

STUDIES ON HYPOGLYCEMIC ACTIVITY OF *Tylophora dalzellii*

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Summary

Plants are a great source of medicines, especially in traditional medicine, which are useful in the treatment of various diseases. The curative properties of medicinal plants are due to the presence of various complex chemical substances of different composition which occur as secondary metabolites. The present study explores the anti-diabetic potential of *Tylophora dalzellii* Hook.f. in diabetic Balb/c mice. Qualitative test of gymnemic acid from the stem and leaf of *T. dalzellii* were carried out. Diabetic Balb/c mice were treated with the alcoholic extracts of *T. dalzellii*. Blood glucose level in diabetic Balb/c mice were estimated. The leaf and stem of *T. dalzellii* gave positive test for gymnemic acid. Results of hypoglycemic potential indicated that *T. dalzellii* showed hypoglycemic activity. These results suggested that *T. dalzellii* can be used as an anti-diabetic

Key Words: Anti-diabetic; *Tylophora dalzellii*

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Introduction

Medicinal plants form a large group of economically important plants that provide the basic raw materials for indigenous pharmaceuticals (3). The use of herbal medicine for the treatment of diseases is a safe and traditional therapy. Hence, medicinal plants have been receiving great attention worldwide by the researchers because of their safe utility. The tribe Marsdenieae of the sub-family Asclepiadoideae and family Asclepiadaceae contains a number of medicinally important genera like *Gymnema*, *Bidaria*, *Tylophora* and *Wattakaka* (7,8,10,12). Traditionally, some medicinal member belongs to the tribe Marsdenieae has been used in treatment of diabetes. Diabetes is a consequence of abnormalities in the blood levels of insulin. Thousands of years ago, Type II diabetes was treated with *Gymnema sylvestre* a medicinal member belongs to the tribe Marsdenieae. *G. sylvestre* leaves contain gymnemic acids, which are known to suppress transport of glucose from the intestine into the blood stream (1,2,11,14,15), therefore, it is useful in lowering blood sugar, balancing insulin levels, lowering blood cholesterol levels and also for promoting weight loss. *Tylophora dalzellii* Hook.f. is a medicinal member belongs to the tribe Marsdenieae of the family Asclepiadaceae. It is a twining perennial plant in India, apparently endemic in the western parts of the Indian Peninsula. It is found to be growing in scrub forest, at the edges of the forest, or on hedges and along the roadsides (12). Traditionally, *T. dalzellii* has been used in treatment of asthma, dermatitis and rheumatism. It is reported in the literature that *T. dalzellii* has same medicinal properties like that of *T. indica* (6). However, no literature is available on its chemical constituents and anti-diabetic potential of this plant.

Materials and Methods

Fresh plant material was collected from Western Ghat region of Maharashtra (India) in large quantities. Efforts were made to collect the plants when they started flowering and fruiting for the correct botanical identification. The plant material was brought to the laboratory and identified with the help of flora of Maharashtra State (13) and Fascicals of flora of India (9). Streptozotocin and Dimethyl sulfoxide (DMSO) were obtained from Sigma chemicals and Accu-chek blood glucose analyzer was a product of Roche. The Experimental Animal Facility at the National Centre for Cell Science, India provided all the animals. Male Balb/c mice 6-8 weeks old were made diabetic by intraperitoneal injection of streptozotocin (180

mg/kg body weight) freshly dissolved in chilled sodium citrate buffer (pH 4.5). Mice showing blood glucose above 200 mg/dL were taken for further experiments. They were kept under 12h in light and 12h in dark conditions at 25°C and fed them with ad libitum during the experiment (5). In the present investigation qualitative test of gymnemic acid from the stem and leaf of *T. indica* were carried out (11).

Qualitative test of Gymnemic acid:

Procedure:

Sample Preparation: Take 1 gm of stem or leaf powder of plant samples of each studied material and mixed in 5 ml methanol (Conc. 200mm or 200µg/µl), Sonicate the mixture, filter the extract and filtrate was used for application.

Stationary Phase: Percolate Silica Gel TLC Plate (20x10cm Merc No. 5554).

Mobile Phase : N butanol : Methanol : Water.

3 : 1 : 1

Developing distance : 80mm.

Tan Saturation : 10 min.

Scanning Wavelength : 580 nm.

Spraying reagent : raniline sulphuric acid.

Rf : 0.61.

Standard gymnemic acid : 1µg/µl = 5µl i.e 1%

Test for hypoglycemic potential: Diabetic Balb/c mice were randomly divided into 6 groups (each having 5 animals) to examine the glucose-lowering property of *T. dalzellii*. All extracts were administered orally at a dose of 50 mg/kg body weight. An effect of vehicle administration DMSO was also determined by acute oral gavage. Blood was collected from tail vein immediately prior to and 24h after administration of the extracts for blood glucose analysis by Accu-chek blood glucose analyzer from Bhone Roche (4).

Results

The use of herbal medicine for the treatment of diseases is as old as mankind. Results of phytochemical screening indicated that the leaf and stem of *T. dalzellii* gave positive test for gymnemic acid. Results on hypoglycemic study indicated that *T. dalzellii* showed hypoglycemic activity (Table No.1). These results suggested that *T. dalzellii* can be used as an anti-diabetic. Thus, the results of this investigation will be helpful for alternative sources of medicine in Ayurvedic, Homeopathic, Unani, Allopathic systems of medicine and Pharmaceutical industries.

TABLE NO. 1: SCREENING OF PLANT EXTRACTS FOR THEIR HYPOGLYCEMIC POTENTIAL

Plant	Blood glucose at 0 h		Blood glucose at 24 h		% change at 24h
Extract	Mean	S. E.	Mean	S. E.	w.r.t. 0h
Name of the Plant & vehicle administration					
(1) <i>T. dalzellii</i>	462.0000	38.6501	398.5000	48.9668	-13.7500
(2) DMSO Dimethy sulfoxide (DMSO)	287.0000	39.5095	344.6667	54.7002	20.0900
% change = $\frac{(\text{final level} - \text{initial level})}{\text{initial level}} \times 100$					
Values represent mean \pm SE					

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