GLOBAL JOURNAL OF PURE AND APPLIED SCIENCES VOL. 11, NO. 1, JANUARY 2005: 77 - 79
COPYRIGHT(C) BACHUDO SCIENCE CO. LTD. PRINTED IN NIGERIA. ISSN 1118-0579

STUDIES ON THE EFFECTS OF AN ALCOHOL EXTRACT OF THE LEAVES OF *TELFAIRIA OCCIDENTALIS* ON ALOXAN INDUCED DIABETIC RATS.

A. OLORUNFEMI ESEYIN, C. ARNOLD IGBOASOIYI, HERBERT MBAGWU, EKAETE UMOH and F. J. EKPE

(Received 1 August 2002; Revision Accepted 2 December 2003)

ABSTRACT

The effect of 96% ethanol extract of the leaf of *Telfaria ocidentalis* on alloxan induced diabetic rats were investigated. A dose of 500mg/kg of the extract was orally administered daily to the test animals for 9 days while the control animals received saline. The following biochemical parameters were evaluated: haemoglobin, glucose, cholesterol, total protein, proteins fractions, Alanine Amino transferase (ALAT) and Aspartate Transaminase (ASAT) levels. The weight of animal were also monitored. Glucose concentration and ASAT/ALAT quotient increased while ALAT activity decreased significally in the test animal compared with control ($p<0.05$). The extract also enhanced the growth of the diabetic animals. The extract did not show hypoglycemic effect.

KEYWORDS: Telfairia occidentalis, diabetes, biochemical parameters.

INTRODUCTION

It has been estimated that there will be a 42% increase from 51 to 72 million diabetic adults in the developed countries, and a 170% increase, from 84 to 228million, in the developing countries from 1995 to the year 2025. In the year 2025, over 75% of people with diabetes will reside in developing countries as compared with 62% in 1995 (Hilary et al 1998) Enriching the diet with natural fibre, complex carbohydrate, vegetable protein, antioxidants and minerals all of which are readily obtained from plants is encouraged. A lot of benefits to the management of diabetes can be gained from the use of "natural". dietary adjuncts as functional foods (Caroline, 1998) *Telfaria occidentalis* (i.e. fluted pumpkin) which is a member of the cucurbitaceae family is widely cultivated in southern Nigeria. It is a very popular vegetable because of its leaf which is rich in proteins (Bosa et al, 1983; Okigbo, 1977) and its seed which contain valuable liquids (Ezugwu et al, 2000; odemena et al, 1998) The leaf extract of the plant is used by traditional medical practitioners in the treatment or management of wide-ranging ailments such as anemia, insomnia and restlessness, stress and hypertension, cancer, premature aging, liver problems e.t.c (Elizaeth, 1998 and Godwin, 2000). This work was undertaken to determine whether the leaf extract could be beneficial to diabetic rats.

MATERIALS AND METHOD

(a) **Extraction**
Two hundred grams of fresh leaves of *Telfairia occidentalis* collected randomly from a garden in University of Uyo were cut into pieces, ground in a mortar and extracted with 200ml 96% ethanol in a soxhlet apparatus. The extract was concentrated in vacuo and dried in a desiccator.

(b) **Preparation of diabetic rats**
Albino rats were made diabetic by intraperitoneal injection of alloxan monohydrate (150mg/kg). They were allowed to rest for 7 days for glucose level to stabilize. The animals had free access to both food and water.

(c) **Administration of Extract**
Twenty diabetic rats were divided into two equal groups. Group A (control) received only 2ml water orally. Group B received oral administration of 2ml of the extract (500mg/kg) each. This dose was chosen based on an earlier work. (Eseyin et al, 2000) Administration of saline and extract were done daily for 9 days.

(d) **Collection of Blood**
The animals were fasted overnight on the 9th day. They were killed on the 10th day and dissected. Blood was collected directly from their hearts with needles and Syringes.

(e) **Processing of blood**
Fresh whole blood (0.05ml) was directly used for haemoglobin determination. Blood was allowed to clot and centrifuged with immufuge (Baxter) centrifuge at 3000g for 10 minutes to obtain serum, which was used for other analyses.

(f) **Biochemical Analysis**
Appropriate Kits (Randox Laboratories Ltd; U.K.) were used in the determination of haemoglobin, albumin, glucose, cholesterol, aspartate transaminase (ASAT) and alanine transaminase (ALAT). Total proteins and protein fractions were determined according to the methods described by Stroev and Makarova (1989).

A. OLORUNFEMI ESEYIN, Department of Pharmaceutical and Medicinal Chemistry, University of Uyo, Uyo - Nigeria
C. ARNOLD IGBOASOIYI, Department of Pharmaceutical and Medicinal Chemistry, University of Uyo, Uyo - Nigeria
HERBERT MBAGWU, Dept. of Pharmacology and Toxicology, Faculty of Pharmacy, University of Uyo, Uyo - Nigeria
EKAETE UMOH, Department of Pharmaceutical and Medicinal Chemistry, University of Uyo, Uyo - Nigeria
F. J. EKPE, Department of Pharmaceutical and Medicinal Chemistry, University of Uyo, Uyo - Nigeria

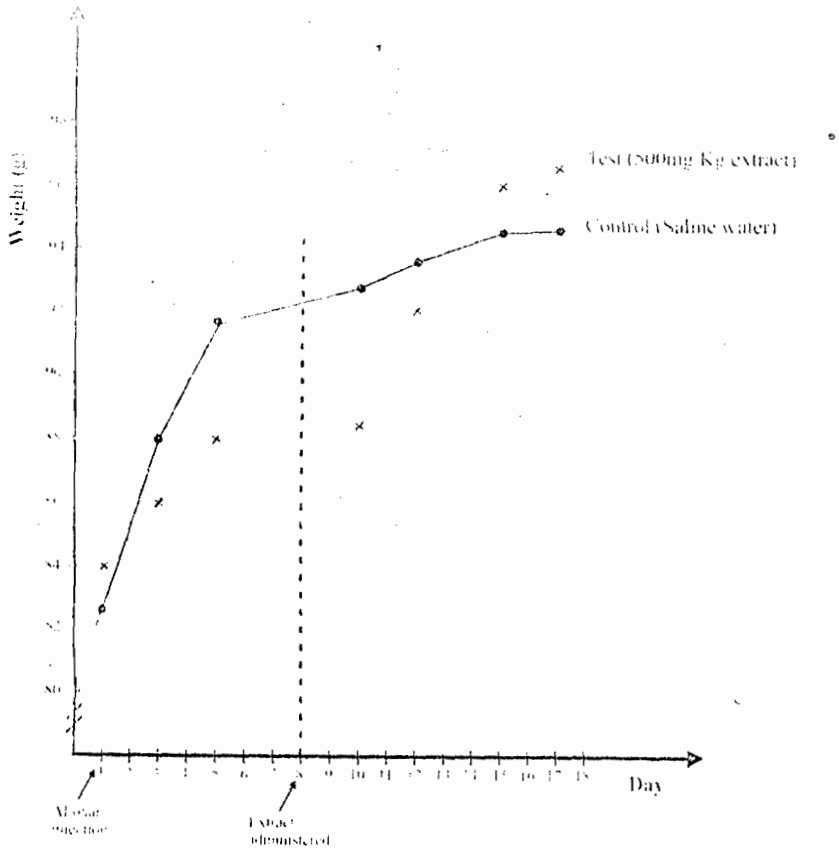

Figure 1: Weight of Animals (g)

Determination of serum proteins – About 9.9ml of sodium chloride solution (saline water) was added to 0.1 ml of serum in a test tube. Absorbance of the mixture was measured against the control sodium chloride solution using UV spectrophotometer (Unicam 8700 series), 1cm cells. Protein concentration (g/L) was obtained from Calcar's empirical formula: 1.45 E280nm – 0.74 E260nm.

ii) **Determination of protein fraction in serum** – six test tubes were numbered 0 – 5.10ml of distilled water was transferred to test tube O (control) and 5ml of corresponding phosphate buffer working solutions (1 – 4) were added into tubes 1-4. 0.5 ml of blood serum, 0.74ml distilled water, and 3.75ml of phosphate buffer stock solution were added to tube 5 and mixed thoroughly, 1ml of mixture in tube 5 was added to the tube (control), and 0.5ml to each of the tubes 1 - 4. The contents were stirred. After 15 minutes, absorbance was measured for solution. Nos. 1 – 4 against tube 0 (control) at 620nm using 1cm thick cells. Protein fractions were calculated as follows:

Albumin,	E	=	E1 - E2
α - globulin,	E	=	E2 - E3
β – globulin,	E	=	E3 – E4
γ – globulin,	E	=	E4
	E total	=	E1 + E2 + E3 + E4
Protein fraction x (%)		=	$\frac{\text{E fraction x 100\%}}{\text{E Total}}$

g. **Statistical Analysis**

Mean values of parameters are expressed with SEM. Student's t test was used to check their level of significance.

RESULTS AND DISCUSSION

A summary of the results obtained is given in table 1

Only the concentration of glucose, activity of ALAT and ASAT/ALAT quotient were significally affected (at 95% confidence interval or $P<0.05$). While there was an increased glucose level and ASAT/ALAT quotient, there was a decrease in activity of ALAT in the test animals as compared with control animals. The extract did not have any helpful effect on the hyperglycaemic state of the

Table 1: Effects Of Extract On Biochemical Parameters

S/N		Test (n = 10)	Control (n = 10)
1.	Haemoglobin (g/dl)	15.64 ± 2.94	17.28 ± 2.89
2.	Albumin (g/dl)	3.84 ± 0.41	4.188 ± 0.30
3.	Glucose (mg/dl)	47.58 ± 8.52	36.39 ± 7.15*
4.	Cholesterol (mg/dl)	433.80 ± 81.38	400.56 ± 47.74
5.	Total proteins (g/l)	0.810 ± 0.168	0.778 ± 0.190
6.	Albumin (%)	53.69 ± 5.36	56.55 ± 3.48
7.	α – globulin	14.05 ± 5.37	14.05 ± 1.65
8.	β – globulin	20.35 ± 4.91	16.77 ± 4.41
9.	γ – globulin	11.90 ± 1.73	12.63 ± 4.79
10.	Albumin/globulin quotient	1.182 ± 0.24	1.314 ± 0.19
11.	ASAT (u/l)	71.25 ± 16.52	79.0 ± 15.17
12.	ALAT u/l)	78.565 ± 15.13	175.31± 63.66*
13.	ASAT/ALAT quotient	0.907	0.451*

*P < 0.05

animals. Increased ALAT activity with simultaneous decrease in ASAT/ALAT quotient is an indication of liver problems such as cirrhosis and hepatitis (stroev and makarova, 1989). The result obtained is the direct opposite of this scenario.

Figure 1. shows that the weight of test animals increased tremendously as from the second day of the administration of extract up to the day the animals were sacrificed. Diabetes was observed to retard rate of growth in both control and test animals. Two days after the administration of extract, the rate of growth of the test animals increased tremendously. These findings seem to suggest that the extract has some beneficial effect on the growth of diabetic animals. The increases in cholesterol and the protein level in test animal compared with control were not significant ($P<0.05$). Similar work on normal rats showed that ethanol extract of the leaf of *T. Occidentalis* lowered cholesterol level, increased total protein and α – globulin fractions significantly ($p<0.05$) (Eseyin et al, in press).

It is difficult at this stage to pass a good judgment on the usefulness of this extract in the management of diabetes since the extract did not show any hypoglycaemic effect.

REFERENCES

Bosa E. O. and Mbeugu, C. M., 1983. Fluted pumpkin, Telfairia occidentalis. West African vegetable Corp. Econ Bot 37(2): 145 – 149.

Caroline Day, 1998. Traditional plant treatments for diabetes mellitus: pharmaceutical foods British J. of Nutr. ,30: 5-6.

Elizabeth, K., 1998. Medicinal values of fluted pumpkin leaves. The Guardian, Thursday, July 30, p. 26.

Eseyin O. A., Oforah E. and Dooka B. D., 2000. Preliminary study of the hypoglrcaemic action of the extract of leaf of Telfairnia occidentalis in Normoglycemic Guinea pigs. Global journal of pure and Applied Sciences 6 (4): 639-641.

Ezegwu, C. O and Nwuudo N. J., 2000. Studies on Telfairia occidentalis (fluted pumpkin) and the characterization of fixed oil from the seed Nig, J. nat. prod. And Med. 04: 37-41.

Godwin, I., 2000. Fluted pumpkin – A green that nourishes, protect and heal. Weekend Vanguard: Nature cures http/wwe..Vanguardngr.com/wk 506200/no 10/070. Ltm.

Hilary, K, Ronald E. A., William, H. H., 1998. Global Birden of diabetes, 1995-2025. DiabetesCare, 21 (9): l414-1431.

Jerry E. A., 1987. Some Biochemical Evaluation of fluted pumpkin seed J. Sci. Food Agric. 40: 151-155.

Odoemena, C. S. and Onyeneke, E. C., 1988. Seeds. 1st Agric Conf. on Biochem of lipids, 147-151.

Okigbo, B. N., 1977. Neglected plant of horticultural and nutritional importance in traditional farming system of tropical Afriac.Act.Hortic; 55: 131-149.

Stroev, E. A and Makarova, V. G., 1989. Laboratory manual in Biochemistry. Mir publishers Moscow.