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ANTIDIABETIC ACTIVITY OF METHANOLIC EXTRACT OF CAMELLIA JAPONICA LEAVES AGAINST ALLOXAN INDUCED DIABETES IN RATS

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Research Article

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Abstract:

Hypoglycaemic activity of the methanolic extract from *Camellia japonica* leaves were investigated in alloxan-induced diabetic rats. After oral administration of the extract at two different doses (100 and 200mg/kg body weight) to alloxan-induced diabetic rats, the blood glucose, level was assayed. The blood glucose levels after a single oral administration of the methanolic extract significantly reduced in a time-dependent manner, which is much faster and more than that of glibenclamide. The blood glucose levels of alloxan-induced diabetic rats treated with the methanolic extract at the higher dose were reduced to 94, 81%, 66%, 45% and 40% at 1, 3, 5, 7 and 9 h, respectively ($p < 0.05$), while the lower dose had least effect. The results suggested that the glibenclamide revealed a mild hypoglycaemic effect, while the methanolic extract from *Camellia japonica* leaves at higher dose showed a significant hypoglycaemic effect in the alloxan-induced diabetic rats. Therefore, the mechanism of the methanolic extract is probably different from that of glibenclamide, which is an insulin-independent mechanism.

Key words: *Cemellia japonica,* Antidiabetic activity, Alloxan

Introduction:

A number of plant species worldwide are known to have hypoglycaemic[1] activity. Despite the presence of known antidiabetic medicines in the pharmaceutical market, screening for new antidiabetic sources from natural plants is still attractive because they contain substances that have an alternative and safe effect on diabetes mellitus. *Camellia japonica* leaves have been used in the ethnomedicine for the treatment of diabetes mellitus without proven value.

Objective:

The objective of our present study is to prove the antidiabetic activity of the methanolic extract of the leaves of *Camellia japonica* by using alloxan induced diabetic rats.

Experimental methods:

1. Acute Toxicity Studies (Up and Down Procedure)[2] :

Swiss albino mice of either sex weighing between 18-25gm were procured from KMCH College of Pharmacy animal house, Coimbatore. Three animals were treated with 2000 mg/kg as single treatment per oral as per the limit test of OECD Guidelines 425 and the animals were observed continuously for first 4 hrs and finally overnight mortality was observed.

2. antidiabetic Activity:

A]Experimental design: In-vivo antidiabetic activity of the extracts was determined in alloxan induced diabetic rats. All the study was approved by Institutional Animal Ethical Committee (Proposal no. KMCRET/Ph.D/04/2007).

B]Experimental method: Sprague Dawley rats of either sex weighing between 180-200gm were divided into 5 groups containing 6 animals each. The rats were housed in polycarbonate cages at a regulated temperature (22^0C) and humidity (55%) controlled room with a 12-h light: 12-h dark cycle. A water and standard pellet diet were available *ad libitum* throughout the experimental period. The rats were injected intraperitoneally with alloxan monohydrate dissolved in sterile normal saline at a dose of 120 mg/kg body weight (bw). Two weeks after treatment, rats with severe diabetes were used for the experiment where the initial blood glucose level was more than 450 mg/dl.

To screen the hypoglycaemic activity the methanolic extract, a total of 30 rats (24 diabetic surviving rats, 6 normal rats) were used. The rats were divided into five groups of six rats each after the induction of alloxan diabetes. Group 1: non-treated normal rats. Group 2: diabetic control rats. Group 3 & 4: diabetic rats given 100 & 200mg/kg bw (oral) of methanolic extract of *Camellia japonica* leaves respectively. Group 5: diabetic rats given glibenclamide. Glibenclamide was administered at a dose of 0.2 mg/kg bw (oral). Blood glucose was measured at 1, 3, 5, 7 and 9 h after a single oral administration. Blood was withdrawn from the tail vein each time. The blood glucose level was determined by the glucose oxidase method.[3]

C] Statistical analysis

All experimental data were expressed as mean±S.E.M. Significant differences among the groups were determined by one-way ANOVA. Statistical significance was considered at $p < 0.05$.

Results and Discussion:

There was a significant elevation in the blood glucose levels during the experimental time period in alloxan-induced diabetic rats, when compared to normal rats (Table 1). The administration of methanolic extract (200mg/kg) significantly reduced the blood glucose levels of diabetic rats at 0 h to 94, 81, 66, 45 and 40% at 1, 3, 5, 7 and 9 hr, respectively ($p < 0.05$). The reduction value at 9 h after treatment with methanolic extract was close to the value of normal rats. The acute reduction in glucose levels after single oral administration of the methanolic extract showed in a time-dependent manner, which is much faster and better than that seen in the glibenclamide-treated rats.

Table No – 1: Effects of methanolic extract from Camellia japonica leaves on blood glucose levels in alloxan-induced diabetic rats (mg/dl)

Treatment	0hr	1hr	3hr	5hr	7hr	9hr
Normal	94 ± 3.6 (100%)	135 ± 7.1 (144%)	128 ± 6.8 (136%)	117 ± 5.9 (124%)	112 ± 3.2 (119%)	119 ± 6.4 (127%)
Diabetic control	464 ± 20.8 (100%)	440 ± 73.1 (95%)	500 ± 48.2 (108%)	461 ± 60.2 (99%)	507 ± 30.6 (109%)	553 ± 23.5 (119%)
MECJ (100mg/kg)	533 ± 31.0 (100%)	499 ± 31.9 (94%)	569 ± 9.6 (107%)	568 ± 10.1 (107%)	576 ± 7.5 (108%)	465 ± 8.6 (87%)
MECJ (200mg/kg)	372 ± 7.3 (100%)	350 ± 26.2 (94%)	301 ± 26.6* (81%)	246 ± 41.7* (66%)	168 ± 56.2* (45%)	149 ± 44.6* (40%)
Glibenclamide (0.2 mg/kg bw)	541 ± 20.5 (100%)	477 ± 32.4 (88%)	417 ± 18.2* (77%)	386 ± 18.1* (71%)	363 ± 22.2* (67%)	346 ± 22.0* (64%)

Values are mean concentration of blood glucose±S.E.M. ($n = 6$). (E) and (A) represent the extract by ethanol and water, respectively. Numbers in parenthesis represent percentage (%) increase or decrease from 0h (100%) of each treatment.
*** Significantly increased or decreased values compared with 0 h data ($p < 0.05$).**

Conclusion:

In the present study, the glibenclamide revealed a mild hypoglycaemic effect, while the methanolic extract from *Camellia Japonica* leaves at higher dose showed a significant hypoglycaemic effect in the alloxan-induced diabetic rats. Therefore, the mechanism of the methanolic extract is probably different from

that of glibenclamide, which is an insulin-independent mechanism.

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