Bioactives of Hypericum perforatum to control diabetes: In-vitro and in-vivo biological evaluation in diabetic rat

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Background: Improving diabetes mellitus treatment is a significant contemporary medical and societal issue. Plant-based botanicals may lower blood sugar, enhance insulin absorption, and block important enzymes that contribute to the onset and course of diabetes. The preventive role of Hypericin perforatum and its constituent hypericin was studied in this study using diabetic rats and in vitro cultures.

Methods: In vitro glucose absorption by yeast cells, alpha-amylase, and glucosidase activity were used to examine the mechanism of action of *Hypericum perforatum* (HP) extract. The safety and in vivo efficacy of extract was studied using Streptozotocin (STZ) induced diabetic rat model. Hematology, blood biochemistry and plasma insulin were also assessed.

Results: Extract significantly ($p<0.03$) enhanced the uptake of glucose through plasma membrane of yeast along with α-amylase ($p<0.05$) and α-glucosidase (o.o4) inhibition activity in vitro. Meanwhile, extract could significantly reduce Renal (uric acid, creatinine), hepatic (SGOT, SGPT, ALP) and lipid (triglycerides, cholesterol) profile in serum of diabetic rats. The extract was found to be safe up to 1000mg/kg dosage in preclinical acute dose toxicity studies. In diabetic rats, the extract reduced pancreatic histological alterations. This study found that extract reduced STZ-induced diabetes and oxidative stress to liver and pancreatic tissue, as well as increased plasma insulin levels in treated rats.

Conclusion: Our findings indicate that *Hypericum perforatum* extract demonstrated protective activity by effectively halting the sequential progression of oxidative stress, Renal and hepatic function test and lipid profile test and STZ induced histopathological alterations in liver and pancreas.

Key words: hypericin, Antioxidants, Anti-diabetic, pancreas, lipid, renal, hepatic, plant botanicals,