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NOTE

HEPATOTOXIC ACTIVITY OF *SACOGLOTTIS GABONENSIS* IN RATS

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ABSTRACT

Sacoglottis gabonensis *(Baillon) Urb. (Humiriaceae) is used as a palm wine additive in Nigeria. When a saline extract was administered to rats at i.p. doses of 125 and 250 mg/kg body weight, serum enzymes indicative of liver damage were elavated in a dose-dependant manner. Histological examination of the livers of the treated animals showed mild sinusoidal dilatation and early necrosis (125 mg/kg) or moderate sinusoidal dilatation and congestion with focal hepatocyte necrosis (250 mg/kg). These results showed that the bark extract of* Sacoglottis gabonensis *is hepatotoxic.*

INTRODUCTION

In Nigeria, *Sacoglottis gabonensis* (Baillon) Urb. (Humiriaceae) (Hutchinson 1973) is used to add bitterness to palm wine, to preserve the drink, and as a preventive against fever (Dalziel, 1936). Anticoagulant effects of the bark extract have been investigated (Madusolumuo & Okoye, 1993a, 1995; Okoye & Ohaeri, 1995), and the effect of *S. gabonensis* extract on the serum levels of acetaminophen and acetylsalicylic acid have been studied (Madusolumuo & Okoye, 1993b). There have also been studies in the seasonal movements of elephants associated with the fruiting of *S. gabonensis* (White, 1994). In this study, the effect of a bark extract of *S. gabonensis* on rat liver and serum the levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and lactate dehydrogenase (LDH) were investigated. The data are of interest since the bark of this plant is widely used in the Southeastern part of Nigeria as a palm wine additive (Okoye & Neal, 1991).

Keywords: Hepatotoxic, necrosis, pyknotic nuclei, sinusoidal dilatation, focal hepatocyte.

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MATERIALS AND METHODS

Preparation of Crude Extract

S. gabonensis bark was bought at the Calabar market and authenticated at the Botany Department, University of Calabar. It was washed, dried in the sun and an oven for 24 hr at 60°C, and ground into powder and stored in airtight containers. The crude extract was prepared by a modification of the method of Amole et al. (1993). The powdered sample was weighed in a piece of washed, dried cotton cloth, and suspended in hot saline of known volume with stirring for 1h. The bag was removed, squeezed and dried to constant weight. The weight before and after extraction was noted, to estimate the weight of the extract in a given volume of saline.

Histological Materials and Animals

Sodium chloride, hematoxylin, eosin and formalin were obtained from Sigma-Aldrich Chemical Company Ltd. (Poole, England). The neutral mounting medium (DPX) was obtained from Aldrich Chemical Co., (Gillingham, England). Male albino rats weighing 60–70 g were used. These rats were obtained from the Biochemistry Department, University of Calabar.

Biochemical and Histological Studies

The animals were divided into three groups of seven each. Group 1 was given saline while groups 2 and 3

TABLE 1. The effect of *Sacoglottis gabonensis* extract on ALT, AST and LDH serum levels in control and treated rats.

Groups	Dose(mg/kg)	ALT* IU/L	AST** IU/L	LDH*** IU/L
1	–	131.0 ± 4.5	44.0 ± 12,5	1.30 ± 0.20
2	125	164.0 ± 3.7	151.0 ± 10.7	1.40 ± 0.20
3	250	177.0 ± 3.0	201.0 ± 7.6	14.0 ± 0.5

Each value represents the Mean ± SEM of 7 determinations.
*There were significant differences ($P < 0.05$) between groups 1 and 2, 1 and 3 ,and 2 and 3.
**There were significant differences ($P < 0.05$) between groups 1 and 3, and 2 and 3.
***There were significant differences ($P < 0.05$) between groups 1 and 3,and 2 and 3.

were injected i.p. with the saline extract of *S. gabonensis* at concentrations of 125 and 250 mg/kg body weight, respectively. Treatment was daily for 7 days and the animals were then sacrificed by suffocation with chloroform and blood was collected by cardiac puncture using sterile disposable syringes. Serum was separated by centrifugation at 2000 g for 5 min and serum ALT, AST and LDH were determined as described by Annino and Giese (1976). Portions of the livers of both control and test groups were removed and fixed with 10% buffered formalin for subsequent histological work. Sections were cut, stained with hematoxylin (H) and eosin (E), and mounted on the neutral mounting medium (DPX).

Statistical Analysis

The results are expressed as mean ± SEM. The statistical comparisons were made by means of Student's *t*-test and $P < 0.05$ was regarded as significant.

RESULTS

The control serum levels of ALT, AST and LDH were 131.0 ± 4.5, 144.0 ± 12.5 and 1.3 ± 0.2 IU/L ($n = 7$), respectively (Table 1). For group 2, treated with bark extract of 125 mg/kg, the respective serum enzyme values were 164.0 ± 3.7, 151.0 ± 10.7 and 1.4 ± 0.2 IU/L, while for group 3, treated with bark extract of 250 mg/kg, the serum enzyme levels were 177. ± 3.0, 201.0 ± 7.6 and 4.0 ± 0.5 IU/L, respectively. For the histological studies (Fig. 1), the control liver section showed normal cells. The test group 2 liver section (Fig. 2) showed mild sinusoidal dilatation and early hepatocyte necrosis, while group 3 liver sections (Fig. 3) showed moderate sinusoidal dilatation and congestion with focal hepatocyte necrosis.

DISCUSSION

Damage to liver cells with necrosis causes the release of intracellular constituents into the blood stream, and the transaminases are sensitive indicators of such damage. Other enzymes such as LDH are also increased (Zilva and Pannall, 1991.) In liver cells, AST is found both in the mitochondria and cytoplasm, while ALT is found in the cytoplasm. In this study, the levels of the enzymes are raised. For ALT, there were significant differences ($P < 0.05$) between groups 1 and 2, 1 and 3, and 2 and 3. For AST, there were significant differences ($P < 0.05$) between groups 1 and 3, and 2 and 3, and for LDH, there were significant differences ($P < 0.05$) between groups 1 and 3, and 2 and 3. In Table 1, the rise of ALT in group 2 compared to the control group 1 is greater than the rise of AST in the same group compared to its control. These data suggest cellular damage, which was confirmed by histological findings. Fig. 1 shows normal liver hepatocytes. In Fig. 2, the section shows mild sinusoidal dilatation and early hepatocyte necrosis characterised by pyknotic nuclei as seen in the occasional cells indicated. In Fig. 3, the section shows moderate sinusoidal dilatation and congestion with focal hepatocyte necrosis with characteristic nuclear pyknosis and karryorhexis. These histological findings are further proof that the bark extract of *S. gabonensis* is hepatotoxic.

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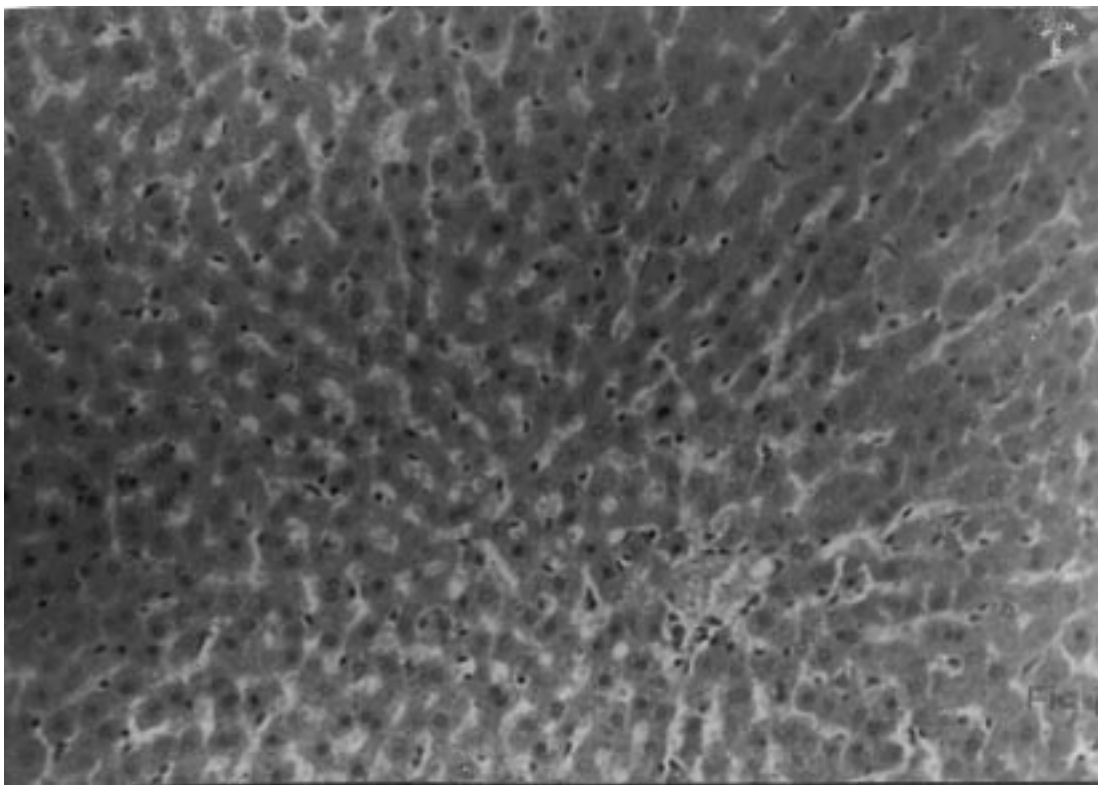

Fig. 1. Liver section of group 1 rat (mag. × 100). The section shows normal liver cells.

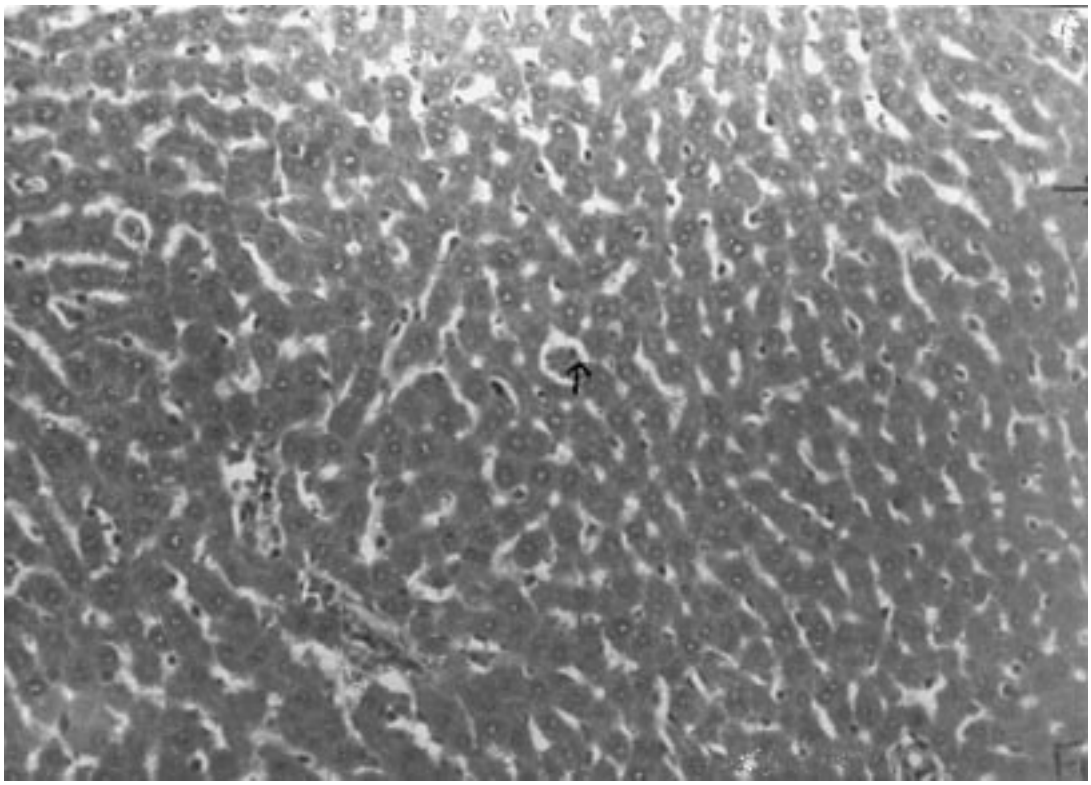

Fig. 2. Liver section of group 2 rat (mag. × 100). The section shows mild sinusoidal dilatation. Early hepatocyte necrosis (arrowed) characterised by pyknotic nuclei is seen in the occasional cells indicated.

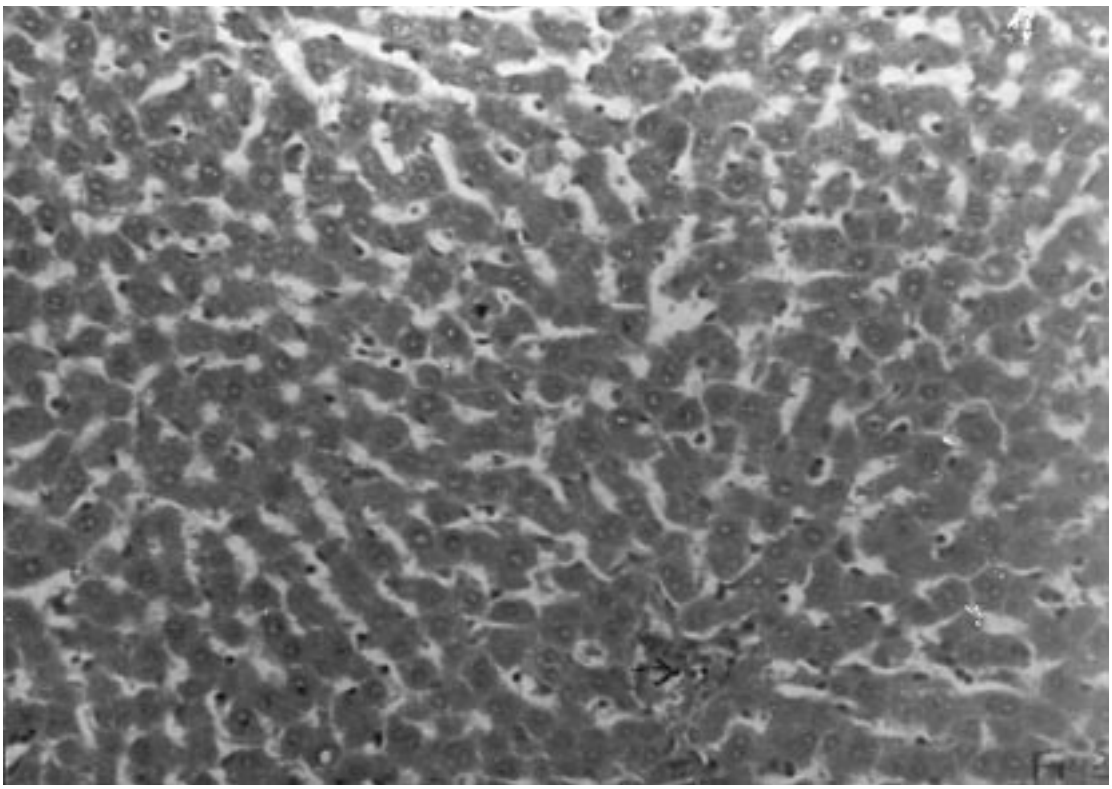

Fig. 3. Liver section of group 3 rat (mag. × 100). The section shows moderate sinusoidal dilatation and congestion with focal hepatocyte necrosis (arrowed) with characteristic nuclear pyknosis and karryorhexis.

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