RESPONSE OF SUBCUTANEOUS ADMINISTRATION OF DIFFERENT DOSES OF AQUEOUS EXTRACT OF *DATURA STRAMONIUM LINN* SEEDS ON LIVER ENZYMES

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ABSTRACT

To evaluate the effect of aqueous extracts of Datura stramonium seeds on the enzymes activity and to identify the hepatotoxicity of aqueous extracts in white albino rats. Effect of aqueous extract of the seed of Datura stramonium Linn was experimented for liver enzymes activities in forty white albino rats (200-250g). Plant extracts (aqueous) were tested for their effect on the enzyme activity at four dose levels: 0.02, 0.04, 0.06, 0.08ml/kgbodyweight (BW) and 0 (saline) levels served as control. The extracts were administered via subcutaneous route for ten consecutive days using completely randomized design and the histological studies of the livers were carried out to confirm their hepatotoxicity activity. The result of the study revealed among others that the extract had significant ($p<0.05$) effect on the liver enzyme activities. This elevation may be an indication of hepatotoxicity of the treated rats resulted from the high dose of aqueous extract. The significant activity exhibited by the aqueous extract on the animals has provided scientific justification for the ethno medicinal uses of the plant in India and South Africa.

Keywords: *albino rat, aqueous extract, Datura stramonium Linn, hepatotoxicity, liver enzymes activities*

INTRODUCTION

Uses of plants for their central nervous system - stimulatory effects date back to prehistoric time. Archaeological evidence suggests that its seed produced mental alertness and sacramental reasons. However, soon recognizing that the stimulant effect of Datura seed has been used in rail and road robberies, to stupefy their victims in India (Considine, 2001). Datura stramonium is a dicot plant with green fruit surrounded by spike, trumpet shaped flower, white or purplish colour. The colour of the fruits changes from green as it's grows to maturity (ripened). Medicinal properties of plants are normally dependent on the presence of certain phytochemical substances

such as alkaloids, tannin, saponin etc which are the bioactive bases responsible for the pharmacological property (Harbone, 1984; Evans, 1999). Toxic effects due to indiscriminate use of herbal remedies have been reported in medical literature, but little or no scientific reports on Datura stramonium poisoning on rats. Therefore, the study aimed at determining the pharmacological activity of the Datura stramonium seed extracts on liver enzymes.

MATERIALS AND METHODS

Forty adult albino rats (both sexes) with body weight ranging from 200g to 250g were obtained from Biochemistry Department of University of Ilorin, Ilorin, Nigeria. The rats were caged (8 rats per cage) in plastic cages in the animal house of Department of Animal Production, University of Ilorin, Ilorin. The rats were allowed free access to normal rats feed and drinking water. They were allowed to acclimatize for 2 weeks, prior to the commencement of the experiment. The rats were divided into five groups of eight rats each. Group I served as control, Group II, Group III, Group IV and Group V are study groups. Rats in group II, III, IV and V were administered subcutaneously with 0.02, 0.04, 0.06 and 0.08 ml/kgbodyweight (BW) of aqueous extract of Datura stramonium Linn seeds respectively. Rats in group I were given 0.05ml/kgBW saline instead of the extract. The administration of the aqueous extract was done in the morning (9.00 am) for ten consecutive days.

At the end of the administration of the extract, two rats were sacrificed weekly for four weeks by decapitation. Using clean test tube, blood samples were collected from the rats and centrifuged. Blood sera were then collected and used for the analysis of enzymes activities. The livers were removed and placed in the 10% formalin for histological monographs. The activities of alkaline phosphatise (ALP) alanine aminotransferase (ALT) and aspartase aminotransferase (AST) in the blood sera collected were determined using Randox method (Randox, 1997). The data generated were subjected to analysis of variance using completely randomized design (CRD). Mean differences were tested using Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Table 1: Effect of different doses of aqueous extract of *Datura stramonium Linn* seeds on Serum enzymes activities

Parameters	Treatments ml/kgBW					
	Saline (0)	0.02	0.04	0.06	0.08	S.E
ALP (U/L)	169.35^{c}	203.41^{c}	276.13^{b}	319.33^{ab}	427.17^{a}	2.054
ALT (U/L)	8.64^{d}	9.21^{d}	14.67^{c}	24.42^{b}	39.72^{a}	0.453
AST (U/L)	7.59^{d}	8.42^{d}	17.32^{c}	29.72^{b}	43.41^{a}	0.632

a, b, c, d means same row bearing different superscripts differ ($p<0.05$).

The results of the effect of different doses of aqueous extract of *Datura stramonium Linn* seeds on serum enzyme activities were presented on table 1. The results of the enzyme activities in control rats and 0.02mg/kgBW rats were found to

be similar and fell within the range of normal values reported by Rec (1972) for ALP (98- 279 U/L) and Reitam and Frankel (1957) for ALT and AST (0- 12 U/L). From the results obtained for subcutaneous administration of 0.02ml/kgBW of Datura stramonium seed aqueous extract for ten days (table 1) on serum enzymes activities when compared to control was insignificantly different ($p>0.05$). This result shows that the dose of 0.02ml/kgBW for 10 days tend to have no toxic effect on hepatic function. This is because hepatic toxicity usually produced a significant alterations in the serum levels of liver specific enzymes; ALP, ALT and AST (Zilva and Pannal, 1975; Price and Alberti, 1985; Palmer, 2004). Subcutaneous administration of ≥0.04ml/kgBW of the aqueous extract of *Datura stramonium* showed significant increase ($p<0.05$) in serum enzyme levels (table 1). Thus suggesting that a dose ≥0.04ml/kgBW of the aqueous extract of *Datura stramonium* seeds tend to produce a mild to acute hepatotoxicity. The liver showed diffused necrosis of the tissue, haemorrhage, lesions were observed in the treated groups and showed mild to severe inflammations, the degree of inflammation was observed to be high in 0.08ml/kgBW treated - rats. This is in line with the earlier results from the enzymes activities. These results confirmed the reports of Considine (2001) who reports increased in enzyme activities with Datura poisoning. Also, the result indicates that subcutaneous administration of aqueous extract of *Datura stramonium* seed at a dose of ≥0.04mg/kgBW for 10 days could be detrimental to the liver and will give rise to hepatotoxicity.

CONCLUSION

Toxic effects due to indiscriminate use of herbal remedies have been reported in medical literature, but little or no scientific reports on Datura stramonium poisoning on rats. Therefore, this study examined with the aim of determining the pharmacological activity of the *Datura stramonium* seed extracts on liver enzymes. It has been found that the indiscriminate use of Datura stramonium seed extract can be toxic to the system. It further shows the hepatotoxicity resulted from subcutaneous administration of ≥0.04ml/kgBW of the extract to the animal.

ACKNOWLEDGEMENT

The researchers gratefully acknowledge Mr Saliu, Department of Chemical Pathology, University of Ilorin Teaching Hospital, Ilorin, on the chemical analysis.

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