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# Effect of Anogeissus leiocarpus leaf extract on blood glucose level in rats

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الملخص:

تمت دراسة المستخلص الميثيلى لاوراق نبات الصهب ***Anogeissus leiocarpus*** علي الجرذان لايضاح أثره الخافض لمستوي الجلكوز في الدم .

أثبتت الدراسة أن المستخلص عند اعطائه للجرزان بجرعة 100 ملج / كجم له أثر واضح خافض للجلكوز بعد ساعتين .

ولكن عند زيادة الجرعة الي 200 ملجم / كلجم ليس له اثر يذكر علي مستوي الجلكوز . واتضح أيضاً أن الاستمرا رفي زيادة الجرعة الي 400 ملجم / كلجم يؤدي الي نتيجة عكسية حيث يرفع مستوي الجلكوز في دم الجرزان .

**Abstract:**

The effect of the methanolic leaf extract of *Anogeissus leiocarpus* was studied in normal wister albino rats pretreated with a loading dose of glucose to explore its hypoglycaemic activity. Significant hypoglycemic effect was observed ($P< 0.05$) at a dose of 100 mg/kg B.W. 2 hours following treatment. At a dose of 200mg/Kg B.W. the plant extract showed no significant change in blood glucose level, while at a dose of 400mg/kg B.W. there was hyperglycaemic effect 2 and 4 hours following/after treatment.

**Introduction:**

*Anogeissus leiocarpus* or *conocarpus leiocarpus*, family: Combretaceae and locally named as Al-Sahab. It is a tree up to 20 cm high. It grows widely in Sudan in Kassala province, Kordofan and Bahar Elgazal provinces, upper White Nile province, Bahar Eljebel, Darfour and Red Sea provinces [1]. Phytochemical analysis on the plant bark revealed the presence of 3,3,4-t Tri- methyle flavellagic acid (1) and 3,3- dimethyle ellagic acid [2]. The gum exudes was found to be rich in amino acids such as histidine, glutamic acid and threonine [3]. In addition the plant was found to be rich in sugars such as L. arabinose, D-xylose, D-galactose, D-mannose and D-glucuronic acid. Further graded hydorlysis afford complex mixture of neutral and acidic oligosaccharides [4]. Also the chromatographical analysis showed the presence of appreciable amount of inorganic elements of which calcium and potassium were in high concentration [5]. Previous biological studies showed the antibacterial activity of the plant [6]. In Sudan the leaf extract of *Anogeissus leiocarpus* is used extensively for treatment of diabetes mellitus (personal communications,2001) and the present study is an attempt to evaluate scientifically this claimed activity

**Experimental:**

**Plant material:**

The leaves of the plant were collected from Rashad area in south Kordofan province in November, 2001 and the plant was authenticated by the botanists in Medicinal and Aromatic plants Research institute (MAPRI), Khartoum, Sudan. A voucher specimen was deposited in the herbarium of the institute (MAPRI).

**Preparation of the extract:**

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185 g of air dried coarsely powdered leaves were extracted with petroleum ether and methanol 95% respectively using soxhlet extractor. The methanolic extract then evaporated under reduced pressure till dryness, and the yield was calculated. The extract was kept in refrigerator and a known weight was resuspended in distilled water at the day of experiments.

**Determination of plasma glucose:**

This experiment was carried following the method described by Konuklugil and his coworkers, (1997). A total of 24 wister albino rats weighing 100 – 150 g were used in this experiment. They were allotted to four groups (A, B, C and D) with six rats each. They were housed at the pharmacology laboratory, Medicinal and Aromatic Plants Research Institute, NCR, Sudan with free access to water and fed suitable diet to maintain their fasting plasma glucose level with the range mentioned previously in literature (4.2-6.1mmol/L).

On the days of the experiment the animals were fasted overnight (18hours) and the fasting glucose level was determined for each animal (Zero time). All the animals then were injected intraperitoneally with a loading dose of glucose (2g/kg B.W.) and in addition the test groups B, C and D were immediately administered orally with *Anogeissus leiocarpus* methanolic extract redissolved in water at a dose of 100 – 200 and 400 mg/kg. B.W. respectively group A served as a control and was given orally distilled water (10mI/kg.B.W). The blood samples were taken at the intervals of 1h, 2h and 4 hours after glucose loading and plasma blood glucose level was measured.

**Statistics:** Results were expressed as Mean ± S.E and analyzed by student t-test. They were considered significant at $P \leq 0.05$.

**Results and Discussion:**

The results, shown in table (1) showed that the methanolic leaf extract of *Anogeissus leiocarpus* had a hypoglycaemic effect at a dose of 100mg/kg B.W. 2hours following treatment. At a dose of 200 mg/kg B.W. there was no significant effect on blood glucose level. While at a dose of 400mg/kg B.W. there was a hyperglycaemic effect 2 and 4 hours flowing treatment. These results indicated the presence of a hypoglycaemic agent in the studied plant extract that exerted a maximum effect at a dose of 100mg/Kg. B.W. In larger doses the glucose lowering effect of the extract was abolished or even superseded by the by extract high contents of sugars [4]. These findings showed that the maximum hypoglycaemic response was exerted by the lower dose of the extract (100mg/kg B.W). However, administration of higher doses (200 mg, 400 mg/ kg B.W) were not associated with further increase in the hypoglycaemic effect but the effect of the extract high contents of carbohydrate predominates. Similar experimental and clinical trials showed the hypoglycaemic effect of the plants *Nelimbo nucifera* and *Hexachlamys edulis* [8], [9].

**Table (1) The effect of the methanolic leaf extract of *Anogeissus leiocarpus* on blood glucose level**

| Treatment | Time after glucose loading | | | |
|---|---|---|---|---|
| | 0 Hour | 1 Hour | 2 Hour | 4 Hour |
| Group A (control) D.W. | 88.0 ± 2.12a | 91.0 ± 4.31a | 88.4 ± 4.31a | 71.0 ± 4.69a |

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| | | | | |
|---|---|---|---|---|
| Group B<br>Ext 100 mg/kg B.W. | 80.0 ± 4.79a | 95.0 ± 5.90a | 69.9 ± 4.04b | 68.5 ± 3.75a |
| Group C<br>Ext 200 mg/kg B.W | 78.0 ± 1.22a | 82.4 ± 8.50a | 79.5 ± 5.34a | 71.5± 9.50a |
| Group D<br>Ext 400 mg/kg B.W | 83.0 ± 4.14a | 71.7 ± 9.31a | 133.0 ± 4.30c | 123.0 ± 4.23b |

Means within the columns designated by different letters are significantly different ($P<0.05$) Values are mean ± SE

D.W. = distilled water

Ext = *Anogissus leiocarpus* methanolic leaf extract, redissolved in water.

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