

**Immunomodulatory Activity of *Calotropis Gigantea* by
Cyclophosphamide Induced Myelosuppression**

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Summary

Total aqueous extract (CAI) and Water soluble fraction (CAII) of *Calotropis gigantea* were evaluated for Immunomodulatory activity in mice at the doses of 50 and 2.5 mg/kg b.w. i.p. respectively. Both CAI and CAII exhibited immunosuppressant activity in the Cyclophosphamide induced Myelosuppression method. CAI and CAII significantly reduced ($p < 0.05$) WBC count in case of Cyclophosphamide induced myelosuppression model.

Key Words: *Calotropis gigantea*, Immunomodulatory activity, Myelosuppression.

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Introduction

Herbal drugs are known to possess immunomodulatory properties and generally act by stimulating or suppressing both specific and non-specific immunity. Many plants used in traditional medicine are reported to have immunomodulating activities. Some of these suppress both humoral and cell mediated immunity while others suppress only the cellular components of the immune system, i.e. phagocytic function without affecting the humoral or cell mediated immunity. Many plants with potential immunomodulatory activity are reported, some of these have already been undertaken for evaluation of their activities in animals, and also to some extent in humans. Some glaring examples with promising activity include *Curcuma longa*, *Panax ginseng*, *Tinospora cordifolia*, *Withania somnifera* and many more. There lies a great scope for exploring the plants for Immunomodulatory utility through systematic investigation¹.

Calotropis gigantea belonging to family Asclepiadaceae commonly known as milkweed or swallow-wort in India is a common wasteland weed found abundant through out India right from Himalayas to southern India². Traditionally it is used for the treatment of different ailments in ayurvedic and unani systems of medicines. The plant has been known as “Vegetable Mercury” since it is used as a remedy for syphilitic affections, also advocated for a variety of diseased conditions including leprosy, ulcers, tumours and piles. The plant is reported to have diverse pharmacological actions like antifertility, cardiogenic, antimicrobial activities³. The present investigation was aimed to study the Immunomodulatory activity of the Total aqueous extract (CAI) and Water soluble fraction of latex (CAII) of *C. gigantea*.

Materials and Methods

Plant Materials

The dried aerial parts of *Calotropis gigantea* were procured from the local market of Mumbai and the sample was authenticated at Agharkar Research Institute, Govt. of India, Pune. The latex oozing out from the plant was collected through giving ‘V’ shaped incision on the branches of the plant, planted in the medicinal garden of the institute which is an authenticated species.

Preparation of extract

The Total aqueous extract (CAI) of the aerial parts was prepared by decoction method using distilled water as solvent. The fresh latex was collected and dried in vacuum oven at 60°C for 48 hours. The dried latex was suspended in water and filtered to get the water soluble fraction (CAII).

Animals

Swiss albino male mice 20 - 30 gms were housed in standard conditions of temperature, humidity and light. They were fed with standard rodent diet and water *ad libitum*.

Test Samples

Weighed quantities of test extracts were suspended in 1 % w/v sodium carboxy methylcellulose to prepare suitable dose. The control animals were given an equivalent volume of 1 % w/v sodium carboxy methylcellulose as vehicle.

Cyclophosphamide induced Myelosuppression⁴

In this model, the animals were divided into 6 groups of six animals each. The control group and Cyclophosphamide (Sigma Lab Germany) group received 1 % w/v sodium carboxy methylcellulose solution alone as vehicle daily for 5 days. while animals in treatment groups were given test extracts i.e. total aqueous extract {(CAI) 50 mg/kg. b.w. i.p.}, water soluble fraction of latex {(CAII) 2.5mg/kg.b.w. i.p.}, CAI (50 mg/kg. b.w. i.p.) + Cyclophosphamide and CAII (2.5 mg/kg. b.w. i.p) + Cyclophosphamide in 1 % w/v sodium carboxy methylcellulose daily for 5 days. On day 3, 4 and 5 day all the animals except in the control group were administered. Cyclophosphamide (Sigma Germany, 30 mg/kg. b.w. i.p.) 1 hour later the administration of the extracts. Blood samples were collected on day 6 and total White Blood Cell (WBC) count was determined.

Statistical analysis

Data are expressed as the mean \pm S.E.M. and statistical analysis was carried out employing Student's *t*-test.

Results and Conclusions

Table1: Effect of administration of CAI, CAI I Total WBC count in mice.

| Treatment | Dose mg/kg | Total WBC count Mean \pm S.D. |
|--------------------------|------------|------------------------------------|
| Control | - | 10383.33 \pm 1485.4 |
| CAI | 50 | 6178 \pm 1037.9* |
| CAII | 2.5 | 5120 \pm 911.99* |
| Cyclophosphamide | 30 | 4190 \pm 837.70 |
| CAI Cyclophosphamide | +50 | 1362.5 \pm 147.87* |
| CAII Cyclophosphamide | +2.5 | 1075 \pm 150* |

The values are presented are average of three reading \pm S.D. n = 6 per group.

CAI: Total aqueous extract of *Calotropis gigantea*.

CAII: Water soluble portion of latex of *Calotropis gigantea*.

All treated groups are compared with cyclophosphamide group in case of cyclophosphamide induced Myelosuppression.

*p<0.01 as compared with control.

Immunomodulatory activity of *Calotropis gigantea* was explored, by evaluating its Cyclophosphamide induced Myelosuppression in mice. Administration of Total aqueous extract (CAI) and Water soluble latex (CAII) showed immunosuppressant activity. Significant suppression with respect to these parameters was obtained. The present investigation therefore reveals that Total aqueous extract and Water soluble latex of *Calotropis gigantea* certainly possess Immunomodulatory properties.

References

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