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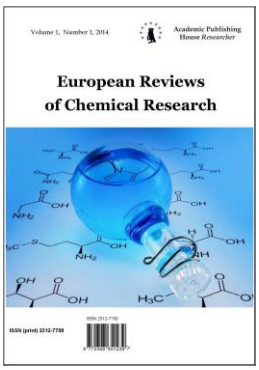

Biochemical Effects of Aqueous Leaf Extract of Abeere (Hunteria Umbellata) on Liver Enzymes of Albino Rats

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Abstract

The research was conducted to ascertain the hepatotoxic potentials of the leaves extract of Hunteria umbellata on liver enzymes of apparently healthy albino rats. A total of sixteen (16) albino rats were clustered into four (4) groups of four (4) rats each designated as group A – D, Group A served as control while groups B, C and D were treated with 200 mg/kg, 300 mg/kg, and 400 mg/kg aqueous leaves of extract of Hunteria umbellata respectively for a period of two weeks. The liver enzymes were determined using spectrophotometric methods. The results show a significant increase ($P < 0.05$) of serum AST activity at all doses. A similar trend was seen in the activity of serum ALP where a significant decrease was observed ($P < 0.05$) at all doses. There was a continuous decrease in the activity of serum ALT as the dose was increased but the increase was not significant ($P < 0.05$). The extract appears to have significant effects ($P < 0.05$) on serum AST, ALP activity but exhibited no significant effects on serum ALT and the Albumin concentration when compared with control rats. In conclusion, acute oral administration of the extracts was found to be quite toxic relatively safe at a low brought alteration in the serum AST and ALP activity but appears to have no significant effect on serum ALT activity.

Keywords: hunteria umbellata, hepatic, ALP, AST, ALT, liver and enzymes.

1. Introduction

Hunteria umbellata is a shrub or small tree with a dense crown; it can grow up to 10-15 metres tall with exceptional specimens to 22 metres (Ibeh et al., 2007). The bole, which is fluted and can be sinuous or straight, is 40-55 cm in diameter. The plant has a colourless or milky latex in all of its parts. The tree is valued locally for its timber and also has a range of medicinal uses. The bark is sometimes exported, mainly to Germany, for medicinal use (Oboh et al., 2019).

Hunteria umbellata grows as either a shrub or small tree up to 22 metres tall, with a trunk diameter of up to 40 centimetres. Its flowers feature a white, creamy or pale yellow corolla. The fruit is yellow and smooth. Its habitat is forests from sea level to 600 metres altitude (Oluwamodupe Cecilia Ejelonu, 2019).

Although all parts of the plant are toxic and fatalities have been recorded, the roots and bark are often used in traditional medicine in Africa (Athira, Jayaraman, 2018). A number of alkaloids have been detected in the plant (Jaca, Kambizi, 2011).

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Some 20 indole alkaloids have been isolated, most occurring in the stem bark and root bark.

The alkaloids eburnamonine, eburnamine and hunterine show cardio-vascular properties, some symphathomimetic properties and a strong and lasting hypotensive action (Adeneye Adejuwon et al., 2013).

Research supports the traditional use of seed extracts in Nigeria for the treatment of diabetes, as it increases the activity of glucokinase and lowers blood glucose levels (Nazar et al., 2016).

Aqueous and methanolic extracts of the leaves, seeds and stem bark have shown significant anthelmintic activity against earthworms (Chekole, 2017). Tests with leaf extracts have shown molluscicidal action on the freshwater snail Bulinus globulus (Momodu et al., 2014). The powdered root and root-decoction are used to prevent miscarriage and in the treatment of menorrhoea (Pereira et al., 2019). The root and stem bark are used as an anthelmintic, especially against guinea worm, filaria worms and schistosomiases (causing ilharzia) (Pereira et al., 2019).

Externally, the bark is used as a lotion to treat fevers and the fresh root-bark extract is applied to sores caused by leprosy (Jima, Megersa, 2018).

Aqueous and alcoholic extracts of the seeds are used as a cure for piles, yaws, diabetes and stomach ulcers. A bark or fruit decoction is taken to treat stomach-ache, liver problems and hernia. The plant is also used in the treatment of geriatric problems. There appears to be no data on its toxicological effects, especially those on liver enzymes. The research therefore aims to study the effects of the plant on same.

2. Materials and methods

Plant Materials

The fresh leaf of Hunteria umbellata was purchased from Olodi Apapa market in Lagos State, Nigeria and was brought to the Biological Science Department, Abubakar Tafawa Balewa University Bauchi.

Preparation of the Extract

The leaves were sorted out separately to obtain only fresh leaves and washed with distilled water without squeezing to remove debris and dust particle. They were air-dried and ground into coarse powder using pestle and mortar and sieved to fine powder. 150 g of the fine powder was extracted or cold macerated into 900 ml of distilled water for 24 hours and the macerated mixture was then filtered through muslin cloth. It was then filtered to obtain the Hunteria umbellata and mixture of aqueous extract through filter paper. The filtrate was dried in an electric oven at 50^{o}C until a semisolid residue dark solid extract was obtained.

Experimental Animals

Sixteen (16) white albino rats with weighed between 80-100 g were purchased from National Veterinary Research Institute (NVRI) Vom, Plateau State. The animals were placed in cages and fed appropriately at biological science department, Abubakar Tafawa Balewa University Bauchi.

Experimental Design

At the end of the seven days' acclimatization period, the animals were randomly assigned into four different groups of four rats each, designated as groups of A – D. Group A received water and feed only and serves as control, group B were administered orally with 200 mg/kg, group C were administered orally with 300 mg/kg and group D were administered orally with 400 mg/kg doses of the extract for the period of fourteen days. On the 15th day all the rats were sacrificed and blood sample collected.

Administration of the Extract

Administration of the extract was done via oral route with the aid of oral cannula and syringe. Animals received their doses once per day for the period of two weeks. They were observed daily for clinical signs of toxicity or pharmacological signs, throughout the period of study.

Collection of Blood

At the end of the two weeks of extract administration, the albino rats were slaughtered to obtain blood from jugular vein. The collected blood sample from each rat were allowed to clot and then centrifuged at 3000 rpm for 10 minutes. Serum was obtained used for the assay of Aspartate aminotransferase (AST), Alanine aminotransferase (ALT), and Alkaline phosphatase (ALP).

Blood Analysis

Hepatic analysis of the serum enzymes for ALT and AST was done by the method of Reitman and Frankel (1957), ALP was assayed according to the method of Rec (1972).

Estimation of Parameters

Aspartate Aminotransferase (AST) assayed using Colorimetric method of Reitman and Frankel, 1957.

Alanine Aminotransferase (ALT) assayed by Colorimetric method of Reitman and Frankel, 1957.

ALKALINE PHOSPHATASE (ALP) assayed by method of Rec, 1972.

3. Results and discussion

The results show a significant increase (P <0 .05) of serum AST activity at all doses. A similar trend was seen in the activity of serum ALP where a significant decrease was observed (P < 0.05) at all doses. There was a continuous decrease in the activity of serum ALT as the dose was increased but the increase was not significant (P < 0.05). The extract appears to have significant effects (P < 0.05) on serum AST, ALP activity but exhibited no significant effects on serum ALT and the Albumin concentration when compared with control rats.

Table 1. Effect of aqueous leaf extract of *Hunteria umbellata* on liver enzymes in normal albino rats

Grouping	Parameters Assayed		
	AST(IU/L)	ALT(IU/L)	ALP(IU/L)
Group A (Control)	5.6±0.15	2.8±0.31	106.26±8.51
Group B (200mg/kg)	7.6±0.50	2.6±0.12	92.21±1.20
Group C (300mg/kg)	8.0±055	2.6±0.03	78.42±1.25
Group D (400mg/kg)	8.7±0.34	2.5±0.033	66.06±0.35

Table 1 showed the effect of aqueous leaf extract of Hunteria umbellata on liver enzymes in normal albino rats. The activity of AST increased to 7.6±0.50 in the rats treated with 200 mg/kg body weight of the extract and increased to 8.0±0.55 and 8.7±0.34 in the rats treated with 300 and 400 mg/kg body weight of the extracts respectively when compared with untreated group (5.6±0.15) with significant (P > 0.05) differences. However, the activity of ALT was slightly decreased to 2.6±0.12 in the rats treated with 200mg/kg body weight of the extracts continuously decreased to 2.6±0.03 and 2.5±0.33 in the rats treated with 300 and 400 mg/kg body weight of the extracts respectively when compared with untreated group (2.8±0.31) with no significant (P > 0.05) difference. The result of ALP showed a significant (P < 0.05) decrease of serum ALP activity (92.21±1.20) was observed in the rats treated with 200 mg/kg body weight of the extracts and decreased 78.42 ±1.25 and 66.06±0.35 was observed in the rats treated with 300 and 400 mg/kg body weight of the extracts respectively when compared with untreated group (106.26±8.51).

5. Conclusion

Acute oral administration of the extracts was found to be quite toxic relatively safe at a low brought alteration in the serum AST and ALP activity but appears to have no significant effect on serum ALT activity.

6. Recommendations

Further studies should be carried out by increasing the number of experimental animals, so that larger data could be obtained so as to reach a better conclusion. Biochemical parameters associated with liver function test such as bilirubin, albumin and total protein should also be analyzed so as to find out the detail hepatotoxic effect of Hunteria umbellata.

Histological analysis of the liver of albino rat should also be conducted.

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