Evaluation of Antidiabetic Activity of Hydroalcoholic Extract of Cassia fistula Linn. pod in Streptozotocin-Induced Diabetic Rats

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ABSTRACT
Background: Diabetes mellitus (DM) is a global health problem and the incidence of DM is increasing at alarming rate all over the world. Many Indian medicinal plants have been reported to possess potential antidiabetic activity and could play important role in the management of diabetes. Objective: The present study aimed to evaluate antidiabetic activities of 70% ethanolic extract of Cassia fistula pod in streptozotocin-induced diabetic rats. Materials and Methods: Diabetes was induced in male Wistar rats by single intraperitoneal injection of streptozotocin (60 mg/kg b.wt.). The diabetic rats were administered orally with C. fistula pod extract at three different doses (100, 250 and 500 mg/kg b.wt./day) for 60 days. The results were compared with standard drug glibenclamide (5 mg/kg b.wt./day) treated rats. Results: The streptozotocin treated diabetic control rats showed a significant increase in the blood glucose and glycosylated hemoglobin (HbA1c) levels with a concomitant decrease in the body weight and glycogen content in the liver as compared to normal control rats. Oral administration of C. fistula pod extract (100, 250 and 500 mg/kg b.wt./day) or glibenclamide for 60 days showed significant reduction in the blood glucose and HbA1c levels and an elevation in the body weight and hepatic glycogen content as compared to diabetic control rats. Furthermore, treatment with extract (500 mg/kg b.wt.) also showed improvement of oral glucose tolerance test (OGTT) in diabetic rats. These results were comparable to glibenclamide. Conclusion: The results of present study showed that C. fistula pod extract possesses significant antihyperglycemic activity and supports the traditional use of C. fistula pod for the treatment of diabetes mellitus.

Key words: Antidiabetic, Blood glucose, Cassia fistula, Glycogen, Glycosylated hemoglobin, Streptozotocin.

INTRODUCTION
Diabetes mellitus (DM) is a chronic complicated metabolic disorder characterized by increased blood glucose level resulting from the defects in insulin secretion, insulin action, or both. Hyperglycemia is suggested to be one major cause contributing to diabetic complication. The incidence of DM is rising at alarming rate all over the world in the coming years. According to the diabetic atlas of the International Diabetic Federation, 382 million people were affected by diabetes worldwide in the year 2013 and diabetes prevalence is expected to 592 million by the year 2035. The World Health Organization projects that diabetes will be the 7th leading cause of death in 2030. Management of diabetes is a global health problem and successful treatment is yet to be discovered. Currently available therapies for diabetes include insulin and various oral antidiabetic agents such as sulfonylureas, biguanides and glinides. Many of them have a number of serious adverse effects; therefore, the search for more effective and safer hypoglycemic agents is one of the important areas of investigation. Medicinal plants are rich source of various bioactive phytochemicals. Many Indian medicinal plants have been found to be useful in the management of diabetes acting though variety of mechanisms. Medicinal plants provide better alternatives as they are less toxic, easily available and affordable and many of the currently available drugs have been derived directly or indirectly from them. Cassia fistula Linn. (Hindi-Amaltas; English-Golden Shower or Indian Laburnum), a medium sized tree belonging to the family--Caesalpiniaceae, is cultivated throughout India as an ornamental plant and is used widely for its medicinal properties. Almost every part of C. fistula are used extensively in the folklore medicine for the treatment of a variety of diseases. The dried pod and pulp are valued for their laxative properties. The pulp is considered a safe purgative, recommended for pregnant women and children to relieve disorders of the liver and biliousness. It is a remedy for malaria and black water fever. It is also used to treat leprosy and diabetes and removal of abdominal obstructions. The slightly sweet seeds pose-
scess laxative, carminative, cooling and antipyretic properties. They are also used to relieve constipation and to treat jaundice, biliousness, skin disease and swollen throat. The plant has been reported to possess various pharmacological activities such as anticancer, antitumor, antifungal, anthelmintic, antihyperlipidemic, anti-inflammatory, Antipyretic activity, antioxidant, antimicrobial, hepatoprotective, immunomodulatory, and laxative effects. Phytochemical studies revealed that the edible fruit tissue of the Indian laburnum is a rich source of potassium, calcium, iron, manganese and also of aspartic acid, glutamic acid and lysine amino acids. The seeds of the plant are rich in glycerides with linoleic, oleic, stearic and palmitic acids as major fatty acids together with traces of caprylic and myristic acids and carbohydrates like galactomannan. Pods contained flavon-3-ol and proanthocyanidins like catechin, epicatechin, epigallocatechin, procyanidin B-2, rhein; 1,8-dihydroxy-3-anthraquinone carboxylic, fistulic acid, 3-formyl-1-hydroxy-8-methoxy anthraquinone, diterpenes; 3β-hydroxy-17-norpinar-8(9)-en-15-one, 5-Nonatetracontanone, 2-hentriacontanone, triacontane, 16-hentriacontanone and β-sitosterol, kaempferol and dihydrokaempferol. Recently presence of quercetin dehydrates has also been confirmed by Laxmi et al. (2015). Oxyantraquinones, chrysophanol and chrysophanein, were also isolated from the seeds of *C. fistula* by Kuo et al., (2002). Antiherglycemic activity of *C. fistula* roots, bark, leaves and flowers, has been reported in diabetic animals with various reports. But reports on antidiabetic activity of *C. fistula* pods are very scanty. Moreover, in traditional medicine, the pods of *C. fistula* are used in the treatment of diabetes. Thus the present study was undertaken to investigate the antidiabetic efficacy of 70% ethanolic extract of *C. fistula* pod in streptozotocin induced diabetic rats.

**MATERIAL AND METHODS**

**Plant material and preparation of extract**

Fresh pods of *C. fistula* were collected in the months April-May, 2013, from the campus of University of Rajasthan, Jaipur. The plant was taxonomically identified by Prof. K.P. Sharma, Incharge, Herbarium, Department of Botany, University of Rajasthan, Jaipur, India where a voucher specimen (Specimen no. RUBL21057) was deposited. The fresh pods were washed with distilled water, shade dried, and powdered in an electric grinder. The powder (300 g) was suspended in 70% ethanol and allowed to stand for 24 h. The mixture was subjected to soxhlet apparatus for extraction at 60°C-70°C for 35 h. It was then filtered using a filter paper and the filtrate was evaporated to dryness in an oven at 40°C. A brownish residue weighing 38.5 g (12.83% of dried powder) was obtained. This was kept in an air tight bottle in a refrigerator until used. The extract was suspended in water before administering to experimental animals.

**Animals**

Colony bred, adult, healthy, male rats of Wistar strain (*Rattus norvegicus*) weighing 170-200 g were used in the present study. The animals were housed in polyplyrene cages under standard husbandry conditions (12 h light / dark cycle; 25 ± 3°C temperature). Rats were provided with water and nutritionally adequate pellet diet (Aashirwad Food Industries, Chandigarh, India) ad libitum. The animals were maintained as per guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). The study was approved by the Animal Ethical Committee of the Centre of Advanced studies, Department of Zoology, University of Rajasthan, Jaipur (India).

**Chemicals**

Streptozotocin was obtained from Himedia Laboratory limited, Mumbai, India. Glibenclamide tablets (Daonil; Aventis Pharma. Ltd., India) were purchased from the medical store. All other chemicals and reagents used were of analytical grade.

**Experimental induction of diabetes**

Diabetes mellitus was induced by a single intraperitoneal injection of streptozotocin (STZ) dissolved in citrate buffer (pH 4.5) at a dose of 60 mg/kg body weight into overnight fasted rats. The STZ treated animals were given 2% glucose solution for 24 h after 5 h of STZ injection to prevent initial drug induced hypoglycemic mortality. Development of diabetes was verified after one week of STZ injection by measuring the blood glucose level in blood samples obtained from the tail vein of overnight fasted rats. The rats having blood glucose level above 250 mg/dl were considered to be diabetic and used in the study. This day was considered as the zero (0) day of the experiment.

**Experimental design**

The rats were divided into six different groups, each consisting of six animals and treated as follows:

**Group I:** Control rats receiving vehicle (0.5 ml distilled water /rat/day) orally for 60 days.

**Group II:** Diabetic rats receiving vehicle (0.5 ml distilled water /rat/day) orally for 60 days.

**Group III:** Diabetic rats receiving *C. fistula* extract (100 mg/kg b.wt./day) orally for 60 days.

**Group IV:** Diabetic rats receiving *C. fistula* extract (250 mg/kg b.wt./day) orally for 60 days.

**Group V:** Diabetic rats receiving *C. fistula* extract (500 mg/kg b.wt./day) orally for 60 days.

**Group VI:** Diabetic rats receiving glibenclamide standard drug (5mg/kg b.wt./day) orally for 60 days.

**Autopsy**

After 24 hours of the last treatment, all the overnight fasted animals of different groups were weighed and autopsied under mild ether anesthesia. Blood was collected directly by cardiac puncture of which 2 ml was added to an anticoagulant vial for the estimation of parameters in blood. The remaining blood sample was allowed to clot and serum was separated and stored at -20 °C for future use. The vital organs from each rat were dissected out, cleaned off from adherent fat and blood clot and weighed on a digital electronic balance. Half of the tissues were fixed in Bouin’s fixative and remaining half were kept frozen at -20 °C for future use.

**Body weight**

Body weights of the control and treated rats were recorded prior to STZ injection and than 1 week after STZ induction (0 day of experiment). Body weights were further recorded at 15 day interval for a period of 60 days.

**Determination of blood glucose**

Blood samples were collected from the tail vein of overnight fasting rats and basal blood glucose levels were determined prior to STZ injection and than 1 week after STZ induction (0 day of experiment) by using a glucometer (One Touch Ultra blood monitoring system from Life Scan, Johnson and Johnson Company, California, USA). Fasting blood glucose levels of control, diabetic and treated rats were further determined at 15 day interval for a period of 60 days.
Oral glucose tolerance test (OGTT)
At the 55 days of experimental period, oral glucose tolerance test (OGTT) was performed in control, diabetic, C. fistula (high dose 500 mg/kg) and glibenclamide treated groups. After overnight fasting blood glucose level was estimated (0 minutes). Without delay, a glucose solution (2 gm/kg b.wt.) was administered orally. Blood samples were taken from the tail vein at 30, 60, 90 and 120 mins after glucose administration and blood glucose level were monitored.

Glycosylated hemoglobin, hemoglobin and glycogen
Glycosylated hemoglobin (HbA1c) was estimated by glycohemoglobin reagent set (Accurex Biomedical Pvt. Ltd. Mumbai, India) and total hemoglobin (Hb) concentration by using Sahli’s apparatus. For estimation of glycogen, liver tissue samples were carefully dissected out and stored at -20°C until biochemical analysis.

Statistical analysis
All the data are expressed as mean ± SEM. The data were statistically analyzed with one way ANOVA followed by Tukey’s as a post hoc test using version 20.0 of IBM SPSS statistics software. Differences in the means were considered significant at p≤0.05.

RESULTS

Body weight
Changes in body weight of the normal control, diabetic control and experimental rats are depicted in Table 1. The mean body weight of the rats of normal control group was significantly elevated by 7.22% (P≤0.05), 10.12% (P≤0.01), 16.65% (P≤0.001) and 23.34% (P≤0.001) respectively after the 15, 30, 45 and 60 days of treatment period when compared to their initial body weight. In contrast to this, the mean body weight of untreated diabetic control rats (group II) was significantly decreased by 5.57%(P≤0.05), 9.38%(P≤0.001), 13.47%(P≤0.001) and 15.61%(P≤0.001) respectively after the 15, 30, 45 and 60 days of experimental period as compared with their initial body weight (0 day).

Diabetic rats treated with C. fistula pod extract at different doses (100, 250 and 500 mg/kg b.wt./day) showed duration dependent increase in the mean body weight when compared to their initial body weight but it was comparatively less than that of normal control rats. At low dose treatment (group III) a significant gain (5.63%, P≤0.05) in the body weight was observed only after 60 days period. In medium dose group (group IV) a significant gain of 6.07% (P≤0.05) and 8.46% (P≤0.01) in body weight was observed after both 45 and 60 days of treatment respectively. The rats of highest dose group showed significant gain in body weight after 30 days (P≤0.05, 3.57%), 45 days (P≤0.05, 9.95%) and 60 days (P≤0.001, 12.94%) of treatment compared with their initial body weight (0 day). In diabetic rats treated with glibenclamide (group VI), the body weight gain recorded was 7.71% (P≤0.05), 10.25% (P≤0.01) and 14.29% (P≤0.001) respectively after 30, 45 and 60 days of treatment period as compared with their initial body weight (0 day).

Blood glucose
Changes in fasting blood glucose level in normal control and experimental rats are depicted in Table 2. Normal control rats (group I) showed sustained blood glucose level throughout the experimental period. In contrast to this, continuous increase in fasting blood glucose levels was recorded in untreated diabetic control rats (group II) by 5.42%, 9.44% and 13.27% (P≤0.05) and 16.40% (P≤0.01) respectively after 15, 30, 45 and 60 days of experiment period as compared with their corresponding values on 0 day.

The fasting blood glucose levels in diabetic rats treated with 100, 250 and 500 mg/kg b.wt./day doses of C. fistula pod extract showed significant dose dependent decline after 15, 30, 45, and 60 days of treatment except in lower dose group where significant decline in blood glucose level recorded only after 30 days. The reduction in blood glucose level observed in the C. fistula extract (100, 250 and 500 mg/kg) treated rats on 60 days treatment duration was 37.25%, 43.97% and 50.13% respectively.

In diabetic rats receiving glibenclamide treatment (group VI), the fasting blood glucose level also reduced significantly(P ≤ 0.001) by 38.77%, 53.34%, 61.32 and 62.84% respectively after 15, 30, 45 and 60 days of treatment as compared with corresponding values on 0 days.

Oral glucose tolerance test (OGTT)
Figure 1 shows the changes in the blood glucose levels in normal control and different experimental groups after oral administration of glucose (2g/kg b.wt.). In all experimental groups oral feeding of glucose induced a significant elevation in blood glucose after 30 minutes as compared with corresponding values on 0 min. After 120 min the blood glucose

Table 1: Effects of C. fistula pod extract on body weight (g) in STZ-induced diabetic rats

<table>
<thead>
<tr>
<th>Treatment</th>
<th>STZ Treatment Day</th>
<th>0th day</th>
<th>15th day</th>
<th>30th Day</th>
<th>45th Day</th>
<th>60th Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>186.67±3.33</td>
<td>189.17±3.75</td>
<td>202.83±2.30±</td>
<td>208.33±3.88±</td>
<td>220.67±3.16±</td>
<td>233.33±2.25±</td>
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<td></td>
<td></td>
<td></td>
<td>(+7.22)</td>
<td>(+10.12)</td>
<td>(+16.65)</td>
<td>(+23.34)</td>
</tr>
<tr>
<td>Group II</td>
<td>192.50±2.14</td>
<td>179.33±2.29</td>
<td>169.33±1.96±</td>
<td>162.50±1.78±</td>
<td>155.17±1.68±</td>
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<td>(-5.57)</td>
<td>(-9.38)</td>
<td>(-13.47)</td>
<td>(-15.61)</td>
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<tr>
<td>Group III</td>
<td>194.00±2.78</td>
<td>180.17±2.36</td>
<td>181.67±2.11±</td>
<td>183.00±1.90±</td>
<td>186.17±2.04±</td>
<td>190.33±2.29±</td>
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<td></td>
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<td>(+0.83)</td>
<td>(+1.57)</td>
<td>(+3.33)</td>
<td>(+5.63)</td>
</tr>
<tr>
<td>Group IV</td>
<td>193.83±1.90</td>
<td>181.00±2.10</td>
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<td>Group V</td>
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<td>172.50±2.49</td>
<td>178.67±3.01±</td>
<td>186.83±2.91±</td>
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<td>(+3.57)</td>
<td>(+8.33)</td>
<td>(+9.95)</td>
<td>(+12.94)</td>
</tr>
<tr>
<td>Group VI</td>
<td>188.00±2.44</td>
<td>177.17±3.02</td>
<td>183.17±2.76±</td>
<td>190.83±2.61±</td>
<td>195.33±3.57±</td>
<td>202.50±4.25±</td>
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<td></td>
<td></td>
<td></td>
<td>(+3.83)</td>
<td>(+7.71)</td>
<td>(+10.25)</td>
<td>(+14.29)</td>
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</table>

Level of significance: ns = non significant; a = P ≤ 0.05; b = P ≤ 0.01; c = P ≤ 0.001, normal control, diabetic control, C. fistula extract and glibenclamide treated rats compared with their corresponding values on 0 day.
level in normal control rats (group I) tend to return near normal level. The untreated diabetic rats (group II) showed maximum increase in blood glucose after 60 min and mild decline after 90 min. In diabetic rats treated with 500 mg/kg b.wt. of \(C.\) fistula extract (group V) or glibenclamide (group VI), the blood glucose level showed continues decline after 60 min and after 120 min the level reached to near initial value at 0 min.

**Total hemoglobin, glycosylated hemoglobin and glycogen**

Figures 2-4 shows the levels of total hemoglobin (Hb), glycosylated hemoglobin (HbA1c) and hepatic glycogen respectively, in normal control, diabetic control and all experimental groups. The diabetic control rats (group II) showed a significant (P≤0.001) decrease in the levels of hepatic glycogen and total hemoglobin (Hb) with a concomitant significant (P≤0.001) increase in the percentage of glycosylated hemoglobin (HbA1c) in blood as compared to normal control rats (group I). Diabetic rats treated with different doses of \(C.\) fistula pod extract (100, 250 and 500 mg/kg) or glibenclamide (group VI), the blood glucose level showed continues decline after 60 min and after 120 min the level reached to near initial value at 0 min.

**DISCUSSION**

Body weight is an indicator of good health and efficient metabolic homeostasis. The body weight of normal control rat showed a progressive increase throughout the experimental period. However, the body weight of untreated diabetic rats was found to be significantly decreased with increasing the duration of treatment. These results are in agreement with previous finding where similar decline in the body weight was recorded in STZ-induced diabetic rats. The observed body weight loss in diabetic rats might be due to dehydration and excessive breakdown of tissue proteins and fats. Increased catabolism leading to muscle wasting might also be responsible for body weight loss. Subchronic treatment of \(C.\) fistula pod extract at different doses (100, 250, 500 mg/kg) in

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**Table 2: Effects of \(C.\) fistula pod extract on fasting blood glucose (mg/dL) in STZ-induced diabetic rats**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>STZ treatment day</th>
<th>0th Day</th>
<th>15th Day</th>
<th>30th Day</th>
<th>45th Day</th>
<th>60th Day</th>
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<td>83.17±1.58</td>
<td>335.33±10.47</td>
<td>333.50±9.39&lt;sup&gt;a&lt;/sup&gt;</td>
<td>367.00±10.68&lt;sup&gt;a&lt;/sup&gt;</td>
<td>379.83±12.41&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>79.83±1.54</td>
<td>324.33±13.73</td>
<td>286.67±16.90&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>(-13.14)</td>
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<td>(-16.54)</td>
<td>(-36.81)</td>
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<td>Group V</td>
<td></td>
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<td>319.17±12.40</td>
<td>248.67±11.80&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>(-22.09)</td>
<td>(-40.89)</td>
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<td>Group VI</td>
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</table>

Level of significance: Value in parenthesis indicate % change  
Values represent mean ± SEM (n=6)

ns = non significant; a = P ≤ 0.05; b = P ≤ 0.01; c = P ≤ 0.001, normal control, diabetic control, \(C.\) fistula extract and glibenclamide treated rats compared with corresponding values on 0 day.
diabetic rats prevented the loss of body weight in both dose and duration dependent fashion. These observations are parallel with the finding of other workers who also reported a similar prevention of body weight loss in diabetic rats after administration of C. fistula extract. This might be due to efficient, better glycemic and metabolic homeostasis and prevention of muscles waisting induced by the plant extract.

Streptozotocin is broad spectrum antibiotic and is widely used chemical for the induction of experimental diabetes in animals. STZ selectively destroys the pancreatic beta cells involving uptake of glucose by glucose transporter-2 (GLUT-2). It also generates reactive oxygen species (ROS), which contribute to DNA fragmentation and evokes other deleterious effects in the diabetic animals.

Glycosylated hemoglobin is considered as the most reliable marker of glycemic control in the body. Glycation is a post translational non-enzymatic addition of sugar residues to N-terminal end of the hemoglobin beta chain. The rate of synthesis of HbA1c is directly related to exposure of RBC to glucose. HbA1c is formed progressively and irreversibly over a period of time and it stable till the life of RBC. During diabetes, the excess glucose present in the blood reacts with hemoglobin. Therefore, the total hemoglobin level is decreased with concomitant increase in the percentage of glycosylated hemoglobin (HbA1c) in the blood of streptozotocin induced diabetic rats as observed during present study. Our results are supported by the earlier findings which have also observed significant increase in HbA1c level in STZ diabetic rats. Administration of C. fistula pod extract or glibenclamide in diabetic rats significantly prevented the rise in glycosylated hemoglobin (HbA1c) level and increased the levels of total hemoglobin in blood. This might be the result of an improvement of the glycemic control in the body. These results are corroborated by earlier reports which have also reported decline of glycosylated hemoglobin levels thereby increasing the levels of total hemoglobin in diabetic rats treated with extract of C. fistula leaves, bark, flowers and root. Liver plays a crucial role in maintaining the blood glucose homeostasis. Insulin regulates glucose metabolism in the liver by stimulating glycolysis, glycogenesis and inhibiting glucogenesisis. Glycogen synthase and glycogen phosphorylase are two key regulatory enzymes that catalyze the rate limiting steps of glycogenesis and glycogenolysis respectively. Insulin favours glycogen synthesis by means of stimulation of glycogen synthase and inhibiting glycogen phosphorylase. Reduced hepatic glycogen content observed in streptozotocin induced diabetic rats in the present study may be correlated with insulin insufficiency and/or defect in insulin action. These results are parallel with the previous findings where similar decline in glycogen contents in liver was observed in diabetic animals. When diabetic rats were treated with different doses of C. fistula pod extract, a significant dose dependent increase in its many potential bioactive phytochemicals especially rhein glycosides, fistulic acid, sennoxides A & B, anthoquinones, flavon-3-ol derivatives, kaempferol, proanthocyanidins like catechin, epiafzelechin, epicatechin and procyanidin and quercetin dehydrates. The seed contains oxyanthraquiones, chrysophanol and chrysophanein.

The antihyperglycemic effect of C. fistula pod extract might be by virtue of individual or synergistic effects of the phytoconstituents resulting in stimulation of insulin from remnant pancreatic β-cells or insulin mimetic effects which in turn stimulates glucose utilization by hepatic and extra hepatic tissues of the diabetic rats. In addition to this, the extract may cause inhibition of glucose absorption in the gut which contribute to DNA fragmentation and evokes other deleterious effects in the diabetic animals. It is well established that C. fistula pod is rich source of antioxidants, which scavenge hyperglycemia induced free radicals and exhibit β-cells protective effect. Oral glucose tolerance test is well accepted and frequently used assay to screen anti hyper glycemic activity of any drug and also to identify the altered carbohydrate metabolism during post glucose administration. The results of oral glucose tolerance test suggest that rats treated with C. fistula pod extract (500 mg/kg b.wt) have better glucose utilization capacity. This action could be due to enhanced insulin secretion from the beta cells, improved glucose utilization and transport. These results are consistent with earlier findings which have also reported significant improvement in oral glucose tolerance in C. fistula extract treated diabetic rats.

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hepatic glycogen reserve was observed indicating enhanced rate of
glycogenosis probably by virtue of insulin secretagogue or insulin
mimetic activity of the extract which may enhance uptake of glucose in
hepatic cells or by forcing the activities of enzymes that are involved in
glycogen synthesis. These results are in agreement with previous studies
which have also shown significant increase in glycogen content of liver
after treatment of STZ-induced diabetic rats with C. fistula leaves
and bark extract. The observed anti-diabetic effects of C. fistula pod extract
were comparable to the standard drug glibenclamide.

CONCLUSION
The results of present study showed that 70% ethanolic extract of
C. fistula pod effectively lowered fasting blood glucose levels and glyco-
sylated hemoglobin in blood and increased glycogen store in the liver
of STZ-induced diabetic rats suggesting improved glycemic control in
diabetic state and supports the traditional use of the C. fistula pod in
management of diabetes mellitus.

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CONFLICT OF INTEREST
There are no conflicts of interest.

ABBREVIATIONS USED
b.wt.: Body weight; C. fistula: Cassia fistula; DM: Diabetes mellitus; Hb:
Hemoglobin; HbA1c: Glycosylated hemoglobin; OGTt: Oral Glucose
Tolerance Test; RBC: Red Blood Cell; STZ: Streptozotocin.

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Jangir et al.: Antidiabetic activity of Cassia fistula pod in STZ-induced diabetic rats

Antidiabetic activity of 70% ethanolic extract of C. fistula Linn. pod in STZ-induced diabetic rats was studied. Extract treatment in STZ-diabetic rat significantly restored body weight. The extract also showed significant reduction in fasting blood glucose, glycosylated hemoglobin (HbA1c) levels and improvement in OGTT.

HIGHLIGHTS OF PAPER

• Antidiabetic activity of 70% ethanolic extract of C. fistula Linn. pod in STZ-induced diabetic rats was studied.
• Extract treatment in STZ-diabetic rat significantly restored body weight.
• The extract also showed significant reduction in fasting blood glucose, glycosylated hemoglobin (HbA1c) levels and improvement in OGTT.
• Hepatic glycogen store was also increased significantly in extract treated STZ-diabetic rats.
• The anti-hyperglycemic effect of the extract was comparable with standard drug glibenclamide and supports the traditional use of C. fistula pod in the management of diabetes mellitus.

GRAPHICAL ABSTRACT

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