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## Antidiabetic effect of *Coccinia grandis* Linn. on streptozotocin induced diabetic rats and its role in regulating hepatic key enzymes

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*Coccinia grandis* (L.) Voigt is an herb, growing throughout India widely used in traditional treatment of diabetes. The aim of present study was to evaluate the antidiabetic potential of ethanol extract of mature unripe fruits of *Coccinia grandis* (CGE) in streptozotocin (STZ)-induced diabetic rats with reference to carbohydrate metabolizing hepatic enzymes. Male albino rats of Wistar strain with body weight,  $180 \pm 20$  g were divided into 5 groups of 6 rats in each (normal control, normal + 250 mg CGE, diabetic control, diabetic + 250 mg CGE and Diabetic + 5 mg glibenclamide (GBE)). Diabetes was induced in overnight fasted experimental rats by a single intraperitoneal injection of STZ (40 mg/kg body weight) dissolved in freshly prepared citrate buffer (0.1 M, pH 4.5). The animals were considered as diabetic, if their blood glucose values were above 250 mg/dl on the third day after STZ injection. The treatment was started on the third day after STZ injection and continued for 30 days at 24 h intervals during the entire period of the experiment. After the experimental period, the plasma glucose was estimated by the method of Trinder using a reagent kit (1969) and the glycated hemoglobin (HbA1c) was estimated by the method of Drabkin and Austin (1932) and Sudhakar and Pattabiraman (1981). Administration of CGE at 250 mg/kg body weight showed a significant ( $p < 0.05$ ) reduction in the levels of plasma glucose, from  $289.65 \pm 22.63$  to  $154.36 \pm 4.64$  mg/dL and HbA1c from  $1.26 \pm 0.027$  to  $0.62 \pm 0.039$  mg/g of Hb when compared to diabetic control group. The levels of hepatic key enzymes *viz.* hexokinase, glucose-6-phosphate dehydrogenase, glucose 6-phosphatase, fructose 1,6-bisphosphatase were assayed using methods of Brandstrup et al. (1957), Koide and Oda (1956), Gancedo and Gancedo (1971) and Bergmeyer (1984) respectively. Oral administration of CGE to diabetic group significantly ( $p < 0.05$ ) increased the activity of hexokinase from  $87.53 \pm 3.57$  to  $98.64 \pm 4.63$  nmoles of glucose-6-phosphate liberated/min/mg protein and glucose-6-phosphate dehydrogenase from  $1.38 \pm 0.14$  to  $1.72 \pm 0.13$  IU/L. In contrast, oral administration of CGE to diabetic group of animals significantly ( $p < 0.05$ ) decreased the gluconeogenic enzymes glucose 6-phosphatase from  $0.31 \pm 0.03$  to  $0.08 \pm 0.04$  IU/L and fructose 1,6-bisphosphatase from  $8.26 \pm 0.41$  to  $3.72 \pm 0.36$  IU/L. The results of this study demonstrated unequivocally the antidiabetic effect of *C. grandis* by modulating hepatic key enzymes and a good candidate for complementary and alternative medicine in the management of diabetes mellitus.

**Keywords:** *Coccinia grandis*, glucose, glycated hemoglobin, hepatic key enzymes, streptozotocin