Abstract

Hodgsonia heteroclita, a semi woody, dioecious, perennial climber is closely associated with the life of the tribe of North east India. This plant is valued as food as well as it's significant medicinal values. The fruit pulp is used by the Bodo people as a remedy against diabetes. The literature shows that till date only a few works have been initiated for the scientific validation. In view of various applications, it has been experimented for the scientific validations.

The present study aimed at *invitro* and *invivo* evaluation and identification of various phytoconstituents found in *H. heteroclita* fruit pulp. The methanolic extract of fruit pulp has been further studied on the alloxan induced diabetic male wistar rats. The pancreatic tissues of the experimented rats were studied through the enzymes assay and histopathology.

The *invitro* phytochemical screening revealed the presence of various phytochemicals like carbohydrates, reducing sugars, tannins, saponnins, flavonoids, steroids, alkaloids, anthra-quinones and glycosides. It has been estimated to have 18.91±0.01mg/g GAE of phenol, 167.95±0.02 mg/g QE of flavonoid and 75.9±0.02 mg/g QE of flavonol contents in the *H. heteroclita* fruit pulp. The GC-MS analysis of methanolic *Hodgsonia* extract (MHE) revealed the presence of many antioxidative and antihyperglycemic bioactive phytoconstituents, namely p-Hydroxy benzoic acid, Salicylic acid, o-Coumaric, Caffeic acid, p-Coumaric, Protocatechuic acid, 2,4-Dihydroxybenzoic acid, Vanillic acid, Gallic acid, Ferulic acid, Syringic acid and Gentisic acid.

The antioxidant assessment of free radical scavenging assay revealed $EC_{50=}$6.03µg/mL in DPPH radical scavenging as compared to the reference antioxidant ascorbic acid (EC_{50}=3.75µg/mL). The reducing power assay of methanolic *Hodgsonia* extract (MHE) demonstrated a strong radical scavenging activity compared to the synthetic BHT.

The *invivo* toxicology of methanolic *Hodgsonia* extract of fruit pulp revealed the median lethal dose (LD_{50}) as 882 mg/mL/Kg. body weight which is relatively safe for

application. After two days of alloxan treatment, the blood glucose range in between 270–333.3 mg/dL was considered as diabetic. A decrease of fasting blood glucose (FBG) in the group receiving low and high dose of MHE (LH &HH) was evident and found significant ($p < 0.5$) as compared to the control rats. Administration of LH(Low dose *Hodgsonia*), HH (High dose *Hodgsonia*) and DG (Diabetic Glibenclamide) led to a significant decrease in blood glucose levels by 45%, 52% and 47% respectively on the 42nd day in comparison to diabetic animals.

The SOD activity in diabetic control (DC) rats showed a significant decrease in comparison to the normal control (NC) rats. The pancreatic tissues of experimental rats of group LH and HH showed a significant reclamation of SOD and GPx activities which were reduced after treating with alloxan. The production of MDA increases with the increase of free radicals in the cells. The diabetic control (DC) rats showed a significant increase of MDA compared to the normal controls (NC) rats. Supplementation of LH and HH dose of HFP extract exhibited a lowered MDA activity compared to the diabetic control rats. Similar trends were also seen in glibenclamide and insulin treated rats.

The photomicrograph of pancreatic tissues of diabetic rats showed a significant tissue degeneration with the reduced number and dimensions of the islets cells. But the animals of LH and HH groups showed the restoration of the size and number of β-cell of Islets of Langerhans which were comparable with glibenclamide and insulin treated animals.

Inhibition of the release of free radical is a primary strategy to control the potent tissue damages. Antioxidants are the key agents to recover the tissue damage. A systematic study in this line signifies the mechanism of action of every individual plant and plant formulation. Thus, the strategies of herbal treatment are receiving an increased attention in medicinal science.

Keywords: Antidiabetic, Antioxidant, Bodo, DPPH, GPx, Histopathology, *Hodgsonia heteroclita,* Hyperglycemia, MDA, Phytoconstituents, SOD.