Study Site

This experiment was planned and executed in the Department of Human Anatomy, Nnamdi Azikiwe University, Nnewi, Nigeria.

2.2. Collection and Preparation

Fresh leaves of the plant (*Telfairia occidentalis*) were obtained locally from farms in Nnewi, Nigeria during the Month of June, 2018 and were air dried at room temperature, ground into fine powder devoid of unwanted particles in order to attain homogeneity. The powder was sieved using mesh sieves to remove any coarse or unwanted particles and afterwards stored in airtight plastic containers. The normal growers mesh, a product of Premier Feed Mills Co. Limited was used as the animal feed during the experimental period. Also, the plant leaf extract was weighed using a weighing balance to ensure standardization.

2.3. Experimental Animals, Study Design and Laboratory Methods

The current study was aimed at assessing the hepatoprotective potential of the aqueous leaf extract of *Telfairia occidentalis(TO)* on the Liver function parameters in Adult Wistar Rats. The sixteen rats used for this study were randomized into groups A, B,C and D. Rats in groups B, C and D were treated with 150, 300 and 600mg/kg.bwt of the leaf extract respectively by intubation for 28 days while group A served as control. All the experimental animals were weighed prior to the administration of the leaf extract and at day 29. The animal care and handling was conducted in accordance with standard regulations. Aspartate amino transferase (AST), alanine amino transferase (ALT), and alkaline phosphatase (ALP) activities were determined using standard laboratory methods. Blood samples for the evaluation of biochemical parameters (ALT, AST and ALP) were collected from the experimental animals into a plain container. ALT and AST estimation was done using the method by Reitman-Frankel,[29] ALP was assayed according to the method by Mauro and Renze,[30]

2.4. Data Analysis

The data obtained was presented as mean±SEM and the mean values of test groups were compared by ANOVA and Students t-test using SPSS Version 23 software. Statistical significance was tested at P<0.05.

3. Results

The results showed that the initial mean weight obtained in the control animals and those treated with 150mg/kg of *T. occidentalis* leaf extract did not differ significantly when compared with the respective corresponding values post treatment with *T. occidentalis* leaf extract (P>0.05). However, the experimental animals belonging to group B (300mg/kg) and C (600mg/kg) did show significant increases in the final mean weight when comparing the Initial weight respectively (P<0.05), Table 1.

Table 1: The mean weight of the experimental animals before and after TO administration for 28 days (mean±SEM).

		Mean	±Sem	P-value	T-value
Group A	Initial	210.00	±30.00	0.423	-1.000
	Final	220.00	±20.00		
Group B	Initial	200.00	±11.54	0.742	0.378
	Final	193.33	±17.63		
Group C	Initial	127.50	±9.46	0.037*	-3.576
	Final	150.00	±5.77		
Group D	Initial	135.00	±11.90	0.014*	-5.196
	Final	150.00	±10.00		

*Statistically significant at P<0.05.

The result showed that the mean activity of AST and ALP were significantly different amongst the group (F=23.444, 63.733) (P<0.05) respectively, whereas, ALT did not differ significantly amongst the group (F=2.488; P>0.05).The mean (±SEM) of serum AST (IU/L)) activity in the experimental group treated with 150mg/Kg/ body weight of *T. occidentalis* leaf extract (Group B) was significantly decreased compared with control group (17.00±0.57 Vs 21.66±0.88; p=0.004). However, no significant mean difference was observed between the AST value obtained in the control when compared with that of group B animals (P>0.05). There was a significant increase in the mean activity of AST in the experimental animals treated with 600mg/Kg *T. occidentalis* leaf extract (group D) in comparison with the control group (P=0.003).

The experimental animals in group B did not show any significant difference in the mean ALP activity when

Table 2: Effect of aqueous leaf extract of *telfairia occidentalis* on AST, ALP and ALT of the liver after 28 days of treatment.

		Mean	±Sem	P-value	F-value
Aspartate Transaminase (IU/L)	Group A (control)	21.66	±0.88		
	Group B	17.00	±0.57	0.004*	23.444
	Group C	21.33	±0.88	0.780	
	Group D	26.66	±0.88	0.003*	
Alkaline Phosphatase (IU/L)	Group A (control)	116.66	±0.88		
	Group B	130.00	±5.77	0.588	63.733
	Group C	278.00	±12.70	0.000*	
	Group D	397.66	±30.31	0.000*	
Alanine amino transaminase (IU/L)	Group A (control)	18.00	±0.57		
	Group B	14.00	±0.57	0.173	2.488
	Group C	21.00	±2.88	0.295	
	Group D	16.00	±2.30	0.476	

*Statistically significant at P<0.05.

compared with control group (P>0.05), but those treated with 300mg/kg and 600mg/kg of the extract (group C and D) respectively were significantly increased in comparison with the control (group A) respectively (P<0.05). However, the mean serum levels of ALT (IU/L) did not differ significantly when compared between the groups respectively (P>0.05). See Table 2.

4. Discussion

The use of plants as source of remedies for the treatment diseases can be traced back to the prehistoric times.[1,31] The choice of medicinal plants for therapeutic purposes seems to be on the rise. Therefore, such plants should be investigated for better understanding of their properties, safety and efficacy.[5]

In the present study, the results revealed that the experimental animals belonging to group B (300mg/kg), C (600mg/kg) and D (600mg/kg) showed significant decrease in the mean weight when compared with control animals respectively (P<0.05). This finding is in contrast with the work of Iweala and Obidoa,[32] The health effect elicited through the consumption of a plant food is rooted in the concentration of its phytochemicals and nutritional constituents as well as the quantity of the plant constituent consumed.[33] Therefore, it could be correct to infer that the weight loss experience by animals in this study was associated with the high doses of the extract administered to the experimental animals.

Findings from this study showed that there were significant increases in mean activity of AST and ALP in the TO treated animals than in control. This corroborates the report of Ekpenyong *et al*.[23] This increase in the mean levels of AST and ALP may be attributable to an extrahepatic origin rather than due to hepatobiliary effect, owing to the fact that they are produced from a number of other sites in the body order than the liver. However, several other similar studies are in contrast with the present finding.[24], [26-27].

In the present study, the mean serum activity of ALT did not differ significantly in the TO when compared with the control. This may be due to the hepatoprotective effect of *T. occidentalis.* This is in consonance with some previous similar studies which had earlier showed the ameliorative effect of *T. occidentalis* on the liver following its inducement with varied forms of hepatotoxins.[24-28]

5. Conclusion

In conclusion, the present study revealed a significant alterations in the mean body weight, mean serum AST and ALP activities with no significant alteration in serum ALT activity. Therefore, this study revealed the hepatoprotective effect of *T. occidentalis*.

6. Source of Funding

None.

7. Conflict of Interest

None.

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