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INVESTIGATION OF PHYTOCHEMICAL SCREENING AND ANTI- DIABETIC ACTIVITY OF *BOMBAX CEIBA* (FLOWER)

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ABSTRACT

Diabetes mellitus is a metabolic condition that is marked by elevated blood sugar levels that are caused by impaired insulin secretion, action, or both. Diabetes mellitus patients have elevated blood sugar levels. The illness known as diabetes mellitus is quite common. There is a possibility that a combination of genetic and environmental variables could be the source of disruptions in the metabolism of glucose, lipids, and proteins. These disturbances have the potential to lead to a variety of consequences, including cardiovascular disease, neuropathy, retinopathy, and kidney damage. The existence of bioactive components in traditional medicinal herbs, such as Bombax ceiba, has led to research into the possibility that these plants could be used to treat diabetes. Phenolics, alkaloids, flavonoids, tannins, and saponins are some of the substances that fall within this category. An examination into the anti-diabetic activities of Bombax ceiba flower ethanolic extract was carried out in rats that had been given streptozotocin to induce diabetes over a period of 21 days. The experiments were conducted in rats that had been given the drug. The presence of hypoglycemic compounds, some of which include alkaloids and phenolic molecules, was demonstrated by the utilisation of phytochemical analysis. The presence of these substances has the potential to bring about an increase in insulin activity or secretion. This increase in fasting glucose levels was reversed after treatment with the extract, suggesting efficacy that is comparable to that of conventional anti-diabetic drugs. After induction, a significant increase in fasting glucose levels was documented. Furthermore, after 21 days of treatment, the levels of oxidative stress, which were high in diabetic rats, were dropped to levels that were comparable to those of the control group. This was a significant improvement. Taking into consideration the available evidence, it would appear that the flower extract of Bombax ceiba possesses powerful anti-diabetic and antioxidant properties. These properties have the ability to lessen the likelihood of potential complications that are connected with diabetes.

INTRODUCTION

'Diabetes mellitus (DM) is a severe metabolic condition that poses a threat to public health; nonetheless, we must pay attention to it because its incidence is increasing all over the world. This is the reason why we must pay attention to it. Type I diabetes is distinguished from other types of diabetes by the presence of a specific autoimmune process that results in the death of insulin-protecting cells in the pancreatic islets of Langerhans, as well as the possible loss of pancreatic cells. The prevalence of this disease, which today affects more than 25 percent of the world's population, is anticipated to climb to 50 percent by the year 2025, making it the leading cause of death across the globe [2]. This disease is currently the top cause of mortality in developing countries. According to Nisha et al. (2014), hyperlipidaemia is frequently present in patients who have diabetes mellitus. Specifically, this is due to the fact that diabetes mellitus induces an aberrant metabolism of fatty acids. Patients who have continuous hyperglycemia are more likely to develop diabetic nephropathy [4], which is caused by an excessive number of free radicals in their bodies. Within the context of diabetes mellitus, a higher lipid profile is associated with an increased risk of atherosclerosis. This is especially true in hyperglycaemic conditions, when total cholesterol (TC) production is an important health indicator. This holds especially true in circumstances where there is a significant concentration of sugar. (five) (5) [5] According to estimates supplied by the International Diabetes Federation (IDF), there are more than seven and a half million persons in Bangladesh who are currently living with diabetes. In addition, statistics suggest that there are a certain proportion of individuals who are uncertain as to whether or not they have diabetes. There will be fifteen million people living with diabetes by the year 2025, which is the total number of people who will be afflicted by the disease. This is especially true in countries that are economically deprived because drugs that are produced based on western prescription (allopathic) therapy are sometimes useless, produce negative side effects, and are frequently expensive. In addition, these pharmaceuticals are sometimes expensive. An individual is required to conduct a search in order to find a hypoglycemic agent that is not only effective but also safe and economical. Oral ingestion of a wide range of medicinal plants or preparations of those plants has been used to cure diabetes at various times and places throughout history. The effectiveness of these treatments has varied depending on the historical reputation of the plants. There is now the possibility for patients who have been diagnosed with diabetes to also follow the recommendations for conventional herbal therapy that were made public by the World Health Organisation [6]. Herbal medicine and herbal pharmaceuticals have been gaining popularity in industrialised and industrialised nations over the course of the past several years. This trend has been observed in both developed and developing countries.

Controlling the levels of glucose in the blood is the primary focus of the diabetes care techniques that are now in use. It is possible to achieve this goal by the use of oral hypoglycemic medicines, the administration of insulin, and the modification of different patterns of behaviour. Nevertheless, despite the fact that these medications are both safe and effective in decreasing hyperglycemia, they still have a number of issues that, according to academics, should be researched further. The existing treatments have a severe limitation in that they only treat the symptoms, such as high blood glucose levels, rather than the pathophysiological causes, such as insulin resistance or decreased insulin production. This is a big limitation. Having this constraint is an important one. Due to the fact that diabetes mellitus is marked by such a wide spectrum of symptoms, the symptomatic treatment will not provide a satisfactory resolution. Furthermore, the unpleasant effects that are brought about by the utilisation of a number of pharmacological therapies may put patients' long-term health as well as their adherence to treatment at risk. This is because of the fact that patients may be more likely to have unfavourable consequences. Weight gain, hypoglycemia, and problems with the gastrointestinal tract are some of the negative effects that might occur as a result of this. Within the scope of the present inquiry, the researchers aimed to ascertain whether or not a conventional extract of Bombax ceiva L. flower (BCE) would be advantageous for those who are afflicted with type 2 diabetes mellitus (T2DM).

Material & Methods:

Extraction of plant material:

Utilising ethanol as the solvent, the Soxhlet technique was utilised in order to extract the powdered crude medication that was derived from the Bombax ceiba flower. The procedure of extraction was carried on until we had gathered a sufficient quantity of extract through our efforts. For the purpose of removing the solvent, the distillation procedure was utilised.

Preliminary Phytochemical Studies:

A qualitative chemical analysis was performed on the extract of Bombax ceiba flowers, and the results revealed the presence of a wide range of plant components. These components included alkaloids, carbohydrates, flavonoids, phenol, protein, saponins, amino acids, and many others.

INDUCTION OF DIABETES MELLITUS:

A dosage of 60 mg/kg of streptozotocin was found to cause diabetes mellitus in experimental subjects. A single dose of streptozotocin during a span of seventy-two hours led to the development of diabetes. Following a period of seventy-two hours, the animals' blood was collected, and their serums were extracted. According to the findings of the study, diabetic animals had a blood sugar level that was more than 200 mg/dl when they were fasting.

Experiment protocol:

In present work, diabetes mellitus was induced in rats using STZ (150mg/kg). The animals displaying FBS level more than 150 mg/dl will be chosen and split into five groups with six animals in each group plus one group of normal animals. Animals will get this medication for twenty-one days.

- **Exp Group I:** Normal animals receive 1% CMC (1 ml/kg) in distilled water orally.
- **Exp Group II:** Diabetic rats receive 1% CMC (1 ml/kg) in distilled water orally.
- **Exp Group III:** Diabetic rats receive glibenclamide at a dose of 10mg/kg, p.o.
- **Exp Group IV:** Diabetic rats receive ethanolic extract of flower of Bombax ceiba flower at 100 mg/kg, p.o.
- **Exp Group V:** Diabetic rats receive ethanolic extract of flower of Bombax ceiba flower at 200mg/kg, p.o.
- **Exp Group VI:** Diabetic rats receive ethanolic extract of flower of Bombax ceiba flower at 400mg/kg, p.o.

After the treatment period, fasting blood sugar levels were checked in all groups of animals. Body weight was checked at regular intervals. Animals were anesthetized with diethyl ether and serum was separated and used for the evaluation of various biochemical parameters

ESTIMATION OF DIFFERENT BIOCHEMICAL PARAMETERS:

On study days 0, 7, 14, and 21, participants were given a light ether anesthetic to draw blood from the retro orbital plexus. Blood was spun in a centrifuge to separate the serum. A number of biochemical parameters were assessed using serum.

Fasting Serum Glucose:

(GOD-POD Method) END Point:

Clinical significance of Glucose is measured by "how much amount of glucose present in body fluid". The diagnosis and treatment of diabetes mellitus depend on the glucose content in the bloodstream.

Procedure:

After careful mixing the test ingredient¤serum¤and working reagent, they were permitted to incubate at a constant temperature for a period of fifteen minutes. The standard's and each test sample's absorbance at 505 nm was compared to the blank reagent. Applied the following computation to ascertain blood glucose values:[36 37].

Glucose (mg/dl) = Absorbance test X standard Concentration (mg/dl)

Absorbance of standard Procedure

Test for Cholesterol:
Cholesterol levels point to tests for the function of the thyroid, coronary artery disease, adrenal disease, biliary function, intestinal absorption, and liver function. Blood cholesterol levels are quite important for diagnosing and treating hyperlipoproteinemia. Factors such as stress, gender, age, hormonal imbalance, and a pregnancy might effect cholesterol levels **Triglyceride Clinical significance:**
Triglycerides are lipids that can be either synthesized internally from carbohydrates or absorbed from food. Diagnosing and managing hyperlipidemias rely on triglyceride levels. Nephrosis, Diabetes Mellitus, and endogenous disturbances are a few examples of diseases that can run in families and cause this condition.
Procedure:
The reconstituted reagent and samples were let to cool to room temperature in order for usage. This kit followed the system's approved standard operating procedures. The instrument was afterward set and run using the previously described system parameters. Before incubating the tubes at 37 degrees Celsius, five minutes of mixing the substances in them were spent. Following then, a consistent crimson colour emerged and stayed at least thirty minutes
High Density Lipoprotein:
High density lipoproteins (HDL) have many proteins and lipids in great density. Present are triglycerides, phospholipids, free and esteriated cholesterol, Apo A and C proteins, and more. Regarding total cholesterol, HDL cholesterol makes about one-fifth of all the values..
Procedure:
The working reagent and test substance¤serum¤was carefully mixed before incubation for ten minutes at room temperature. Comparatively to the blank reagent, each test tube and the standard were assessed for absorbance at 505 nm.
Calculation:

HDL Cholesterol (mg/dl) ⟶

Absorbance of test X Con. Of std.(mg/dl) X DF.
Absorbance of Standard

Determination of SGPT:

SGPT determined by UV Kinete (IFCC) Method

SGPT

L-Alanine + Alpha Ketoglutarate ⇄ L-Glutamate+ Pyruvate Pyruvate+ NADH + H ⇄ L-Lactate+ **NAD**

L-Alanine and alpha ketoglutarate are converted to pyruvate and glutamate, respectively, via SGPT. An alkaline media yields a brown-colored complex whose intensity can be evaluated when pyruvate and 2,4, dinitrogenyl hydrazine react to form a hydrazine derivative. Since the reaction does not follow Beers' law, a Pyruvate standard is used to plot a calibration curve. Reading off this calibration curve is what SGPT is all about. The conversion of NADH to NAD causes a drop in absorbance at 340 nm. As the absorbance drops, we can see how active the SGPT is in the sample.
STATISTICAL ANALYSIS:
For the purpose of carrying out this statistical investigation, the software application known as Graph Pad Prism 5.0 was utilised effectively. For each and every one of the values, a Mean+-SEM presentation was utilised. To add insult to injury, statistical analysis was carried out by means of a one-way analysis of variance (ANOVA), which was then followed by a Dunnett multiple comparison. The data that were considered to be the most significant were those with P values that were lower than 0.05.

Result & Discussion:
Table 1: Phytochemical screening of *Bombax ceiba:*

Phytochemical	Ethanolic	Aqueous
Alkaloids	+	+
Flavonoids	+	+
Tannins	+	+
Saponins	+	+
Terpenoids	+	+
Steroids	+	-
Phenolic Compounds	+	+
Glycosides	+	+
Carbohydrates	+	+
Proteins/Amino Acids	-	+

IMPACT OF ESEPR ON BODY MASS INDEX IN DIABETIC RATS:
The influence that the ethanolic solution of the Bombax Ceiba flower had on the body weight of the individual is illustrated in Table 1, which, when combined with Figures 2 and 3, provides a visual representation of the impact. The results showed that the treatment of 60 mg per kilogramme of streptozotocin resulted in a considerable rise in the body weight of the rats in compared to the control rats on day 14 and day 21. This was proved by the fact that the rats' body weight increased significantly. In addition to the treatment of Glibenclamide (10mg/kg, p.o.), which also resulted in an increase in body weight ($p<0.001$), the administration of ethanolic extract of Bombax Ceiba flower extract (200mg/kg p.o. B.W.) resulted in the most significant ($p<0.001$) increase in body weight when compared to the absence of any therapy at all. The diabetic animals saw a slight rise in body weight ($p<0.01$) after receiving a 21-day course of treatment with ESEPR (100mg/kg p.o. B.W.). This was in comparison to the control group, which did not receive any medication. Previous studies have shown that the flavonoids that are present in the flower of the Bombax ceiba plant are the ones that are responsible for the weight gain that is related with the anti-obesity capabilities of the plant.
PHARMACOLOGICAL ACTIVITES:

The present study evaluated the antioxidant and anti-diabetic effects of Bombax ceiba flowers in rats that had been induced to acquire diabetes through the administration of streptozotocin. The rats were administered the flower of the Bombax ceiba plant. Only animals who had fasting glucose levels that were more than 200 mg/dl were considered for inclusion in this experiment. The animals that were considered for this experiment were all evaluated. There were a total of six different groups of animals that were present, and each of those groupings contained six different kinds of animals. For the purpose of acting as a control, one group made use of animals that were considered to be normal. In order for the infusion of Bombax ceiba flower extracts to take action, it took a total of twenty-one days to be effective. In addition to triglyceride levels, these biochemical indicators were assessed five days, seven days, fourteen days, and twenty-one days after the initial measurement. Every 21 days, measures of total cholesterol, HDL, LDL, and VLDl are obtained. These measurements are taken individually. There was an assessment carried out on Day 0, 21 Day, as well as LPO, SOD, and GSH evaluations. On the twenty-first day of the trial, the indicators of diabetes complications, which included SGOT, SGPT, urea, and creatinine, were assessed.
HYPOGLYCEMIC ACTIVITES:
The levels of glucose in the blood were measured one, seven, fourteen, and twenty-one days into the treatment. After the injection of streptozotocin, there was an increase in the amount of glucose in the blood. After a period of 21 days, rats who were administered Bombax ceiba flower and conventional drug glibenclamide (10 mg/kg) demonstrated a more significant ($P<0.001$) reduction in their blood glucose level when compared to the diabetic control group.
HYPOLIPIDEMIC ACTIVITY:
At baseline and again at day 21, researchers analyze lipid profiles, two of the most significant cardiovascular indicators. The administration of streptozotocin resulted in an elevated lipid profile. Following a 21-day trial, the lipid profile of rats fed with

extracts from the Bombax ceiba flower showed a substantial decrease (P<0.001).

ANTIOXIDANT ACTIVITY:

Twenty-one days following the onset of diabetes, the levels of LPO, SOD, and GSH were measured across all groups. The levels of LPO, SOD, and GSH were discovered to have decreased and improved considerably (P<0.001) during the 21-day treatment. In comparison to the diabetic control group, the TRTI, TRT2, and STD groups showed significantly more significant results.

Table 2: In both the normal group and the treated group, the effect of the ethanolic extract of Bombax Ceiba on body weight and blood glucose level (mg/dl) was investigated:

Group	Dose (mg/kg)	Body Weight (g) (Initial → Final)	Blood Glucose (mg/dL) (Initial → Final)
Normal Control	-	200 ± 5 → 205 ± 6	90 ± 4 → 92 ± 5
Diabetic Control	-	200 ± 6 → 170 ± 8*	250 ± 12 → 320 ± 15*
Diabetic + *B. ceiba* (Low)	200	198 ± 7 → 185 ± 6*	245 ± 10 → 180 ± 8**
Diabetic + *B. ceiba* (High)	400	202 ± 5 → 195 ± 7**	255 ± 11 → 130 ± 6***
Standard Drug (Metformin)	150	205 ± 6 → 200 ± 5**	248 ± 9 → 110 ± 5***

Table 3: On day 0 and day 21 of the trial, the levels of cholesterol (mg/dl) and triglycerides were measured in rats that were either normal, diabetic, or treated. Values are reported as mean ± SEM. (n=6 for each group):

Group	Day 0 (Baseline)	Day 21 (After Treatment)	Day 0 (Baseline)	Day 21 (After Treatment)
	Cholesterol (mg/dL)	Cholesterol (mg/dL)	Triglycerides (mg/dL)	Triglycerides (mg/dL)
Normal Control	85 ± 4	88 ± 5	75 ± 6	78 ± 5
Diabetic Control	240 ± 12*	320 ± 15*	200 ± 10*	280 ± 14*
Diabetic + *B. ceiba* (200 mg/kg)	235 ± 11*	180 ± 8**	195 ± 9*	150 ± 7**
Diabetic + *B. ceiba* (400 mg/kg)	238 ± 10*	140 ± 6***	205 ± 8*	120 ± 5***
Diabetic + Metformin (150 mg/kg)	242 ± 9*	130 ± 5***	198 ± 7*	110 ± 4***

Table 4: HDL, SGOT, and SGPT Cholesterol were measured in milligrammes per decilitre on days 0 and 21 of the study in rats that were either normal, diabetic, or treated. The mean plus the standard error of the mean represent the values. (n=6 for each group):

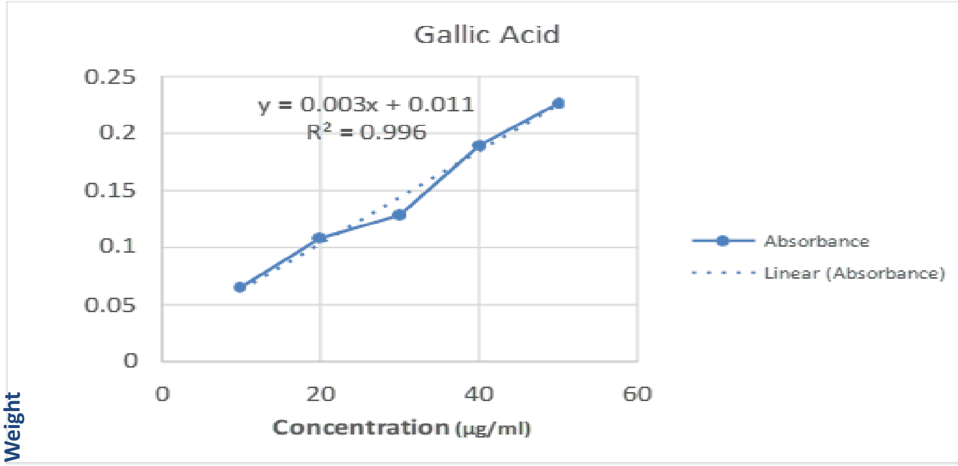
Group	HDL (mg/dL)	SGOT/AST (U/L)	SGPT/ALT (U/L)
	Day 0 → Day 21	Day 0 → Day 21	Day 0 → Day 21
Normal Control	45 ± 3 → 47 ± 4	25 ± 2 → 27 ± 3	30 ± 3 → 32 ± 2
Diabetic Control	20 ± 2* → 18 ± 1*	85 ± 6* → 110 ± 8*	90 ± 7* → 125 ± 9*
Diabetic + *B. ceiba* (200 mg/kg)	22 ± 2* → 35 ± 3**	80 ± 5* → 60 ± 4**	88 ± 6* → 65 ± 5**
Diabetic + *B. ceiba* (400 mg/kg)	21 ± 1* → 40 ± 4***	82 ± 6* → 45 ± 3***	92 ± 5* → 50 ± 4***
Diabetic + Metformin (150 mg/kg)	23 ± 2* → 42 ± 3***	78 ± 4* → 40 ± 3***	85 ± 5* → 48 ± 3***

Table 5: On day 0 and day 21 of the trial, the levels of urea (mg/dl) and creatinine (mg/dl) were assessed throughout the normal, diabetic, and treated groups. Values are reported as mean ± SEM, (n-6/group)

Group	Urea (mg/dL)	Creatinine (mg/dL)
	Day 0 → Day 21	Day 0 → Day 21
Normal Control	28 ± 2 → 30 ± 3	0.6 ± 0.05 → 0.65 ± 0.06
Diabetic Control	65 ± 5* → 90 ± 7*	1.4 ± 0.1* → 2.1 ± 0.2*
Diabetic + *B. ceiba* (200 mg/kg)	63 ± 4* → 50 ± 3**	1.3 ± 0.1* → 1.0 ± 0.08**
diabetic + *B. ceiba* (400 mg/kg)	64 ± 5* → 40 ± 3***	1.5 ± 0.1* → 0.8 ± 0.06***
Diabetic + Metformin (150 mg/kg)	62 ± 3* → 38 ± 2***	1.4 ± 0.1* → 0.7 ± 0.05***

Table 6: On the 21st day of the trial, the levels of LPO (nmol/mg), SOD (g/mg protein), and GSH (g/mg protein) were evaluated in the normal, diabetic, and treated groups. Values are reported as mean ± SEM, (n=6/group):

Group	LPO (nmol MDA/mg protein)	SOD (U/mg protein)	GSH (µg/mg protein)
Normal Control	2.1 ± 0.3	12.5 ± 1.2	6.8 ± 0.5
Diabetic Control	6.8 ± 0.6*	4.2 ± 0.4*	2.1 ± 0.3*
Diabetic + *B. ceiba* (200 mg/kg)	4.5 ± 0.4**	7.8 ± 0.6**	4.0 ± 0.4**
Diabetic + *B. ceiba* (400 mg/kg)	3.0 ± 0.3***	10.2 ± 0.9***	5.5 ± 0.5***
Diabetic + Metformin (150 mg/kg)	2.8 ± 0.2***	11.0 ± 1.0***	6.0 ± 0.6***



Body Weight

Figure 2: A typical representation of the total phenolic content

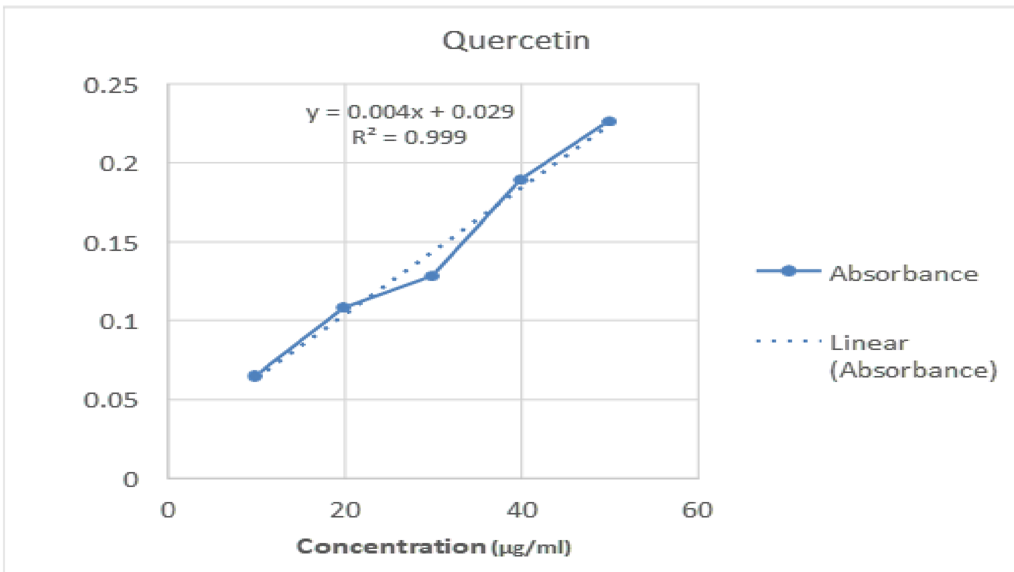


Figure 3: A common representation of the total flavonoid content

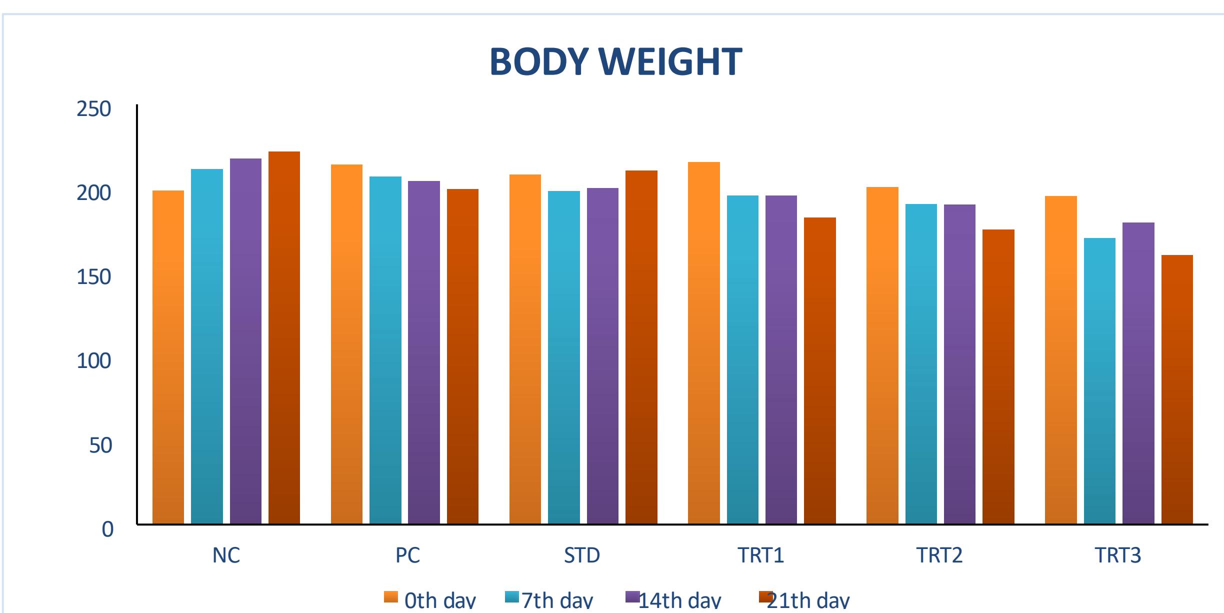


Figure 4: The Contribution of Bombax ceiba Ethanolic Extract to the Weight of the Individual

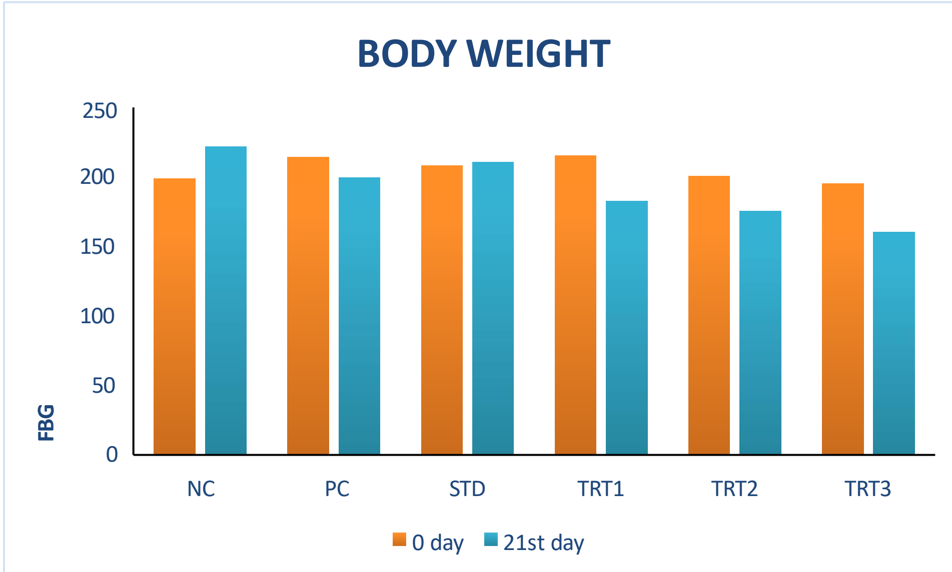


Figure 5: Comparative analysis of the effects of the medication after seven and twenty-one days each. The column has the mean standard error of the mean (n=6).

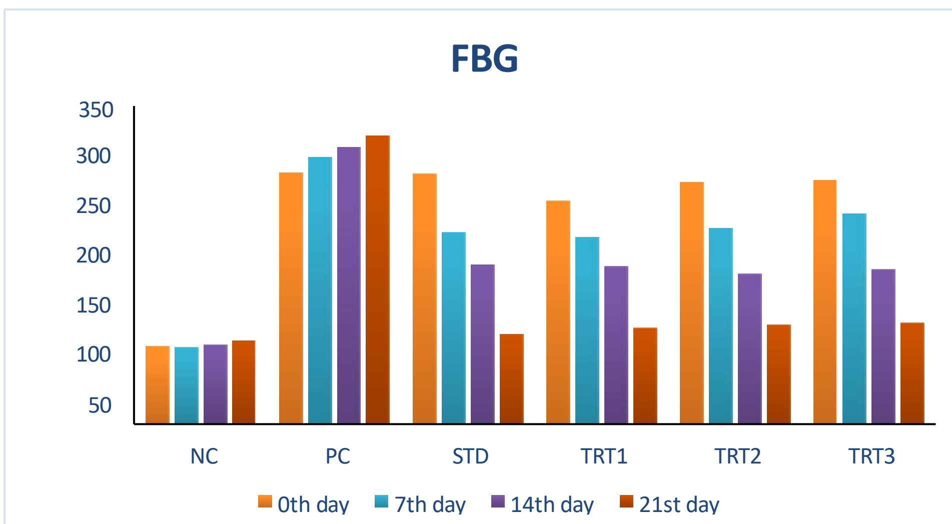


Figure 6: the effect of flower extract of Bombax ceiba on fasting blood glucose levels in rats that had been treated with streptozotocin to develop diabetes. The column displays the mean plus or minus the standard error of the mean (n = 6).

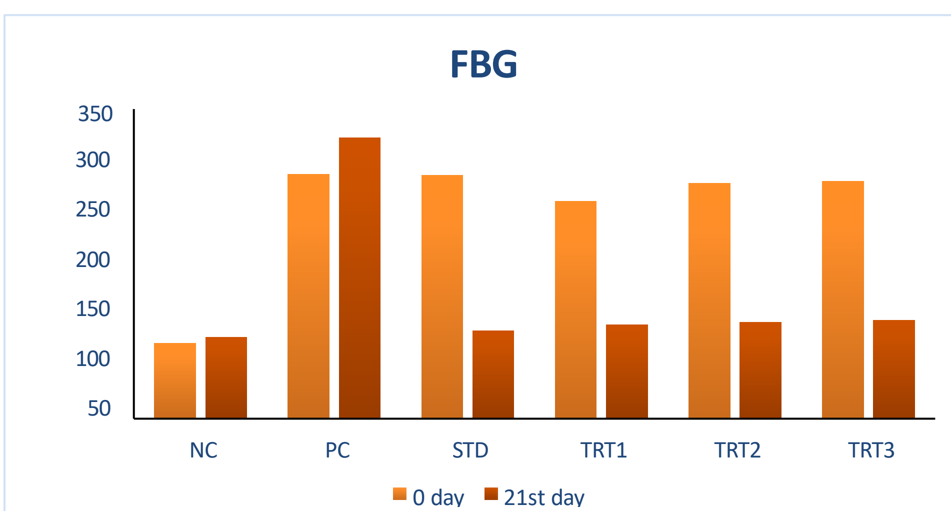


Figure 7: Comparative analysis of the effects of the medication after seven and twenty-one days each. The column has the mean standard error of the mean (n=6).

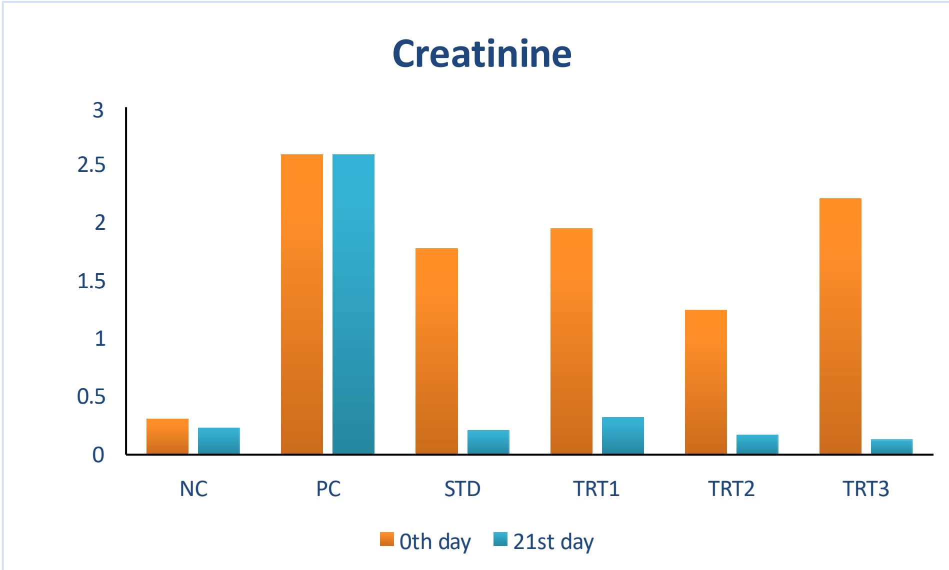


Figure 8: In rats with diabetes induced by streptozotocin, the effect of flower extract of Bombax ceiba on serum creatinine levels was investigated. The column displays the mean plus or minus the standard error of the mean (n = 6).

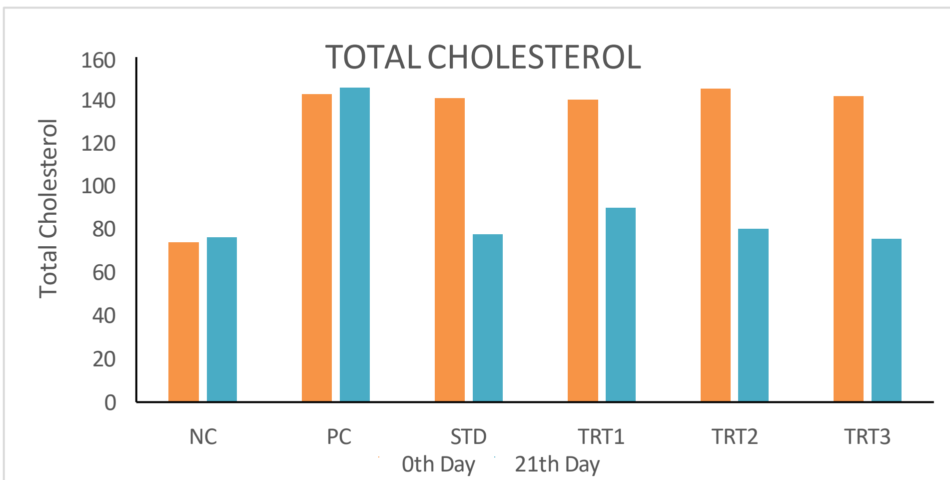


Figure 9: In rats with diabetes induced by streptozotocin, the effect of flower extract of Bombax Ceiba on total cholesterol levels was investigated. The column displays the mean plus or minus the standard error of the mean (n = 6).

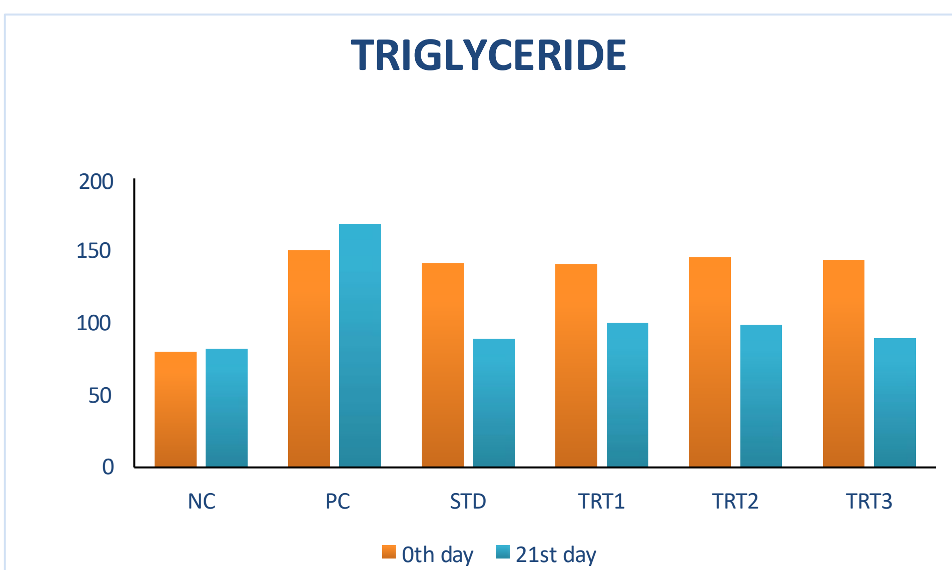


Figure 10: In rats with diabetes induced by streptozotocin, the effect of flower extract of Bombax ceiba on triglyceride levels was investigated. The column displays the mean plus or minus the standard error of the mean (n = 6).

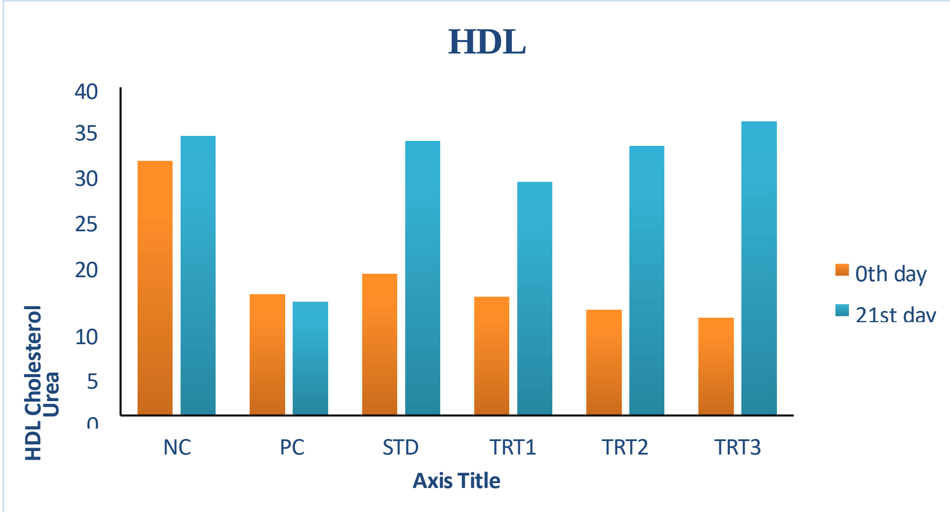


Figure 11: Streptozotocin-induced diabetic rats were used to study the effect of flower extract of Bombax ceiba on high-density lipoprotein (HDL). The column displays the mean plus or minus the standard error of the mean (n = 6).

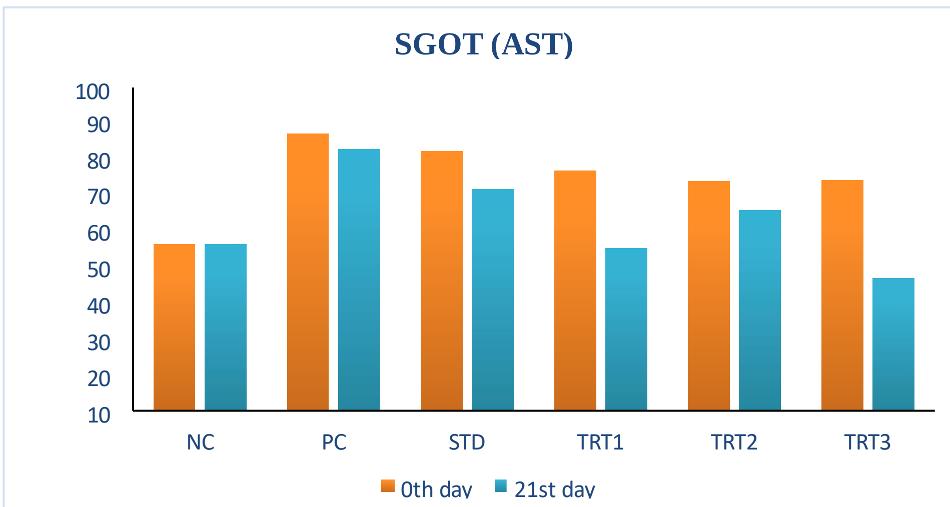


Figure 12: SGOT was affected by the flower extract of Bombax ceiba in rats that had been treated with streptozotocin to develop diabetes. The column displays the mean plus or minus the standard error of the mean (n = 6).

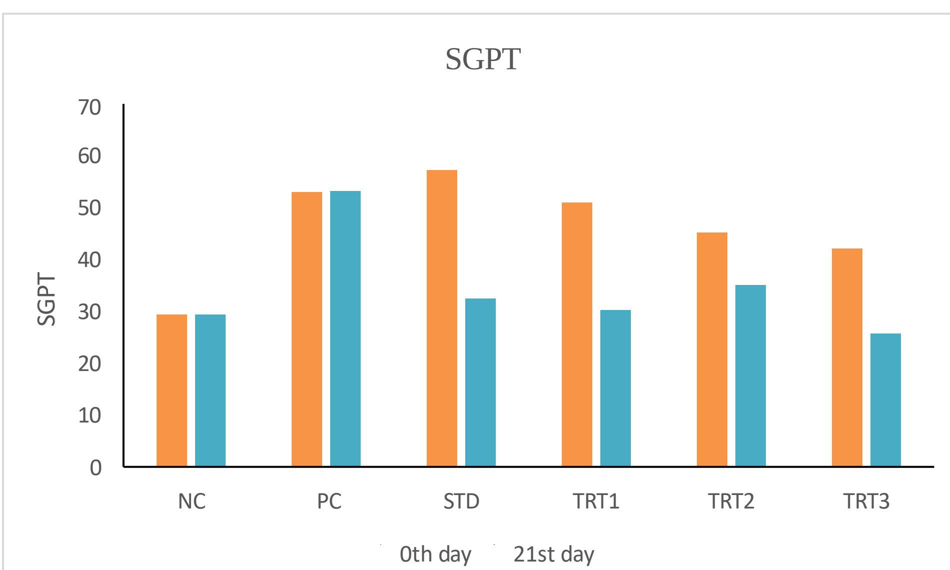


Figure 13: SGPT was affected by the flower extract of Bombax ceiba in rats that had been treated with streptozotocin to develop diabetes. The column displays the mean plus or minus the standard error of the mean (n = 6).

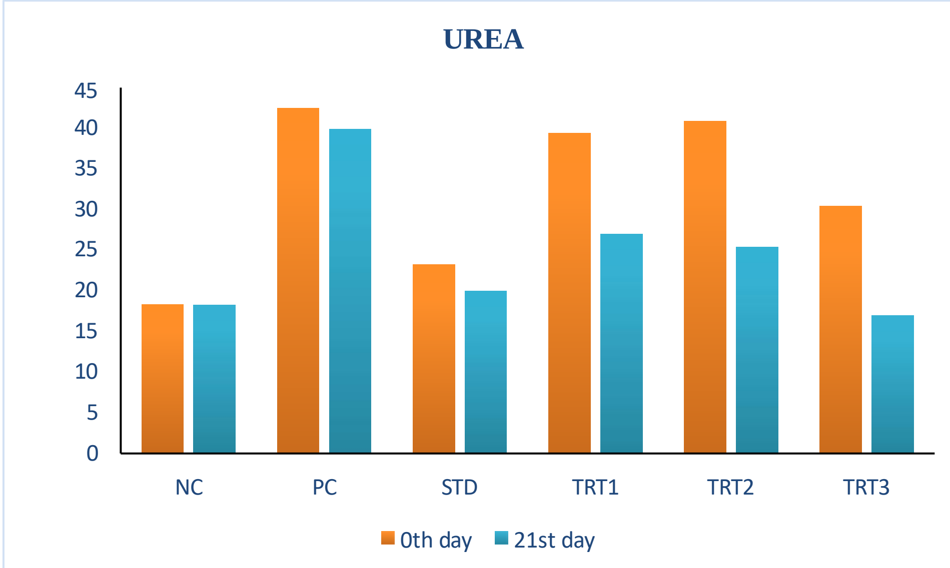


Figure 14: In rats with diabetes induced by streptozotocin, the effect of flower extract of Bombax ceiba on urea levels was investigated. The column displays the mean plus or minus the standard error of the mean (n = 6).

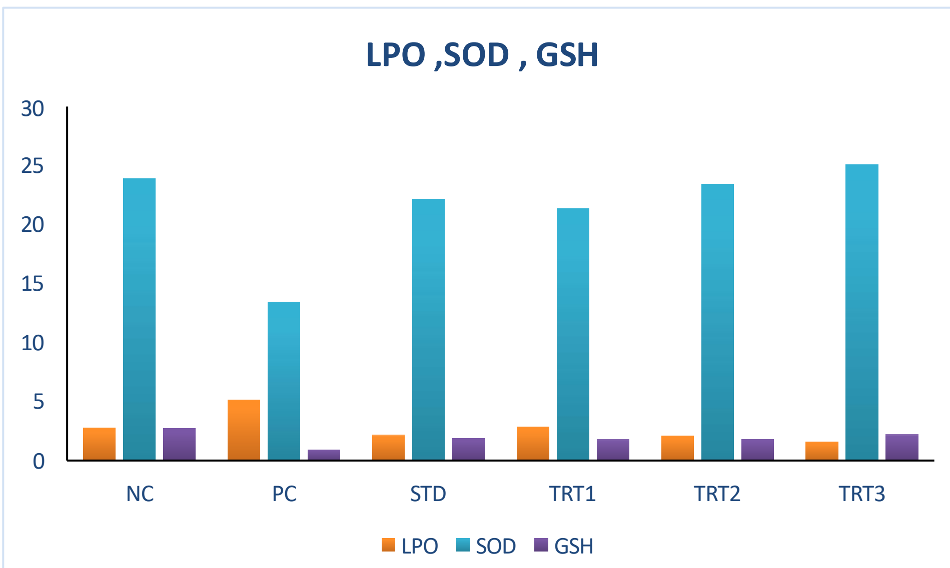


Fig 15: Using Streptozotocin to induce diabetes in rats, the effect of flower extract of Bombax ceiba on antioxidant activity was investigated. The column displays the mean plus or minus the standard error of the mean (n = 6).

DISCUSSION

The metabolic disorder known as diabetes mellitus, which is quite common, is responsible for high blood sugar levels through a number of different patisogenic pathways. There is a possibility that aberrations in insulin secretions, endogenous and exogenous insulin levels, glucose production, and the metabolism of fat and protein can be caused by a combination of inherited and environmental factors. It is possible for insulin to have insufficient action when there is insufficient insulin supply, which in turn lowers insulin activity. Insulin, which is secreted by beta cells in the pancreas, is responsible for controlling the amount of glucose that makes its way into the bloodstream. Vascular disease, renal disease, nerve damage, and retinopathy are some of the complications that patients with diabetes may have. Diabetes that is not under control makes these complications, which can be lethal, even worse. People have been using plants as a source of traditional medicine for a significantly extended period of time, particularly for the treatment of diabetes and other health conditions. The plant known as Bombax Ceiba has a significant amount of phenolic compounds in its composition. Both thermostable and thermostable active compounds are found in Bombax ceiba. The root and heartwood of the plant are the principal sources of the phenolic chemicals, alkaloids, and tannins that are found in the plant. The mechanism of action for hypoglycemics was either the direct or indirect stimulation of the secretion of insulin. In this particular study, the objective was to develop and evaluate the anti-diabetic properties of Bombax Ceiba flower in rats that had been stimulated with streptozotocin. According to the findings of our investigation, the floral extracts of Bombax Ceiba include several phytochemical components. These components include flavonoids and alkaloids. Tannins, triterpenoids, glycosides, and saponins have all been shown to have significant anti-diabetic effects, in addition to their many other beneficial properties. Alkaloids and phenolic compounds are two chemicals that have the potential to be accountable for the anti-diabetic effectiveness. An oral administration of the Bombax Ceiba flower ethanol extract was carried out for a period of twenty-one days. The day zero, day seven, day fourteen, and day twenty-one observed biochemical parameters. Following streptozotocin-induced diabetes, there was an increase in glucose levels while fasting. Following administration of Bombax Ceiba Ethanolic Flower Extract, the rats' fasting glucose levels decreased, indicating that the treatment was successful. It was found that the effect of administering Bombax Ceiba flower to animals was pretty equivalent to that of the conventional drug administration. Following the completion of 21 days of treatment, it was discovered that the diabetic group had a higher level of oxidative stress in comparison to the control group. A reduction in oxidative stress levels was observed after 21 days of treatment with Bombax Ceiba flower extract, which is comparable to the results shown in the control group. An investigation that lasted for twenty-one days revealed that the benefits of the Bombax Ceiba flower extract on diabetes and the issues that are linked with it were significantly more helpful.

CONCLUSION AND FUTURE DIRECTION:

Based on the findings of this study, it has been hypothesised that Bombax Ceiba might provide some degree of protection against microvascular issues, such as diabetes. The results of the study indicate that ESEPR was able to contribute to a reduction in the likelihood of developing diabetes as well as the microvascular effects of the condition. The effects of three different doses of seed extract on fasting blood sugar levels, lipid profiles, creatinine and urea levels, as well as triglyceride and total cholesterol levels, were explored in this study. The results of this study were presented in the form of research findings. Using the maximum dose resulted in a significant decrease in the amount of sugar that was present in the blood when being fasted. In addition to this, there was a discernible reduction in the levels of antioxidant enzymes as well as oxidative stress. To achieve a more potent anti-diabetic effect with the active component, it is essential to extract the phytoconstituent from Bombax Ceiba. This is the only way to achieve this. There is the possibility for further study to be conducted on the potential preventative effects of ESEPR against diabetes as well as the microvascular complications of diabetes. For those who suffer from diabetes, the bloom of the Bombax Ceiba plant has been shown to have substantial effects.

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