

**ANTI DIABETIC ACTIVITY OF THE BARK OF *PARKINSONIA ACULEATA* IN
STREPTOZOTOCIN INDUCED DIABETIC RATS**

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ABSTRACT: The extraction of the bark of *Parkinsonia aculeata*, family Leguminosae was carried out using benzene, chloroform, ethanol and distilled water in succession. The presence of alkaloids, flavonoids, tannins, steroids, and reducing sugars was confirmed during preliminary phytochemical screening. The extracts were evaluated for antidiabetic activity. The chloroform and ethanol extracts showed significant antidiabetic activity.
Keywords: Streptozotocin, glibenclamide, β -amyrenone, daucosterol.

INTRODUCTION

Parkinsonia aculeata a small spiny tree, 4 – 10 m in height, with a short and often crooked trunk up to 40 cm in diameter, often branching near the ground with a very open crown of spreading branches. Bark of trunk, branches and twigs smooth, green or brown, thin and slightly bitter. Leaves bipinnate, ending in a stout spines. The plant is native of tropical America, found almost throughout the drier parts of India. The plant grows mainly in tropical and subtropical region with a great temperature range from very hot to several degrees below freezing with frosts. It is extremely drought resistant. It is native to semi desert vegetation, specially desert valleys and desert grassland zones. It does well on sandy or gravelly soils¹⁰. The tree is used for the treatment of many diseases such as the infusion of dried flowers of *Parkinsonia aculeata* used orally as an antipyretic, abortifacient, diaphoretic in human adults⁸. Hot water extract of leaves used orally as abortifacient in pregnant women. It cures boils and tumors if young twigs are crushed and applied. Leaf, fruit and stem decoction are taken orally to treat fever, malaria. Reported phytoconstituents include β -amyrenone, β - amyryn, daucosterol, palmitic acid and β -sitosterol in dried aerial parts of *Parkinsonia aculeata*, L-dopa isolated from dried seeds of *Parkinsonia aculeata*, β - amyryn from dried stem bark of *Parkinsonia aculeata*, Flavones as Apigenin, chrysoerol, diosmetin-6-C-beta-glucoside, kampferol, lucenin 2, Lute- olin, orientation, iso- orientation, vicenin 2, pillion-6-3- β -D-glucoside, vitexin, iso-vitexin in dried leaf of *Parkinsonia aculeata*, presence of alkaloid in flower, leaf stem of *Parkinsonia aculeata*, Amino acid tryptophan from dried seeds of *Parkinsonia aculeata*, Glycerol β -butanoate α , α' 1-dipentanone, β -Sitosteryl- β -D-glucoside, β -Sitosterol, glycerol α -heptanone kappa octanoate from stem of *Parkinsonia aculeata*⁶. Many pharmacological activities viz. CNS depressant activity of ethanol-water (1:1) extract of dried aerial part, Smooth muscle stimulant activity of aqueous extract of dried aerial part of *Parkinsonia aculeata*⁴, Antibacterial activity taking ethanol-water extract of dried leaf of *Parkinsonia aculeata*², Antidiabetic effect taking water soluble fraction of aerial parts of *Parkinsonia aculeata*¹ have been reported earlier. However detailed investigation of the antidiabetic activity of it has not been carried out.

MATERIAL AND METHODS

Plant Material

The disease free fresh plant material (Bark) were collected in the month of September 2007 from Jamadarpali a place in the Sambalpur district, Orissa and authenticated at Botanical Survey of India, Shibpur, Howrah. After authentication, fresh barks were collected in bulk from the tree, shade dried, pulverized and passed through sieve no.40 to obtain coarse powder.

Preparation of the Extract

The powder bark (800 gm.) were subjected to continuous hot successive extraction with benzene, chloroform, ethanol in Soxhlet extractor and simple maceration with triple distilled water followed by concentrating each extract under vacuum. (Yield: Benzene – 2.50%, Chloroform – 1.00%, Ethanol – 2.50% and Aqueous – 3.90%) with respect to the dried powder plant material (bark). The extracts were used for the study of antidiabetic activity in albino rats.

Phytochemical Studies

The benzene extracts showed the presence of phytosterols. The chloroform and ethanolic extracts showed the presence of alkaloids & flavonoids, the ethanolic and aqueous extracts showed the presence of carbohydrates and tannins.

Antidiabetic Activity:

Streptozotocin induced diabetic rats

Albino rats of either sex weighing 120 to 250 gm were selected. They are placed into standard poly propylene cages and provided with food and water *ad libetium*. Before experiment treatment animals were fasted overnight and allowed free access to water. The animals were divided into six groups taking six animals in each group.

Diabetes was induced by streptozotocin at a dose of 70mg /kg. It was administered i.p. to the animal after dissolving it in citrate buffer (pH 4.5) immediately before administration.

Blood samples were collected at 12, 24, 36 and 48 hours after streptozotocin administration and a stable hyperglycemia was produced after 48 hours. The sugar level was determined by digital display glucometer (one touch –Johnson & Johnson Ltd.)

Initial blood sample were taken before the oral administration of the standard drug and test samples or extracts. Again samples of blood collected at 2, 4, 8 and 12 hour after drug & test samples administration.

Control

The animal marked as group 1 were treated with 2% w/v aqueous acacia solution in amount equivalent to the drug treated group

Standard

The animals marked as group 2 received orally 5mg /Kg of glibenclamide as standard oral hypoglycemic for comparison.

Test

The animal marked group 3 to 6 received 500mg /Kg body weight of various extract orally. Benzene, Chloroform, Ethanol & Aqueous extracts of *Parkinsonia aculeata* Linn were treated with the groups of 3 to 6 respectively.⁵

The results of the hypoglycemic activity in rats have been expressed as mean \pm SEM & significance of the result were analyzed by students- t test compared with the control^{3,7}.

RESULT AND DISCUSSION

It was observed that chloroform extract at a dose of 500mg/kg body weight showed maximum antidiabetic activity amongst the other extracts. The chemical constituents which are present in the chloroform extract of the bark of *Parkinsonia aculeata* are good antidiabetic agents. The result indicated that the major component responsible for antidiabetic activity may be present in chloroform extract.

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