

Original article

Effect of extract of *Abrus precatorius* on blood glucose concentration of alloxan induced diabetic Albino Wistar Rats

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Abstract

Objective: To evaluate the effect of extract of *Abrus precatorius* on blood glucose of alloxan induced albino wistar rats. **Methods:** Experimental animals received daily oral administration of extract of *Abrus precatorius* for 14 days. The effect of 200 mg/kg dose was studied during the treatment period. **Results:** There was a significant reduction in blood glucose concentration ($P < 0.05$) with the mean blood glucose of the different groups as 5.0 ± 0.3 for normal control, 7.0 ± 0.4 for diabetic control group and 4.0 ± 0.2 for diabetic treated group. **Conclusion:** The findings of this study suggest that extract of *Abrus precatorius* has hypoglycemic effect.

Keywords: *Abrus precatorius*; Hypoglycemia; Diabetes; Hyperglycemia

INTRODUCTION

There are more than 125 million persons with diabetes worldwide today and by 2010 this number is expected to approach 220 million. Type 1 and 2 diabetes mellitus (DM) are both increasing in frequency. Factors that contribute to the increasing incidence of type 2 DM include genetic factors, increasing age, obesity, sedentary lifestyle and low birth weight. On rare occasions, diabetes results from point mutations in the insulin gene. A positive family history is predictive for the disease. Studies of identical twins show 70 % – 80 % concordance for developing type 2 DM. There is a high prevalence of type 2 DM. Persons with more than 20 % over their ideal body weight also have a greater risk of developing type 2 DM. The presence of high-titer islet-cell antibodies (ICA) confers a very high risk for the development of type 1 DM in first-degree relatives. DM with all

its fatal complications^[1] is a major public health problem in the developed as well as developing countries. It is a metabolic disease characterized by hyperglycemia and glycosuria due to absolute or relative lack of insulin^[2]. DM is further characterized by an inability to reabsorb water resulting in polyuria, polydipsia and polyphagia. It can be complicated disorders of lipid metabolism^[3]. Medicinal plants with hypoglycemic properties are increasingly being sought for in the treatment of this debilitating condition.

There are over 1 000 species of plant, out of which only very few including *Abrus precatorius* the plant in this current research effort that have been widely used by traditional healers for the treatment of DM. *Abrus precatorius* (leguminosae) is a perennial plant that grows in tropical and subtropical areas of the world. It has been used for the treatment of various diseases such as colds, cough, convulsion, fever, rheumatism, conjunctivitis and ulcers by traditional healers. Nath and Sethi reported its abortifacient properties^[4]. Rain-tree 2004 reported its use in the treatment of diabetes and chronic nephritis^[5]. This current study therefore is to evaluate the effects of extract of *Abrus precatorius* on hyperglycemia in-

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duced by alloxan in rats.

MATERIALS AND METHODS

Albino rats (12) were obtained from the University Animal House. These animals were kept in large plastic cages and acclimatized for at least two weeks before the commencement of the experiments. The animals were fed with a standard diet of growers mash supplied by Gee Pee Nigeria Limited and had access to clean drinking water *ad libitum*. The fresh leaves of the plant *Abrus precatorius* were dried in the open air in a shade for a period of about four weeks prior to extraction process. The water extract of the plant was obtained by decoloration in accordance with the general process described in the USP XII^[6] to yield an extract of 4.0 % w/v, which was used in the experiment. Normal saline and 5 % alloxan monohydrate were purchased from reputable chemical store in Port Harcourt.

Twelve albino wistar rats were used for this study. 2 out of the 3 groups were made diabetic with single dose of alloxan monohydrate 5 % (125 mg/kg, I. P) dissolved in normal saline and confirmed on third day post administration. Fasting blood glucose of the rats was determined at the start and end of the experiment. Treatment was by oral compulsion for 14 days. The animals were grouped as follows:
Group I : Control, given only normal saline
Group II : Alloxan induced diabetic made with a single dose of alloxan monohydrate 5 % dissolved in normal saline (125 mg/kg, I. P)
Group III : Diabetic rats treated with extract of *abrus precatorius*(4.0 % w/v).

Blood was collected by cardiac puncture 24 hrs after completion of treatment. Blood glucose was estimated by enzymatic colorimetric method.

RESULTS

Blood glucose concentration of the rats after 14 days of treatment with extract of *abrus precatorius* were determined using the methods described above. There was a significant reduction of the blood glucose levels from a mean value of 7.0 mmol/L in the diabetic non-treated group to 4.0 mmol/L for the diabetic treated group. For the control group the blood glucose levels after 14 days of treatment were as follows: 5.6 mmol/L, 5.5 mmol/L, 5.4 mmol/L, 5.6 mmol/L, with a mean of 5.5 mmol/L for the control group. On the other hand, the blood glucose levels after 14 days of treatment for the diabetic non

treated group were as follows: 7.2 mmol/L, 6.8 mmol/L, 7.4 mmol/L, 6.9 mmol/L, with a mean of 7.0 mmol/L for the diabetic non treated group. Interestingly, the blood glucose levels after 14 days of treatment for the Diabetic treated group were as follows: 4.2 mmol/L, 4.4 mmol/L, 4.1 mmol/L, 4.2 mmol/L, with a mean of 4.2 mmol/L for the Diabetic treated group.

DISCUSSION

The blood glucose levels in group III animals treated with extract of *Abrus precatorius* decreased significantly ($P < 0.05$) compared to group I and group II. The levels in the group II treated animals returned to normoglycemic values. The results of this current study indicate that indeed extract of the plant *Abrus precatorius* possesses hypoglycemic activity and may explain the usefulness of the plant in the treatment of DJM by traditional healers. However it is not known how this extract of *abrus precatorius* acts to produce this observed hypoglycemic effect. It is also not known what the toxic side effects of this plant are in its usage. We therefore state that further studies are required to elucidate the toxic effects of this plant as well as identification of the active ingredient responsible for this hypoglycemic action of this plant.

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REFERENCES

- 1 Dey L, Attele SA, Yuan CS. Alternative therapies for type 2 diabetes. *Alt Med Rev* 2002;7 (1) : 45 – 58.
- 2 Haslett C, Childers ER, Hunter JA, Boon NA. *Davidson principles and practice of medicine*. 18th ed. New York: Churchill Livingstone;1999.
- 3 Ononogbu IC. The role of lipid in the study and diagnosis of diabetes mellitus. *Proceedings of the 1st African Conference on Biochemistry of Lipids*. 1998;1 : 57 – 69.
- 4 Nath D, Sethi N. Commonly used abortifacient plants with special reference to their teratologic effects. *Ethnopharmacology* 1992;36(2) : 147 – 154.
- 5 Rain-Tree. Available at <http://www.rain-tree.com/abrus.htm>. (2004).
- 6 Origination for Economic Operation and Development. *Guidance document on acute oral toxicity testing series on testing and assessment No. 24*. Paris: Environment, Health and Safety Publication; 2001.

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