BIOCHEMICAL ESTIMATION OF TOTAL SUGAR IN THE BARK OF ANTI-DIABETIC PLANT *TERMINALIA ARJUNA*

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**ABSTRACT**

The antioxidant property of *Terminalia arjuna* is the basic principle for its use as an anti-diabetic agent. Ethanolic extract of the bark of *Terminalia arjuna* was prepared and then was further taken for estimation of total sugar by following phenol-sulphuric acid method. Upper, Middle, and Inner bark portions were taken and estimated for total sugar content and it was found that middle portion of the bark possessed more amount of total sugar. Shade dried bark of the plant was taken and powdered and then further ethanolic extract of the bark was prepared and stored in the dried form which was further used for biochemical estimation. The purpose of study is to find out total sugar content in the sample.

**KEYWORDS:** Antioxidant, anti-diabetic, total sugar.

**INTRODUCTION**

*Terminalia arjuna* is an important medicinal plant, belongs to the family Combretaceae (Jain S et al; 2009). *T. arjuna* is distributed throughout India, Burma and Sri-Lanka (Kirtikar KR et al 1975). It mainly grows along the banks of the river and streams. *Terminalia arjuna* (TA), commonly known as *Arjuna*, has been used in Indian system of medicine (ISM) for over three centuries (Muthu C et al; 2006). The thick, white to pinkish gray bark has a long ethnomedicinal history, including cancer treatment; cardioprotective; hypotensive, hypolipidemic and wound healing activity(Yashodharan K et al; 2007). Moreover, it plays a beneficial role in hepatic and renal disorders, and has profound effects on hepatocellular carcinoma *in vivo* and *in vitro* (Prushti AB et al; 2007). Hyperphysiological burden of free radicals causes imbalance in homeostatic phenomena between oxidants and antioxidants in the body (Brindha P et al 1981). This imbalance leads to oxidative stress that is being suggested as the root cause of ageing and various human diseases like atherosclerosis, stroke, diabetes, cancer and neurodegenerative diseases.

**MATERIALS AND METHODS**

**PREPARATION OF SAMPLE**

Different bark samples (upper stem bark, middle bark and inner bark) of *Terminalia arjuna* were collected from the nursery of Rewa Agricultural college and cut into small pieces. These pieces were shade dried and then further powdered. About half kg of arjuna powder was soaked in one litre of eth-
anol and kept for 48 hrs in a glass jar with the lid closed. Further with the help of muslin cloth, soaked powder was squeezed and liquid extract was obtained. Then this liquid extract was spread on petri plate and left for water to be evaporated and lastly dried powder was scratched and stored in glass bottle for further use. This process was carried for all the layers.

**ESTIMATION OF TOTAL SUGAR**

Phenol-sulphuric acid method described by Dey was used to estimate total sugars. The plant material was suspended in 20ml of 90% ethanol in 50mL test tube. The test tubes were sealed with cork and the suspension was incubated for one hour in hot water bath maintained at 60°C. The extract was filtered and the filtrate was collected in 25ml capacity volumetric flask. The residue was re-extracted with another 10ml volume of 90% ethanol. Both the fractions were collected and final volume was made 25ml with 90% ethanol. For the estimation, 0.2ml plant extract was taken in a test tube and volume was made 1ml with distilled water. 1ml (5%) phenol was carefully added and mixed thoroughly. To these test tubes, 5ml concentrated sulphuric acid (analytical grade) was added rapidly but very carefully. This was mixed thoroughly by vertical agitation with a glass rod. The mixture was cooled at room temperature in air and the absorbance was recorded at 485nm against blank containing distilled water instead plant extract. The amount of soluble sugars was estimated with the help of standard curve of glucose (0.1mg/ml) and expressed in g.100g⁻¹ dry tissue.

**RESULT AND DISCUSSION:**

The quantitative biochemical estimation of protein of bark of anti-diabetic and cardiotonic *Terminalia arjuna* conducted and results are as given in the table below. As table reveals that amount of total sugar is highest in the middle bark area which is in the range 6.70±83.32

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Plant taken</th>
<th>Parameter</th>
<th>Upper bark (µg/mg)</th>
<th>Middle bark (µg/mg)</th>
<th>Inner bark (µg/mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terminalia arjuna</td>
<td>Total sugar</td>
<td>9.26±61</td>
<td>6.70±83.32</td>
<td>1.64±7.23</td>
</tr>
</tbody>
</table>
A chart representing mean (µg/mg) and S.E from the mean of total sugar content present in 1) upper bark 2) middle bark and 3) inner bark of anti-diabetic plant Terminalia arjuna.

CONCLUSION

The present evaluation of biochemical parameter total sugar will be helpful while standardizing the drug for its various pharmacological potentials such as its use as anti-diabetic agent and to check the adulteration in natural valuable drug at the time of consumption for desired pharmacological effect.

REFERENCES


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