HYPOGLYCAEMIC ACTIVITY OF THE LEAVES OF MIMOSA RUBICAULIS (LAM)

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ABSTRACT
Natural products and plant based products have played a vital role in prevention and mitigation of human diseases for centuries, diabetes mellitus is a metabolic disorder is characterized by hyperglycemia, polyuria, polydipsia and polyhagia which are deficient insulin production or ineffectiveness in insulin actions. The present study was aimed to evaluate the anti-diabetic screening of the hydroalcoholic extract of M.rubicaulis leaves was studied on both alloxan induced diabetic rats and normoglycaemic rats, The extract was found to produce marked reduction in blood glucose concentration between 2-4h of administration in both alloxan induced hyperglycaemic and normal glycaemic rats when compared with the reference Glibenclamide. The results indicate that the hydroalcoholic extract of Mimosa rubicaulis is endowed with effective hypoglycaemic effects.

KEYWORDS: Mimosa rubicaulis, Glibenclamide, Alloxan, Hydroalcoholic extract.

INTRODUCTION
Diabetes is a metabolic disorder of carbohydrate, fat and protein, affecting a large number in the world. Diabetic mellitus is a not single disorder but it is a group of metabolic disorder characterized by chronic hyperglycemia, resulting from defects in insulin secretion, insulin action, or both. Increased thirst, increased unitary output, Ketonemia and ketonuria are the common symptom of diabetes mellitus, which occur due to the abnormalities in carbohydrate,
fat and protein metabolism. *Mimosa rubicaulis* Lam. Family: Mimosaceae comprises over 300 species distributed mainly in Asia, but also found in other continents; traditionally the plant is reported to be used in the treatment of several ailments. The roots and leaves are widely used in Indian folk medicine for treating piles, bruises, burns, diabetics, antiemetic agent\(^1\)\(^2\) several phytoconstituents were observed from the plant earlier. The plant is reported to contains flavonoid compounds quercetin, luteolin, 5,7,4' -tri hydroxy-6,3',5' -trimethoxy-flavone,7-O-alpha-L-arabinopyranosyl(1->6)-O-beta-D-lucopyranoside and tannins, 4-ethylgallic acid. A few pharmacological activates of *M.rubicaulis* plant extracts have been reported earlier\(^3\)\(^6\). In the light of the foregoing, the author has taken up the plant to evaluate for anti diabetic activity.

**MATERIAL AND METHODS**

**Plant Material**

Fresh leaves (1.5kg) were collected from young matured plants from the rural belt of Eturunagaram, Warangal district and authenticated by Prof. V. S. Raju, Department of botany, Kakatiya University, Warangal. A voucher specimen (MRM/01/2012) was deposited in A.U.College Pharmaceutical Sciences, Andhra University and Visakhapatnam. The collected plant material was dried under shade, pulverized, passed through sieve no. 40 and used for further studies.

**Preparation of extract**

The powdered plant material (500g) was extracted with 2 liters of ethanol-water (1:1) by maceration for 72h. The liquid extract was concentrated under vacuum to yield dry extract (yield: Hydroalcoholic extract 4.12% w/w with respect to dry material). The extract was suspended in 0.5% w/v sodium carboxy methyl cellulose in distilled water.

**Hypoglycaemic evaluation of the hydroalcoholic extract of the M.rubicaulis**

The anti-diabetic screening of the hydroalcoholic extract of *M.rubicaulis* leaves was studied on both alloxan induced diabetic rats and normoglycaemic rats\(^7\)\(^8\). The acclimatized animals were kept fasting for 24h with water *ad libitum* and injected intraperitoneally a dose of 120 mg/kg of alloxan monohydrate in normal saline. After one hour, the animals were provided feed *ad libitum*. The blood glucose level was checked before alloxanisation and 24 h after alloxanisation by withdrawing blood from the tip of the tail of each rat under mild ether anesthesia. The blood glucose level was measured with haemoglucostrips supplied by M/s Pulsatum Health Care Pvt. Ltd., Bangalore with the help of a Pulsatum blood glucose...
monitor. Animals were considered diabetic when the blood glucose level was raised beyond twice the value of normal. This condition was observed at the end of 48 h after alloxanisation. The animals were segregated into four groups of six rats in each. Group-I served as control and received vehicle (2 ml/kg) through oral route. Group-II received Glibenclamide (2.5 mg/kg). Group-III and IV received the extract at doses of 200 and 400 mg/kg in a similar manner. Blood samples were collected from each rat by cutting the tip of the tail under mild ether anesthesia. Blood glucose level was estimated at 0 h, 1 h, 2 h, 4 h and 8 h respectively. The results are expressed as mean ± S.E.M. in Table-1.1. Significance of difference between control and treated groups was determined using Student’s $t$-test.

**Anti-diabetic evaluation of the hydroalcoholic extract of M.rubicauls using normoglycaemic rats**

The animals were fasted for 18 h, but were allowed free access to water before and throughout the duration of experiment. At the end of the fasting period, taken as zero time (0 h), blood was withdrawn from the tip of the tail of each rat under mild ether anesthesia and the blood glucose was estimated as above. The normal rats were then divided into four groups of six animals each. Group-I served as control and received vehicle (2 ml/kg) through oral route. Group-II received Glibenclamide(2.5 mg/kg). Group-III and IV received the extract at doses of 200 and 400mg/kg in a similar manner. Blood glucose levels were measured after 1, 2, 4 and 8 h of administration of single dose of test samples. The results were expressed as mean ± S.E.M. in Table-1.2. Significance of difference between control and treated groups was determined using Student’s $t$-test.

**RESULTS AND DISCUSSION**

The present studies revealed that the hydroalcoholic extract of the leaves caused significant reduction in the blood glucose levels in the rats. The extract was found to produce marked reduction in blood glucose concentration between 2-4h of administration in both alloxan induced hyperglycaemic and normal glycogenic rats at tested dose levels as depicted in Table-1.1 and 1.2 respectively. When compared with the reference Glibenclamide, the extract caused noticeable reduction in the blood glucose level in both classes of animals.
Table-1.1: Hypoglycaemic activity of hydro alcoholic extract of the *M.rubicaulis* leaves on blood glucose concentration in alloxan induced hyperglycaemic rats.

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Dose</th>
<th>Blood glucose conc. (mg/dl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0h</td>
</tr>
<tr>
<td>I</td>
<td>0.5% w/v Sodium CMC (Vehicle)</td>
<td>2 ml/kg</td>
<td>172.41 ± 10.81</td>
</tr>
<tr>
<td>II</td>
<td>Glibenclamide</td>
<td>2.5 mg/kg</td>
<td>167.23 ± 9.74</td>
</tr>
<tr>
<td>III</td>
<td>Hydroalc. extract of <em>M.rubicaulis</em></td>
<td>200 mg/kg</td>
<td>183.49 ± 14.23</td>
</tr>
<tr>
<td>IV</td>
<td>Hydroalc. extract of <em>M.rubicaulis</em></td>
<td>400 mg/kg</td>
<td>187.62 ± 16.67</td>
</tr>
</tbody>
</table>

Results expressed as Mean ± SEM from six observations. Figures in parentheses represent percentage reduction in blood glucose concentration.*P < 0.01, **P < 0.001.

Table-2.2.2: Hypoglycaemic activity of hydro alcoholic extract of the *M.rubicaulis* leaves on blood glucose concentration in normal glycaemic rats.

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Dose</th>
<th>Blood glucose conc. (mg/dl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0h</td>
</tr>
<tr>
<td>I</td>
<td>0.5% w/v Sodium CMC (Vehicle)</td>
<td>2 ml/kg</td>
<td>69.83 ± 1.95</td>
</tr>
<tr>
<td>II</td>
<td>Glibenclamide</td>
<td>2.5 mg/kg</td>
<td>65.33 ± 2.05</td>
</tr>
<tr>
<td>III</td>
<td>Hydroalc. extract of <em>M.rubicaulis</em></td>
<td>200 mg/kg</td>
<td>68.0 ± 1.45</td>
</tr>
<tr>
<td>IV</td>
<td>Hydroalc. extract of <em>M.rubicaulis</em></td>
<td>400 mg/kg</td>
<td>66.33 ± 1.77</td>
</tr>
</tbody>
</table>

Results expressed as Mean ± SEM from six observations. Figures in parentheses represent percentage reduction in blood glucose concentration.*p< 0.01, **p< 0.001.

**CONCLUSION**

The comparable effect of the *M. rubicaulis* extract with Glibenclamide was interesting. This justifies the use of the plant in the folklore diabetic treatment. The present work justifies its use in the folklore remedies as a hypoglycemic activity.
ACKNOWLEDGEMENT
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