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Effects Of Aqueous extract Of Tamarindus indica on body weight and Liver function of Wistar Rats

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This study aims at investigating an impacts of ethanolic extracts of Tamarindus indicaon liver biomarkers such as Aspartate transaminase, Alkaline phosphatase, Alanine transaminase, and body weight (bw) of Wistar rats. Species have been classified into four groups. Normal handling cluster A received rat feed and water ad libitum only, Test Group B (100 mg/kg bw), Test Group C (150 mg/kg bw) and Test Group D (200 mg/kg bw) of the aqueous Tamarindus indica respectively. The management of a harvest has been done twice everyday (morning and evening) for a period of seven (7) days. The activity of liver function was assessed by quantifying the alterations in the serum liver enzyme levels. Data was analysed by One-way ANOVA and significance was considered at (p<0.05). The two dose levels of *Tamarindus indica* fruit extract significantly lowered the levels of the liver enzyme biomarkers (AST, ALT and ALP) and there were no significant changes in the weight of the rats. Present study showed that *Tamarindus indica*may possesses hepatoprotective potentials and for maintenance of body weight

Keywords: Hepatoprotective potentials, Biomarkers, Enzymes, Body weight

1. Introduction

Medicinal plants have been a major practice among developing nations [1] Even today, medicinal plants are still the predominant means of healthcare in Africa where higher fraction of the population is poor [2, 3]. To modern medicine plants are also the centre for drug development because of their constituent metabolites or phyto-antioxidants properties such as saponins, flavonoids, alkaloids, glycosides, tannins, and other phenolic compounds that yield positive physiological and pharmacological actions in the living system [4, 5]. Hence, a search for useful bioactive compounds from medicinal plants such as *Tamarindus indica* Linn, which has been reported to have hepatoprotective effect [6, 7, 8, 9, 10], is now considered to be a rational approach in nutraceutical and drug development.

Tamarindus indica L. also called ‘tsamiya’ in Hausa is a major leguminous plant species in the family of Fabaceae [3]. Virtually each and every part of Tamarindus indica L has various roles in medicine, nutrition, economic, and environmental context [2]. Thus, it is regarded as a versatile plant. However, the tree has proven to tolerate dry conditions within a range of 5–6 months’ period, but it can’t survive stumpy temperature [11]. According to Devi and Boruah (2020), the varieties of tamarind can be grouped into two distinctive categories – the acidic and sweet acidic type. The former variety can be easily developed under temperate locations and thus is most common. The latter, which is a sweet-type variety, is sensitive to

environmental changes and so not readily available. There is high demand for the fruits of Tamarind [5]. Seeds of tamarind are waste for industries that use the pulp in production. In some third world nations the tamarind seeds are consumed as protein [12]. Flowers and leaves can be eaten fresh, cooked with variety of delicacies. The tasty sweetened salty flavor of tamarind pulp is believed to be due to the availability of tartaric acid and a reducing sugar content [12]. This present study was undertaken to fil l this gap of knowledge in establishing a consequences of leaf extracts of Tamarindus indica on liver activity and muscle mass of wistar rats.

2. Materials and Methods

2.1 Materials

All chemicals used in this study were of analytical grade which include distilled water, chloroform, methylated spirit, phosphate buffer, L-alanine, alpha-oxoglutarate, 24-dinitrophenylhydrazine, and sodium hydroxide.

2.2 Equipment

All the equipment used in this study were of laboratory standard and they include the following: Animal cages, oral gavage canula, centrifuge tubes, dissecting set, dissecting board, cotton wool, surgical gloves, syringes, Beakers, water bath, hot plate, weighing balance, measuring cylinders, thermometers, stirrer, stop watch, centrifuge machine, oven, funnel, Whatman filter paper grade 1, plates, test tubes, test tube holder, spatula, blender, pH meter, spectrophotometer, and refrigerator.

2.3 Sample Collection/Preparation

The fruit pulp of Tamarindus indica were obtained from Suleja Market, Niger State, Nigeria and was taken to the Department of Biology Veritas University Abuja for authentication.

The aqueous extract of the pulp of Tamarindus indica were prepared .The fruit pulps were washed and soaked in hot distilled water at 500˚C for 12 hours and the juice was filtered using Whatman No. 1 filter paper and refrigerator for further use.

2.4 Animal Management

Twenty (25) healthy albino wistar rats of male sex weighing 160g - 200g were obtained from the Ahmadu Bello University Zaria, Kaduna State and were acclimatised for 7 days. The animals were fed with pellets made from growers' mash and drinking water 'ad libitum'. The animals were kept in clean cages and the floors of the cages were laid with saw dusts, cleaned and replaced daily. The study was conducted in the accordance with the stated laws for the care and use of laboratory animals by the University.

2.5 Experimental Design

Table 1: Animal Grouping

SN	Groups	Number of rats	Administration
1	Normal Control	7	Feed and distilled water
2	Test Group 1	6	100 mg/kg of *T. indica* extract by oral gavage
3	Test Group 2	6	150 mg/kg of *T. indica* extract by oral gavage
4	Test Group 3	6	200 mg/kg of *T. indica* extract by oral gavage

2.6 Body Weight Management

Human mass has been measured in the non-fed phase just at start of the trial (starting mass) and even at a moment of execution (final weight). Gain in weight (total bodily mass (g) minus beginning body mass (g)).

2.7 Sample Collection and Biochemical Assay

Trial has been noted for seven days. Rats have been deprived for 12 h and afterwards compromised under light ether anaesthesia. The blood must have been collected from across all living creatures by cardiac puncture. The blood specimens has been taken into freshly washed microcentrifuge tube preserved at 37° temperature for 10 mins then at 4°C for 60 mins and vortexed at 4000 rpm for 15 min to isolate serum. Serum has been shifted into washed tubes and kept at −20∘C till being analyzed.

3. Statistical Analysis

Data was expressed as mean ± standard deviation of three replicate measurements. Data was subjected with SPSS version 23 and analysed by one-way analysis of variance and differences between means was considered significant at $P < 0.05$.

Table 2: Result showing the effect of aqueous extract of Tamarindus indica on the Body weight of Wistar rats.

Groups.	Initial Body weight (g).	Final Body weight (g)
A	199.85±4.62*	200.57±6.50*
B	177.33±16.82*	173.92±20.45*
C	160.04±15.23*	162.28±19.37*
D	171.71±16.52*	174.50±21.11*

Values are expressed as Mean±SD

* Values on the same row with the same superscript are statistically not different at p<0.05.

Table 3:Result showing the effect of aqueous extract of*Tamarindus indica* on some liver function parameters of Wistar Rats.

Groups.	**AST(U/L)**	**ALT(U/L)**	**ALP(U/L)**
A	**44.90±34.93**	**4.80±35.66.**	**4.90±34.93**
B	**5.40±10.06***	**8.00±16.47*a**	**5.02±26.76***
C	**53.80±46.32**	**30.80±35.65***	**21.10±33.37a**
D	**5.00±23.05***	**5.50±29.01***	**15.50±12.52***

Values are expressed as Mean±SD

* Significantly different from Normal Control at p<0.05,

a Significantly different among the test groups at p<0.05

4. Discussion

Alkaline Phosphatase (ALP); Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST), levels of serum have been undertaken to evaluate liver activity. level of these will retained a most valuable measure for the diagnosis of hepatic cell damage or malfunction, since they seem to be available in increased levels in hepatocytes. If hepatocytes or their cell vesicles got totally punctured, so these enzymes release into in the bloodstream [9].

Elevated concentrations of AST imply liver problems, ALT enzyme that transforms of alanine to pyruvate and glutarate and is moved in identical ways. Therefore, ALT is much more selective to liver as well as is thereby an improved factor for diagnosing liver problems [9]

The findings of this study showed that aqueous extract of Tamarindus indica at varying doses of 100, 150, and 200 ml/kg body weight have significantly reduced the levels of the liver biomarkers (AST, ALT and ALP) in rats. The fundamental technique of hepatoprotective impacts of Tamarindus indica observed in this study could be attributable to the involvement of anti - oxidant polyphenolic elements inside the fruit which

could be beneficial in the management of the hepatic organs. This study finding is consistent with the report of [6]. The liver is a major organ in the body responsible for carrying out different metabolic roles for body functioning [13]. Destruction to liver cells with necrosis stimulate the production of subcellular components further into arteries [14].

Body weight measurement serves a one of the major parameters in assessing nutritional status in experimental studies. The Tamarindus indica fruit extract at varying doses of 100, 150, and 200 mg/kg body weight administered for seven days to the rats did not show any significant effect on the body weight. This could be attributed to the short study period. However, there were slight variations in the body weight and it was concluded that Tamarindus indica fruit extract exhibited hepatoprotective effect but did not show any significant effect on body weight.

5. Conclusion

From my results above, It may be suggested that the aqueous extract of Tamarindus indica has potential hepatoprotective effects and for the maintenance of body weight.

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