

HYPOGLYCEMIC ACTIVITY OF AQUEOUS LEAVE EXTRACT OF *NEWBOULDIA. LAEVIS* ON ALLOXAN INDUCED DIABETES IN MALE ALBINO RATS

AJAH .O.^{1,3}, UNEGBU .C. C.², UZOMBA N.I.¹, NNAOMA I.E.³, AND CHINYERE I.G.¹

1. Department of Biochemistry, Federal Polytechnic Nekede
2. Department of Chemistry, Federal Polytechnic Nekede
3. Department of Biochemistry, Michael Okpara University of Agriculture, Umudike NIGERIA

ABSTRACT

Medicinal plants have great usefulness in the management of chronic diseases. The aqueous extract of *Newbouldia. laevis* was administered to male albino rats in which diabetes had been induced using alloxan (120mg/kg body weight). After oral administration at a dose of 200mg/kg body weight for two weeks, the result revealed reduction in the elevated blood glucose level by 30.40%. Treatment with known antidiabetic drug, glibenclamide (5mg/kg body weight) lowered the blood glucose by 28.70% indicating significant improvement in the activity of the extract.

Keywords: Hypoglycemic, *Newbouldia laevis*, antidiabetes, activity.

INTRODUCTION

Diabetes is a chronic metabolic disorder which is characterized by elevated blood glucose level as a result of the diminished production of insulin or resistance to its action (Kameswara *et al.*, 2009). Traditional medicinal practice has existed in Africa for centuries since man came into being (Omonkhelin *et al.*, 2011). The plant *Newbouldia laevis* is a fast growing evergreen shrub which belong to *Biggnoniales* family. It is commonly called boundary tree and locally called *aduruku* in hausa, *ogirisi* in igbo and *akoko* in yoruba languages of Nigeria (Usman and Osuji, 2007). The plant leaves are widely used in the treatment of diarrhea, dysentery, fever, convulsion, epilepsy and to stop vaginal bleeding in threatened abortion. (Omonkhelin *et al.*, 2011). This study was designed to test the hypoglycaemic effect of the aqueous extract of the leaves of *Newbouldia laevis* on alloxan induced diabetes in male albino rats, and to investigate if the leave can truly be used in the management of diabetes mellitus (Arbonnier, 2004).

MATERIALS AND METHODS

Plant material

The leaves of *Newbouldia laevis* were collected from Orlu area in Imo State, Nigeria. The plant was identified by Mr. Duru of the Department of Environmental biology, Federal Polytechnic Nekede.

Extract preparation

The leaves of *Newbouldia laevis* were air dried for several days and then ground into fine powder. 300 g of the powdered leaves was soaked in 500ml of distilled water inside a conical flask and left for two days. Filtration was carried out using a funnel and filter paper. The extract was concentrated in an evaporating dish over a hot water bath.

Experimental animals

Adult male albino rats were used for this study. The animals were obtained from the animal house of the Department of Pharmaceutical Technology, Federal Polytechnic Nekede, Imo State. They were kept in standard cages in a well-ventilated room, fed with standard growers mash (Grand Feeds and Flour Mills).

Toxicity test

The toxicity test for investigating median lethal dose 50 (LD50) in healthy rats was carried out in four steps. Animals were divided four groups (1-4) of 4 rats each, and were administered orally by gavaging 1000, 2000, 3000, 4000mg/kg of the extract respectively. The rats were observed for food consumption, behavioral changes such as excitement, nervousness, dullness, alertness and death (if any) continuously for 1h after treatment and then 4h and thereafter over a period of 72h. (Rambir *et al* 2011)

Induction of diabetes mellitus

Sixteen male albino rats were used. The rats were fasted overnight prior to injection with alloxan dissolved in normal saline at a dose of 120 mg/kg. After 48 hours, rats with blood glucose levels from 190 mg/dl and above were considered diabetic and were used for this research (Omonkhelin *et al.*, 2011).

Antihyperglycemic treatment

The alloxan-induced diabetic male albino rats were placed in 4 groups of 4 rats each and treated as follows: group 1 (normal healthy rats) received normal saline orally for 14 days; group 2 were diabetic control (untreated diabetic rats); groups 3, diabetic rats received orally 200mg/kg of the extract, for 14 days, the 4th group (diabetic) received 5mg/kg of known antidiabetic drug, (glibenclamide) orally for 14 days of the experiment.

Measurement of blood glucose levels

All blood samples from the various rats were collected by cutting the tail-tip of the overnight fasted rats. Blood samples for fasting blood glucose test were collected at 0, 7th and 14th day following treatment. Measurement of the blood glucose level (mg/dl) was carried out using Accu- Chek Active glucometer and results were recorded (Rheney and Kirk, 2000).

Statistical Analysis

The results were expressed as mean of each group. The statistical analysis comparing untreated rats and treated was performed using paired t test and others was performed using analysis of variance (one way ANOVA). $P < 0.05$ was considered significant.

RESULTS AND DISCUSSION

The hypoglycemic effect of the extract at 200 mg/kg dose of the aqueous extract of *Newbouldia laevis* was shown in figure 1 below. In the toxicity test, after administration of 1000, 2000, 3000 and 4000mg/kg of the extract, no sign of excitement, nervousness was

observed. There was a sign of dullness at the 4000mg/kg administration but there was no death in all doses. Food consumption was normal in all animals treated with the extract. This implies that the plant leave is safe for consumption at moderate dose since no mortality was seen (4000mg/kg body weight). The diabetic control male albino rats were compared with normal healthy control albino rats (negative control). The diabetic male albino rats treated with the AENL were compared with the untreated diabetic rats. The fasting blood glucose level on treatment with AENL showed significant ($p < 0.05$) reduction by 15.63% (from 224 to 189) on day 7 and on day 14, the fasting blood glucose level reduced to 131.54 which is equivalent to 30.40%.

The fasting blood glucose level of diabetic male albino rats treated with glibenclamide (standard drug) showed reduction after 7 days by 11.43% (from 245 to 217mg/dl) and on the 14th day, it reduced to 154.72mg/dl which is equivalent to 28.70%. There was significant ($p < 0.05$) difference on the treatment when compared with the untreated diabetic control. The significant reduction on the blood glucose level of diabetic male albino rats treated with AENL is an indication that *Newbouldia laevis* leaves can be used in the management of diabetes mellitus.

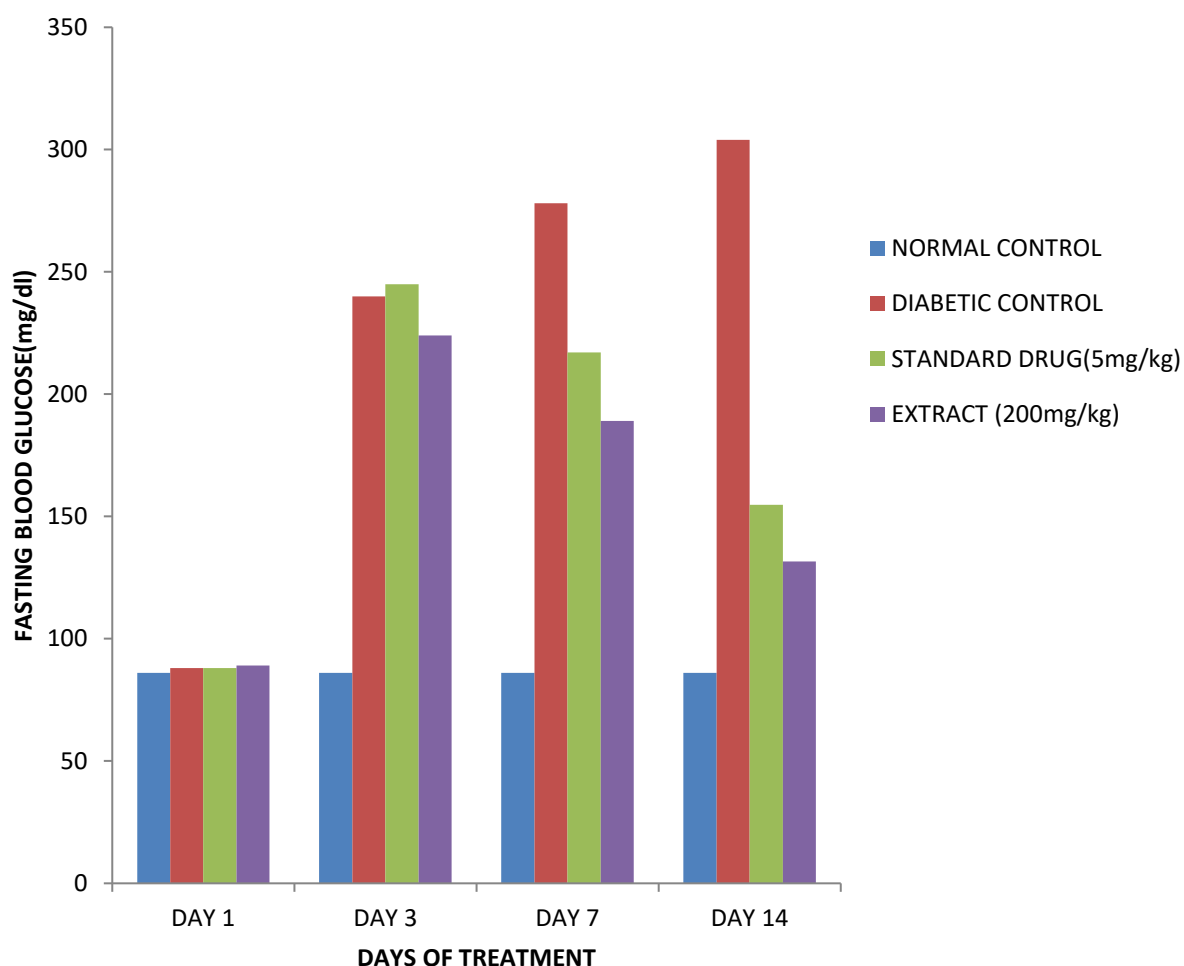


Figure 1. effect of aqueous extract of *N. laevis* on FBG in rats

CONCLUSION

The aqueous leaf extract of *Newbouldia laevis* showed hypoglycemic activity in male albino rats and lethal dose studies also show it to be relatively safe since no mortality was seen at the concentration administered, This study therefore suggest the use of *Newbouldia laevis* leave extract in the management of diabetes mellitus.

REFERENCE

- Abdullahi M., Fatimah O. R., Abubakar N. S., Jonathan Y., Labake A. F. and Emmanuel O. O., (2014). Assessment of Phytoconstituents and Antidiabetic Activity of the Crude Extract and Partitioned Fractions of *Maytenus senegalensis* (Lam.) Exell (*Celastraceae*) Root Bark. *International Research Journal of Pure & Applied Chemistry* 4(6): 746-761
- Omonkhelin J. O., Fabian C. A., and Mercy O. (2011). Effect of Ethanol Leaf Extract of *Newboulda Laevis* on Blood Glucose Levels of Diabetic Rats. *Tropical Journal of Pharmaceutical Research*.10 (3): 249-254.
- Rambir S., Aarti S., Poonam S., (2011). Hypoglycemic, Antidiabetic and Toxicological evaluation of *Momordica dioica* fruit extract in alloxan induced diabetic rats. *Journal of Pharmacology and Toxicology*. 6(5):454-467.
- Rheney C. C, Kirk J. K (2000). Performance of three blood glucose meters. *Ann Pharmacother*; 34: 317-321.
- Arbonnier M. (2004) Trees, shrubs and lianas of West African, *Dry zone*. CIRAD. Margra GMBH MNHN. Cote D'ivoire. p 194
- Usman H, Osuji J. C. (2007). Phytochemical and in vitro antibacterial assay of the leaf extract of *Newboulda laevis*. *Afr J. Trad CAM*; 4: 476-480
- Kameswara R. B., Kesavulu M. M., Giri C. H. (2009). Antidiabetic and hypolipidemic effects of *Momordica cymbalaria* Hook fruit powder in alloxan-induced diabetic rats. *J. Ethnopharmacol*, 67: 103-109