Effect of the aqueous leaf extract of Anchomanes difformis on the glucose level and organ/body weight ratio of Wistar rats

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ABSTRACT
Anchomanes difformis (Araceae) is a plant with many reported therapeutic properties. This study is aimed at testing the blood sugar level and organ-to-body weight ratio effect of the aqueous leaf extracts of A. difformis, as measures of toxicity of the plant in a short term. Blood sugar test was done using a handy glucometer while organ-to-body weight ratio analysis was carried out following standard methods. Results got show that A. difformis had no effect on the blood glucose level and organ-to-body weight ratio on rats. A robust toxicity analysis of A. difformis aqueous leaf extract to further find out more proofs that the plant is safe for human subjects is recommended.

KEY WORDS: Anchomanes difformis, blood sugar level, glucose, organ-to-body weight ratio
is used in treating cases of dysentery (Oyetayo, 2007). The rhizome of *A. difformis* has analgesic and antipyretic activities (Eke *et al.*, 2013). The aim of this study is to test the effect of the aqueous leaf extract of *A. difformis*, on the glucose level and organ-to-body weight ratio in Wistar rats, after 21 days daily administration.

**MATERIALS AND METHODS**

**Plant Material and Preparation of Extract**

Fresh leaves (2,500 kg) of *A. difformis* were got from a bush in Ekosodin village in Ovia North East of Edo state. The plant was authenticated by Professor MacDonald Idu of the Department of Plant Biology and Biotechnology. The fresh leaves were washed in distilled water and blended using a kitchen blender. The filtrate was dried using an FD-10M freeze dryer at a temperature of - 4°C at the National Centre for Energy and Environment (NCEE), Benin City. The dried filtrate amounted to 42% yield.

**Animals**

Rats of either sex weighing 165 ± 2.51 (mean ± standard error of mean [SEM]) were got from the livestock market, Aduwawa, Benin City. They were allowed to acclimatize for 2 weeks in the Animal House and fed with grower’s marsh and drinking water *ad libitum* for the 21 days. Experimental methods followed the recommendations provided in the “Guide for the care and use of laboratory animals” (National Academy Press, 1996).

**Toxicity Studies**

Rats weighing between 120 and 225 g were used in this study. They were divided into four groups of five animals each; two males and three females. The extract of *A. difformis* was administered orally at varying doses of 500, 1,000 and 2,500 mg/kg to the animals. They were observed for any mortality during experimentation on a daily basis for the 21 days of this study. A group of animals treated with distilled water served as the control group. Blood was obtained from the abdominal aorta with a 1 ml syringe. Droplets of the blood were placed on glucose strips and values got using the ACCU-CHEK glucometer.

**Data Presentation and Statistical Analysis**

The results are presented as mean ± SEM and *n* is the number of animals used in each experiment. Raw data were analyzed using column statistics, ordinary one-way ANOVA and multiple comparison tests with the aid of Graph pad computer software version 6.0. *P* < 0.05 shows significant difference.

**RESULTS**

The effect of *A. difformis* aqueous leaf extract on organ-to-body weight ratio is shown in Table 1. No significant differences were noted when control was compared with treatment groups.

Effect of the aqueous leaf extract of *A. difformis* on blood sugar level after 21 days oral daily administration is shown in Table 2.

**DISCUSSION**

An important need in toxicological experiments is the ability to assess the effects of xenobiotics on specific organs (Bailey *et al.*, 2004). It is done through macroscopic examination of the organs, measuring histopathology of the tissues and organ weight. Organ weight may be the most sensitive indicator of the effect of an experimental compound. A disparity in organ weights between treated and untreated (control) animals can occur in place of any morphological changes (Bailey *et al.*, 2004). When organ weight changes are significant or outstanding from the control values in any way; the interpretations derived, should distinguish treatment related findings from incidental findings and give perspective on the reasons for these distinctions (Sellers *et al.*, 2007).

Blood sugar level and organ-to-body weight ratios are indices often used in toxicological evaluations (Michael *et al.*, 2007), but they do not show lesions (Ozolua *et al.*, 2010). Self-monitoring blood glucose (SMBG) can aid both patients and their health care professionals better adjust to therapy and evaluate the responses to therapy. Benefits of SMBG include; patients can immediately assess the impact of an action on blood glucose levels and consequently undertake prompt interventions designed to counter the increase or reduction in blood glucose concentration (Galvin, 2007). Elevated glucose concentration in the blood is a characteristic of diabetes mellitus syndrome due to deficiency or decreased effectiveness of insulin (Davidson, 1979). Glucose spill into the urine is associated with polyuric and other diseases (Iweala *et al.*, 2005). In this study, treatment groups showed reduced blood glucose indices; (not in a definite dose-dependent manner) at 500 mg/kg (78.20 ± 12.59), 1000 mg/kg (88.60 ± 13.63) and 2500 mg/kg (69.20 ± 14.62) as compared to the control group (94.20 ± 13.98).
This result although not statistically significant, gives an idea tending to the belief that *A. difformis* aqueous leaf extract may have the potency of reducing blood glucose level. The organ-to-body weight ratios and blood glucose concentrations were not altered when compared with the control groups. This infers that a long-term use of *A. difformis* may not be toxic on organ-to-body weight ratios and blood glucose concentration. There’s need for a comprehensive toxicological analysis of the plant extract to figure out the functional groups the extract contains and its mechanism of action in human subjects in particular, those suffering from diabetes mellitus syndrome.

**REFERENCES**


Okpo SO, Ching FP, Ayinde BA, Udi OO, Alonge PO, Eze GO. Gastroprotective effects of the ethyl acetate

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**Table 1:** Organ-to-body weight indices following oral treatment with varying concentrations of aqueous leaf extract of *A. difformis* extract

<table>
<thead>
<tr>
<th>Concentrations (mg/kg)</th>
<th>H: BW</th>
<th>K: BW</th>
<th>Li: BW</th>
<th>L: BW</th>
<th>S: BW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control 0.004±0.000</td>
<td>0.004±0.000</td>
<td>0.034±0.002</td>
<td>0.008±0.000</td>
<td>0.005±0.000</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>0.004±0.000</td>
<td>0.003±0.000</td>
<td>0.009±0.001</td>
<td>0.005±0.000</td>
<td></td>
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<tr>
<td>1000</td>
<td>0.004±0.000</td>
<td>0.004±0.000</td>
<td>0.008±0.000</td>
<td>0.005±0.000</td>
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<tr>
<td>2500</td>
<td>0.004±0.000</td>
<td>0.003±0.000</td>
<td>0.007±0.001</td>
<td>0.005±0.000</td>
<td></td>
</tr>
</tbody>
</table>


**Table 2:** Effects of 21 days oral daily treatment with the aqueous leaf extract of *A. difformis* on Wistar rats

<table>
<thead>
<tr>
<th>Concentrations (mg/kg)</th>
<th>Glucose index</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (control)</td>
<td>94.2±13.98</td>
</tr>
<tr>
<td>500</td>
<td>78.20±12.59</td>
</tr>
<tr>
<td>1000</td>
<td>88.60±13.63</td>
</tr>
<tr>
<td>2500</td>
<td>69.20±14.62</td>
</tr>
</tbody>
</table>

*n=5, values are mean±SEM. No statistical differences between control and treatment groups (*P*>0.05), SEM: Standard error of the mean, *A. difformis: Anchomanes difformis*


