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# Effects of Aqueous Ethanolic Extract of the leaves of *Guiera senegalensis* J.F. Gmel (Combretaceae) on Liver Function in Wister Strain Albino Rats

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**ABSTRACT**

The effects of different doses of aqueous ethanolic extract of the leaves of *Guiera senegalensis* on liver function test of wister strain albino rats were investigated at high doses of 1000mg/kg and 2000mg/kg which showed high toxicity with some clinical signs but at lower doses of 100mg/kg, 150mg/kg and 200mg/kg, showed little or no effects on the liver function tests (AST, ALT, TP, ALK-PH, and ALB). Of these only ALK-PH showed significant increase ($P<0.05$) as the dose increases when compared with the control and total protein at only 200mg/kg. The result of these studies showed that *G. Senegalensis* at lower doses is not harmful to the liver and therefore can be exploited as it is served in the treatments of some illnesses.

**Key Words:** *Guiera senegalensis,* Ethanol, Liver Function Test.

## 1.0 INTRODUCTION

Medicinal plants are known as plants that are naturally used to treat and prevent illnesses. Herbal medicine has existed since pre-historic times and still occurring today, as it serves as the primary form of medicine for most of the world's population (80%) and over 83,000 species of plants are used throughout the world for this aim. But only a few of them have been scientifically investigated accordingly. (Somboro *et al*, 2011). In recognition to this, the World Health Organization (WHO) encourages and supports the screening of plants for pharmacological and biological active substance (Ernest and Johanna, 1999). *Guiera senegalensis* is one of the plants that have not been scientifically exploited fully.

*Guiera senegalensis* is a shrub found abundantly in the savanna region of West Africa, It is known as *kashishi* in Kanuri language, *Saabara* in Hausa language, *shafi pitu* in Marghi language and *Tadar* in Tangale language (Habila 1999). Its

leaves are 3-5cm long and 1.5cm broad and are opposite, rounded or slight heart-shaped (cordate) at the base, short sharp point at apex. The leaves of the plant are used against dysentery, cough, and malaria fever. A tea made from its leaves is prescribed through oral route to treat eczema (1liter per day) (Somboro *et al*, 2012). Phytochemical studies on *G.senegalensis* showed the presence of seven active ingredients that have anti-microbial and anti-fungal activities (Azza *et al*, 2009).

## 2.0 MATERIALS AND METHODS

### 2.1 *Test material*

The plant leaves of *G.senegalensis* were collected on the banks of the river Yobe near Geidam, North eastern Nigeria. The plant was identified and authenticated by the taxonomy unit of the department of Biological Sciences, University of Maiduguri. The dried powder was macerated in an aqueous ethanolic (70:30 ethanol:water) at room temperature. The aqueous ethanolic extract was completely dried *in vacuo*. The material was stored in a refrigerator at $4^{o}$C and protected from light until time of drug administration when appropriate stock solutions were made in distilled water for administration to the experimental animals.

### 2.2 *Animals*

Adult wister strain albino rats (120-260g) of both sexes were used for the acute toxicity studies but only male rats (180-260g) were used for sub-acute toxicity. The animals were purchased from the trypanosomiasis Research Division of the National Veterinary Research Institute (NVRI) Vom, near Jos, North-Central Nigeria and kept in the animal house of the Department of Biochemistry for two weeks to acclimatize. The animals were fed with standard commercial feeds and had free access to water (*ad Libitum).*

### 2.3 *Chemicals and Reagents*

The kits used for this experiment were of Analytical graded.

### 2.4 *Acute toxicity studies*

The acute toxicity ($LD_{50}$) was estimated orally in rats following Lorke's method (1983).

Group A-1000mg/kg body weight

Group B-2000mg/kg body weight

*Sub-acute toxicity studies*

Twenty (20) male wister strain rats were randomly selected and divided into 4 groups of 5 rats each.

Group A- Control

Group B- 100mg/kg body weight

Group C- 150mg/kg body weight

Group D- 200mg/kg body weight

**2.5** ***Preparation of sera samples***

On Day 21 of the dosing period, all the animals were exsanguinated under chloroform anesthesia and blood samples were drawn from the heart of each sacrificed animal. The samples were collected in plastic test tubes. The clotted blood samples were centrifuged at 3000 rpm for 10 min and clear serum samples were aspirated off and stored frozen.

**2.6** ***Serum Biochemistry***

The following liver Function test were determined by employing standard ready-to-use kits and methods as described by Randox laboratory laboratory limited U.K Alkaline phosphatase (ALK-PH), Alanine amino transferase (ALT) aspartate amino transferase (AST), Albumin(ALB), Total protein(TP). The manufacturer's instructions for each of the parameters were strictly followed in the course of the investigations.

**2.7** ***Statistical Analysis***

The results were expressed as mean ± Standard Deviation (SD) using one-way Analysis of variance (ANOVA) followed by student's t-test to evaluate the significance of the difference between the mean value of the measured parameters in the respective test and control groups. A significant change was considered acceptable at $P< 0.05$.

**3.0 RESULTS AND DISCUSSION**

**Table 1**. Liver function test following intubation for 21 days

| Ui/l | **Group A (control)** | **Group B (100mg/kg)** | **Group C (150mg/kg)** | **Group D (200mg/kg)** |
|---|---|---|---|---|
| ALK-PH | 101.40 ±055[a] | 121.40± 1.67[b] | 123.80 ±044[c] | 129.40±0. 54[d] |
| ASAT | 76.20± 1.64[a] | 77.40±5 .98[a] | 77.00± 1.72[a] | 76.80±1.7 3[a] |
| ALAT | 27.80± 1.79[a] | 27.40±1 .82[a] | 26.20± 1.64[a] | 25.00±2.3 0[a] |
| TP | 74.00± 1.41[a] | 73.80±1 .09[a] | 75.20± 2.49[a] | 83.60±2.3 0[b] |
| ALB | 33.20± 2.17[a] | 34.40±0 .89[a] | 34.20± 1.78[a] | 33.60±0.8 9[a] |

Results are presented as mean ± S.D of 5 rats in each group

- Experimental groups are compared with the control.
  - Values with different superscripts letter are statistically significant a: NS P>0.05

Rats used for $LD_{50}$, the first group that received a dose of 1000mg/kg and the second group received

a dose of 2000mg/kg of aqueous Ethanolic extract of the leaf *Guiera senegalensis* and were observed within 24 hours shows some clinical signs of weakness. Their feeding patterns changed as they clustered to each other looking depressed but no mortality was recorded at the end of the $LD_{50}$.

For the subacute toxicity, three (3) sets of rats each received different doses of the ethanolic extract of G. senegalensis respectively i.e. 100mg/kg/day, 150mg/kg/day, 200mg/kg/day. Biochemical changes in serum constituents included significant increase in the alkaline phosphatase ($P<0.05$) when compared with the control. The total protein only increased significantly at 200mg/kg/day of the ethanolic extract of *G. Senegalensis* ($P<0.05$). AST, ALT and TP do not show any significant or clinical effects which is good news, because these cellular enzymes which are present in the hepatocytes of the liver are not leaked into the bloodstream.

Because of the wide-spread use of *G. senegalensis* in the treatment of ailments such as malaria, diarrhea chest pain, dysenteric etc we can safely say that the plant *G. senegalensis* can be taken *al beit* at lower doses in the treatment of these illness.

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