

BIOCHEMICAL STUDIES AND ANTI-ULCEROGENIC POTENTIAL OF *ONCOBA SPINOSA*

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ABSTRACT

Anti ulcer activity and biochemical study of aqueous ethanolic root extract of *Oncoba spinosa* extract was investigated *in-vivo*. Acute toxicity tests showed that the extract was tolerated at the dose of 500-1500mg/Kg orally. The results revealed that the plant possesses anti-ulcerogenic property in a dose (500-1500mg/kg) dependent manner. It protected rats from ethanol-induced ulcerogenesis. The extract did not significantly ($P \geq 0.05$) affect the serum activities of aspartate amino transferase (AST) and alanine aminotransferase (ALT) in the treated rats when compared with the control. These results correlate with local use of the *Oncoba spinosa* as antiulcer medicinal plant.

KEYWORDS: Anti-ulcer; Aspartate amino transferase; alanine aminotransferase; *Oncoba spinosa*

INTRODUCTION

Peptic ulcers occur when the endogenous defense mechanism of the protective mucosa barrier fails to counteract aggressive factors that usually produce an insult on the gastro intestinal wall (Laurence *et al.*, 1999). Efforts have been directed toward finding a suitable anti ulcer drugs from natural products since many factors such as decreased mucosal resistance and bacterial infection acid pepsin secretion have been implicated in the pathogenesis of gastric ulcer (Aoygi and Sommerskil, 1966; Pearson *et al.*, 1980; Gupta *et al.*, 1980).

More than 70-80% of the populations in the developing countries including Nigeria depend on traditional healers for most of their ailments including peptic ulcer (Balick *et al.*, 1994). In traditional or herbal medicine, the roots of *Oncoba spinosa* are employed to treat peptic ulcer in Ijebu land among the Yoruba speaking tribes of Western Nigeria. Preliminary Phytochemical screening revealed the presence of alkaloids, tannins and trace amount of saponins (Odebiyi and Sofowora, 1978). However, there is little or no information in literature concerning the stomachic activity and toxicity and involve toxicity of *Oncoba spinosa*.

MATERIALS AND METHODS.

Sample collection and preparation

The plant was collected from the forestry reservation at Ijebu-Ode, Nigeria and was identified as *Oncoba spinosa* by Dr. X.Y. Diwura of the Department of Botany, University of Ibadan, Nigeria. Voucher specimen was deposited at the herbarium center of Biochemistry Department, Federal University of Technology Akure, Nigeria. The sun dried roots of *Oncoba spinosa* were cut into smaller pieces, was pulverized using the Laboratory grinding machine to coarse powder. About 200g of the sample was soaked in 50% aqueous ethanol and shaken at regular interval for 72 hours after which the extract was filtered. The filtrate was concentrated using rotary evaporator. The gummy extract weighed 80 g, which is equivalent to a yield of 40 % w/w.

Ethanol induced ulcer

Twenty-five albino rats weighing (150-180) were divided into five groups of five rats each. The rats were fasted for twenty-four hours before they were used but maintained with water which was later removed two hours prior administration of drugs. The extracts (500-1500mg/Kg) were administered orally 30 minutes prior absolute ethanol (1 ml) orally to the treatment groups while the control group received equivalent volume of physiological saline (0.9% NaCl). After 8 hours, the animals were sacrificed and stomachs were removed and cut open along the greater curvature. The stomachs were rinsed under a slow stream of water and pinned flat on a cork board. The stomachs were coded to avoid observer's bias and examined macroscopically and microscopically to assess the degree of ulceration using scoring method of Nwafor and Okwuasaba, 2001. The intensity of the sore was used to determine the degree of ulceration (ulcer index). The percentage of Ulcer protection was determined as follows;

$$\% \text{ Ulcer protection} = 1 - \frac{\text{Ulcer index for tested agent}}{\text{Ulcer index for negative control}} \times 100$$

Hematology and Biochemical studies

Twenty male adults rats weighing (150-180g) divided into four groups were used. Groups 2-4 received 500, 1000, and 1500 (p.o) mg/kg of the extract daily respectively for a period of four weeks while the control (group 1) received an equivalent volume of normal saline (0.9 % NaCl). The animals were sacrificed by cervical dislocation after the experiment. Blood was collected and centrifuged to obtain clear serum which was used for the biochemical tests while whole blood was used for the hematological tests. The tested hematological parameter include: Packed cell volume (PCV) (Oscar, 1965), Hemoglobin concentration (Hb) (Oyewole, 1992) and White blood cell count (WBC) (Scham *et al.*, 1975), while the biochemical parameters include serum activities of Aspartate amino transferase (AST) and alanine amino transferase (ALT) (Reltman and Frankel, 1957), serum activity of alkaline phosphatase (ALP) (Babson *et al.*, 1966), bilirubin (Doumas *et al.*, 1973) and albumin (Doumas and Biggs, 1972).

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Statistical analysis

This includes mean \pm S.D, analysis of variance (ANOVA) and multiple range tests and student - T test. (Zar, 1984).

RESULTS AND DISCUSSION

Table 1 summarizes the result of hematological tests. These tested parameters: PCV, WBC and HB of the treated groups were not significantly ($P > 0.05$) affected when compared with the control. The effects of the extracts on some liver function parameters were given in Table 2. Also the results showed

that the extract did not significantly ($P > 0.05$) affect the serum activities of AST, ALT, and bilirubin. However, the serum albumin was significantly ($P < 0.05$) reduced when compared with control. The liver is the major site of intermediary metabolism and synthesis of many important compounds and detoxification of natural and potentially toxic compounds (Strove, 1989). Since, the major indicators (AST, ALT, ALP and bilirubin) of liver function were not affected, the plant may be said to have little or no hepatotoxic effect. Therefore, it may be relatively safe for consumption at the doses used in this study.

The effect of the extract on ethanol induced ulcer showed that the extract significantly and dose-dependently

TABLE 1: EFFECT OF ROOT EXTRACT OF *O. spinosa* ON HAEMATOLOGICAL PARAMETERS OF ALBINO RATS

Dose (mg/Kg)	PCV%	HB	WBC X10 ³
Control (Saline)	30.4 \pm 0.02	10.2 \pm 0.58	10.94 \pm 0.26
500	30.8 \pm 0.03	10.2 \pm 1.30	9.54 \pm 1.54
1000	33.6 \pm 3.53	10.98 \pm 1.24	11.28 \pm 1.18
1500	33.8 \pm 3.36	11.40 \pm 1.26	11.94 \pm 1.10

Values (mean \pm S.D)

PCV; Packed cell-volume, HB; Hemoglobin concentration, WBC; White blood cell

TABLE: 2 LIVER FUNCTION PARAMETERS OF ALBINO RATS TREATED *O. spinosa* ROOT EXTRACT

DOSE (Mg/Kg)(mg/100ml)	BILIRUBIN (IU/L)	AST (IU/L)	ALT (IU/L)	ALP (IU/L)	ALBUMIN (mg/100ml)
Control	0.76 \pm 0.02	10.80 \pm 0.37	10.20 \pm 0.20	7.90 \pm 0.05	4.16 \pm 0.25
500	0.58 \pm 0.06	11.60 \pm 0.40	10.20 \pm 0.20	7.40 \pm 2.45	3.90 \pm 0.10
1000	0.60 \pm 0.03	11.20 \pm 0.50	10.40 \pm 0.40	7.20 \pm 1.23	4.00 \pm 0.00
1500	0.62 \pm 0.06	11.8 \pm 0.20	10.00 \pm 0.00	7.80 \pm 1.23	3.36 \pm 0.37

Values (mean \pm S.D)

AST; Aspartate amino transferase, ALT; Alanine amino transferase, ALP; Alkaline phosphatase

TABLE 3: EFFECT OF *O. spinosa* ROOT EXTRACT ON ETHANOL-INDUCED ULCER

DOSE (mg/ Kg)	ULCER INDEX	%Ulcer protection
Control	5.00 \pm 0.50	
500	1.40 \pm 0.89*	72
1000	1.40 \pm 0.89*	72
1500	1.00 \pm 0.89*	80

*The mean difference is significant at $P < 0.05$ levels

decreased the ethanol induced ulcer Table 3. Peptic ulcer is undoubtedly believed to be due to an imbalance between aggressive (acid- pepsin) and defense (mucus) factors (Laurence *et al.*, 1999; Ezer, 1998). Antisecretory drugs have been found to be effective in the treatment of peptic ulcer diseases especially where excessive acid secretion is implicated (Bambery *et al.*, 1992; Mohammed and Hunt, 1994). This result suggested that the plant extract may possess anti-ulcerogenic property (Bertaccini and Scapignato, 1982).

Based on the findings of the present investigations, the extract appeared to be safe and at the same time possesses the potential of anti-ulcer agent. However the mechanism(s) of action not determined.

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