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ANTIHYPERGLYCEMIC ACTIVITY OF ETHANOLIC EXTRACT OF *CEDRUS DEODARA* WOOD IN ALLOXAN INDUCED HYPERGLYCEMIC RAT

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ABSTRACT

In present study, antihyperglycemic potential of ethanolic extract of *Cedrus deodara* wood was estimated at two different doses of 50 and 100 mg/Kg body weight in alloxan induced hyperglycemic rats. The effect of ethanolic extract of *Cedrus deodara* was estimated on 0 day, 5th day, 10th day and 14th day. A marked decrease in the blood sugar level ($P < 0.01$) was observed in hyperglycemic rats upon *Cedrus deodara* treatment. Preliminary qualitative chemical investigation shows the presence of alkaloids, glycosides, tannins & phenolic compounds, triterpenoids, fixed oils, fats, and flavanoids. The results suggest that ethanolic extract of *Cedrus deodara* has promising antihyperglycemic action in alloxan induced rats.

Key words: Ethanolic extract, Alloxan, Antihypergycemic, *Cedrus deodara wood,* Blood sugar level.

INTRODUCTION

Cedrus deodara is an evergreen conifer tree reaching unto 85 m in height with almost rough black, furrowed bark and spreading branches, shoots dimorphic, leaves 2-5-5-8 cm needle like triquetrous, sharp, pointed, flowers usually monoecious, but some trees or branches habitually bear flowers of one sex[1].

All parts are bitter, hot, slightly pungent, oleaginous, useful in inflammations, dyspepsia, insomnia, cough, fever, urinary discharges, ozoena, bronchitis, itching, elephantiasis, tuberculous glands, leucoderma, opthalmia, plies, disorders of the mind, diseases of the skin and of the blood (Ayurveda).The leaves lessen inflammation applied in tuberculous glands. The wood is bitter, diuretic, carminative, expectorant, and useful in

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rheumatism, piles, palsy, epilepsy, stones in the kidney and bladder, useful in fever, costiveness, piles, pulmonary complaints, and prolapsus recti[2,3]. The oil is analgestic and alexipharmic, useful for bruises and injuries to joints, boils, tubercular glands, skin diseases (Yunani), as a diaphoretic, in skin diseases. It is considered to possess diaphoretic, diuretic and carminative properties and to be useful in fevers, flatulence and urinary disorders[4]. A decoction of this drug was administered to cases of chronic fevers and the result was unsatisfactory (Koman).Wood is carminative; bark is powerfully astringent and febrifuge. Leaves have mild terebinthinate properties[5,6]. As there are no scientific reports on the antihyperglycemic activity of *C. deodara*, it was taken up for scientific validation in alloxan-induced hyperglycemic rats in our present study.

Fig. 1: Plant of *Cedrus deodara*

EXPERIMENTAL

Materials and methods

Plant material

The *Cedrus deodara* wood was purchased from the Bharath Trading Company, Chennai, Tamil Nadu, India. The plant material was taxonomically identified from Central Research Institute for Siddha, Arumbakkam, Chennai.

Preparation of extract

The dried powder material of *Cedru Deodara* wood were defatted with petroleum ether (60-80^{o}C) in a Soxhlet apparatus. The defatted powder material was obtained was further extracted with ethanol for 72 hours in Soxhlet apparatus. The solvent was removed by distillation under low pressure by rotary evaporator. The resulting semisolid mass was dried in dessicator over $CaCl_2$ and used for phytochemical analysis and antihyperglycemic activity. Preliminary phytochemical investigation was carried out and results are tabulated in Table 1.

Table 1: Qualitative phytochemical analysis of ethanolic extract of *Cedrus deodara* wood

Phytochemical constituents	Ethanolic extract
Alkaloids	+
Saponins	-
Glycosides	+
Carbohydrates	-
Tannins & phenolic compounds	+
Triterpenoids	+
Proteins and amino acids	-
Fixed oils fats	+
Flavonoids	+

(+) Present, (-) Absent

Animals

Male, Swiss Albino mice (25-30 g) and Wister rats (150-200 g) procured from the animal house, IRT Perundurai Medical College, Erode, India, were housed at a temperature of 24 ± 2^{o}C and relative humidity of 30–70% with a 12 : 12 light : day cycle throughout the experimentation period. All animals were fed with standard commercial rat chaw pallets (M/s. Hindustan Lever Ltd, Mumbai) and water was provided. All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee, J. K. K. Nataraja College of Pharmacy, Komarapalayam and were in accordance with the guidelines of the CPCSEA.

Effect of *Cerdus deodara* on glucose levels in rats

The animals were divided into five groups each containing six rats. Group I animals served as the normal control, while Group II animals were as diabetic control. Group II to IV rendered diabetes by the intraperitoneal injection of alloxan (150 mg/kg)[7-9]. After two weeks, when the condition of diabetes was stabilized, standard and test drug were given to animals[10-12]. The animals of Group III were treated with the standard drug glibenclamide (600 µg/kg), while *C. deodar* was administered orally in doses of 50 mg/ kg and 100 mg/ kg to Group IV and Group V rats for 14 day. Blood glucose was estimated 0 day, 5th day, 10th

day and 14th day by using commercially available glucose strips (Clever Chek) using Clever chek TD-4222 blood glucose meters[10,11].

RESULTS AND DISCUSSION

Effect of ethanolic extract of *Cedrus deodara* on blood glucose levels hyperglycemic rats

The alloxan-induced hyperglycemic condition was maintained in these animals throughout the study period. In the animals treated with glibenclamide and *Cedrus deodara* (50 mg/kg and 100 g/kg), the reduction in the blood glucose levels were significant on 5, 10 and 14 days of the study. Ethanol extract of *Cedrus deodara* at 100 mg/kg exhibited better antidiabetic activity and it was comparable with the effect produced by the standard drug glibenclamide treated groups. The results are tabulated in Table 2.

Table 2: The effect of ethanolic extract of *Cedrus deodara* wood on blood glucose level (BGL) in hyperglycemic rats

	0 day	5th day	10th day	14th day
Normal control	107.33 ± 5.071*	107.50 ± 3.78*	105.33 ± 4.79*	97.67 ± 5.73*
Diabetic control	366.67 ± 5.32	327.67 ± 4.53	305.83 ± 5.41	306.50 ± 4.83
Positive control (Glibenclomide 600 mg/kg)	370.67 ± 3.72	190.83 ± 6.66	127.1 ± 6.51*	90.00 ± 2.65*
Cedrus deodara wood extract (50 mg/kg)	372.67 ± 2.69	293.17 ± 6.68*	188.50 ± 4.65*	132.67 ± 3.22*
Cedrus Deodara wood extract (100 mg/kg)	381.50 ± 3.77	236.67 ± 2.03*	159.83 ± 3.35*	98.00 ± 6.20*

(* = $p < 0.01$) vs. Diabetic control,* ± SD mean)

Statistical analysis

The values were expressed as mean ± S.E.M. The data were analyzed by one way analysis of variance (ANOVA) followed by Dunnett's t-test[54] using graph pad prism. P value < 0.01 were considered as significant.

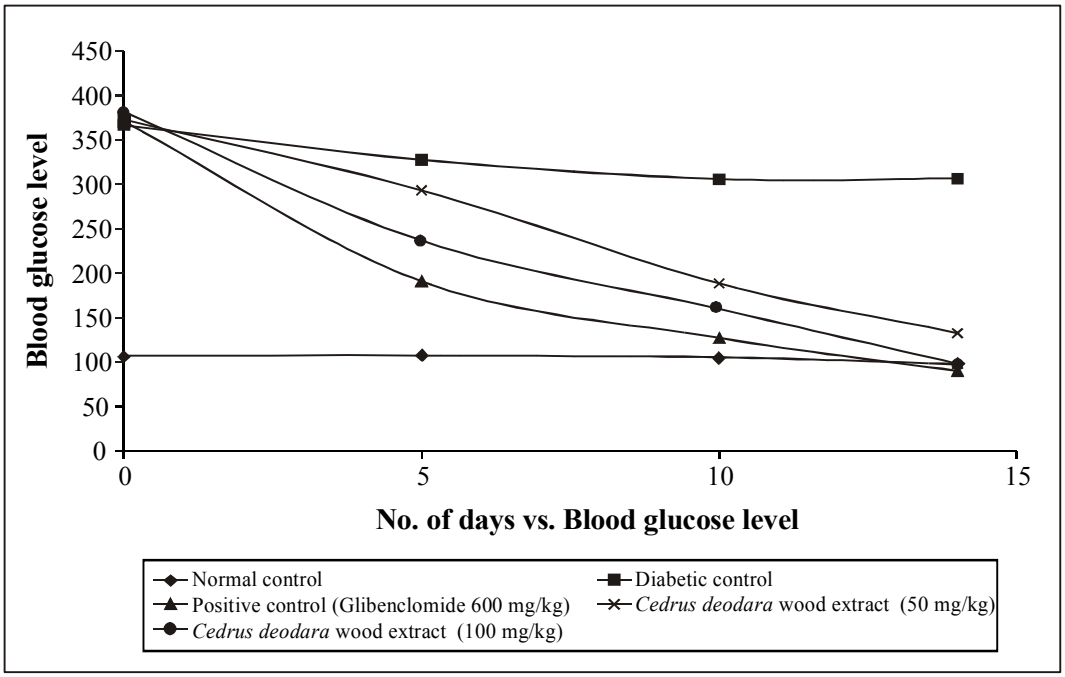

Fig. 2: The effect of ethanolic extract of *Cedrus deodara* wood on blood glucose level of hyperglycemic rats

No. of days vs. Blood glucose level

Hence, from result of our study, it is evident that *Cedrus deodara* has a significant protective effect against alloxan-induced Type I diabetes in rats, and this can be attributed to the combined effect of various chemical constituents of Cedrus *deodara*. The probable mechanism involved in the treatment of Type I diabetes and its efficacy in the treatment of Type II diabetes are yet to be determined, to provide the role of *Cedrus deodara* in the treatment of diabetes.

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