Abstract

Background: Diabetes Mellitus stands as a paramount public health concern, particularly in developed nations, posing severe complications when untreated. Currently, no hypoglycaemic agent or combination therapy offers a solution devoid of toxicity or adverse effects. Emerging evidence suggests that green tea derived from Camellia Sinensis may have beneficial effects on blood glucose control and insulin sensitivity.

Objective: This study aims to explore the potential hypoglycaemic impact of green tea in Alloxan diabetic Sprague Dawley rats, juxtaposed with the effects of Glibenclamide. Additionally, we seek to examine the protective role of green tea on pancreatic and liver cells.

Methods: Thirty-two male rats were divided into four groups: negative control (no intervention), positive control (diabetes induced by alloxan with no drug intervention), glibenclamide treated (diabetes induced by alloxan and treated with glibenclamide), and green tea treated (diabetes induced by alloxan and treated with green tea). Diabetes induction entailed intraperitoneal administration of Alloxan monohydrate at a dosage of 150mg/kg. After 48 hours oral tea supplementation commenced at a daily dosage of 3g/kg for a further 21 days, with comparisons drawn against oral Glibenclamide at 0.5mg/kg. At the end of the experiment, the overnight fasted rats were sacrificed by decapitation and blood glucose levels, liver function tests, and histopathological analysis of liver and pancreatic tissue were evaluated.

Results: The blood glucose levels were significantly increased in the untreated Alloxan-induced diabetic group, reaching 165.7 ±11.319 mg/dl ($p < 0.001$) compared to the control normal group 91.75 ± 7.464 mg/dl. Administration of tea resulted in a significant decrease in blood glucose levels to 85.8 +4.657 mg/dl ($p < 0.001$), a reduction comparable to that achieved with Glibenclamide treatment, where blood glucose decreased to 87.57 =5.507 mg/dl ($p <0.001$).

The histopathological examination of Pancreas revealed significant damage to the islets of Langerhans in addition to reduced size, disruption, and pyknotic nuclei in diabetic control group's rats'. However, an increase in Langerhans islets with restored structure was seen in the histological study of the pancreatic cells from the Glibenclamide and green tea groups.

Diabetic rats showed no hepatic morphological and biochemical changes.

Conclusion: These results demonstrate that green tea exerts both blood glucose-lowering and pancreatic protective effects in the diabetic model.
Key word: Diabetes Miletus, Green tea, Glibenclamide, Alloxan