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EFFECT OF SUBCHRONIC ADMINISTRATION OF *Setaria megaphylla* STEUD (POACEAE) ON BIOCHEMICAL PARAMETERS OF RATS

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Abstract
The effect of subchronic administration of ethanolic leaf extract of *Setaria megaphylla* on biochemical parameters in rats was studied. The extract (240-720 mg/kg,p.o.) produced a significant increase in the levels of serum alkaline phosphatase (ALP), aspartate aminotransferase (AST), alanine aminotransferase (ALT), total protein, albumin, creatinine, total and conjugated bilirubin. However, the effect of the extract was dose dependent and was more pronounced with the highest dose. Thus, the extract is toxic to the liver and kidney.

Keywords: *Setaria megaphylla; toxicity*; *biochemical parameters*; *enzymes*; *hepatotoxic*; *nephrotoxic*;

INTRODUCTION

Setaria megaphylla (Steud) Dur and Schinz (Poaceae) also called broad-leafed brittle grass is a tall, robust, tufted, perennial grass used mainly as pasture grass. It occurs in tropical and subtropical areas of Africa, America and India where there is high rainfall (Oudtshoorn, 1999; Lowe, 1989). The plant is used traditionally by the Ibibio ethnic group in Akwa Ibom State, Nigeria in the treatment of various ailments including inflammation and diabetes. The plant has also been reported to possess antiplasmodial activity in vitro (Clarkson *et al*., 2004). The ethanolic leaf extract whose LD_{50} is reported to be 2.40 g/kg contains flavonoid, carbohydrate, terpenes, saponins, tanins, anthraquinones and cardiac glycosides and has hypoglycaemic and antidiabetic activity (Okokon and Antia, 2006). The present study was aimed at investigating the effect of subchronic administration of ethanolic leaf extract of *S. megaphylla* on some biochemical parameters of rats to establish any possible toxicity considering its medicinal importance in folk medicine.

MATERIALS AND METHODS

Plant materials

Fresh leaves of *S. megaphylla* were collected in November, 2004 at Anwa forest in Uruan, Akwa Ibom State, Nigeria. The plant was identified and authenticated by Dr. Margaret Bassey, a taxonomist in the Department of Botany, University of Uyo, Uyo, Nigeria. Herbarium specimen was deposited at the Faculty of Pharmacy Herbarium, University of Uyo, Uyo with Voucher No. FPHU 221. Fresh leaves (2 kg) of the plant were dried on the laboratory table for 2 weeks and reduced to powder. The powder 100 g was macerated in 95% ethanol (300 ml) for 72 hours. The liquid extract obtained was concentrated in vacuo at 40°C. The yield was 2.08% w/w. The extract was

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stored in a refrigerator at 4°C until it was used for the experiment reported in this study.

Animals

Albino rats, wistar strain (105-165 g) of either sex were obtained from the University of Uyo animal house. The animals were maintained on standard animal pellets and water *ad libitum*. Permission and approval for animal studies were obtained from the College of Health Sciences, Animal Ethics Committee, University of Uyo, Uyo.

Methods

The rats were weighed and randomly assigned on the basis of weight into 4 groups of 5 animals each. Animals in Group A, B and C were orally administered with 240, 480 and 720 mg/kg of the extract dissolved in 12% Tween 80 respectively in divided doses, while animals in group D were orally given normal saline equivalent to 5 ml/kg and served as control. Daily administration of the extract lasted for 21 days. Twenty four hours after the last administration, the animals were anaesthesized with chloroform vapour and dissected. Whole blood was obtained by cardiac puncture from each rat and collected into sample bottles devoid of anticoagulant. The samples were centrifuged for 10 minutes at 1000 rpm to obtain the sera. Serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase ALP, total protein, albumin, total and conjugated bilirubin and creatinine were determined using Randox test kits. All samples were analysed with a Winelight-Unican Spectrophotometer.

Statistical analysis

All data obtained were statistically analysed using student's *t*-test and values of $P<0.05$ were considered significant.

RESULT AND DISCUSSION

Administration of ethanolic leaf extract of *S. megaphylla* (240-720 mg/kg) to rats produced significant ($P<0.05$) increase in the levels of AST, ALT, ALP, total protein, albumin, creatinine, total and conjugated bilirubin compared to control. The degree of increase was dose-dependent. However, it is known that an increase in enzymatic activity of ALT, ALP and AST in the serum, directly reflect a major permeability or hepatic cell rupture (Benjamin, 1978). ALT is hepatospecific enzyme that is principally found in the cytoplasm of rats (Benjamin, 1978; Ringer and Dabieh, 1979). AST is present in high quantities in the cytoplasm and mitochondria of the liver and also in the heart, skeletal muscles, kidneys and brain (Benjamin, 1978; Ringer and Dabieh, 1979). Alkaline phosphatase is localised to bile duct and also found in other tissues like liver, bone and placenta (Klaassen and Watkins, 1999). The observed increase in AST and ALT portrays a possible damage to the liver probably pathology involving the cell membrane which causes the leakage of these enzymes from the liver. The increased levels of bilirubin suggest that the extract causes cholestasis in the liver. Similarly, the increase level of alkaline phosphatase reflects a possible damage to the bile duct, while increase in the creatinine level reflects pathological effects on renal tissues.

From the result of this study, it can be said that the ethanolic leaf extract of *Setaria megaphylla* demonstrated a serious dose dependent hepatotoxic as well as nephrotoxic effects at the doses administered.

Table 1: Effect of Ethanolic Leaf of *Setaria Megaphylla* on Biochemical Parameters of Rats

	Treatment (mg/kg)			
Parameter	**Control**	**240**	**480**	**720**
Total protein (g/dl)	6.60 0.57	6.70 0.10	6.82 1.03	8.00 0.02*
Albumin (g/dl)	4.35 0.35	4.05 0.05	3.25 0.05**	2.850 0.15**
ALT (IU/L)	40.00 0.45	41.00 0.45	45.50 0.50**	89.00 0.01**
AST (IU/L)	21.00 0.80	29.00 1.03**	32.00 2.21**	55.00 2.41**
ALP (IU/L)	235.50 1.13	249.0 0.90**	262.0 2.27**	274.5 2.02**
Total bilirubin (mol/l)	19.90 1.67	20.90 0.65	21.10 0.90	23.40 1.32*
Conjugated bilirubin (mol/l)	12.80 0.98	13.30 2.21	14.70 0.90	17.90 0.75**
Creatinine (mol/l)	222.50 2.85	191.0 2.01**	177.0 3.40**	141.5 2.00**

Data are expressed as mean SEM. *P<0.05; **P<0.01

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