Abstract

In recent years, humans have depended heavily on herbal remedies to cure a wide range of diseases. One of the primary areas of this effort is the creation of scientific evidence for medicinal herbs. Combining these medicinal herbs can have a synergistic effect on the condition; therefore, it is critical. *Bambusa balcooa* (leaf), *Phyllanthus emblica* (fruit), *Hodgsonia heteroclita* (fruit pulp), and *Punica granatum* (fruit peel) were chosen for their hypoglycemic/antidiabetic activity, based on literature.

Plant samples were first standardized based on morphological characteristics (color, odor, texture, and size). The macroscopical examination of crushed powder was found to be generally acceptable to sense organs. The powered microscopic examination revealed the presence of epidermis, fiber, stone cells, and pitted vessels. The tap density, bulk density, angle of repose, Hausner ratio, and Carr's index were all investigated. All test samples were found to be within the parameters of normal rules. Heavy metal estimations, cadmium, bismuth, and lead, which were found to be missing, indicating no heavy metal contamination, and so may be safely used as a component in various herbal compositions.

Through qualitative testing, the presence of numerous phytochemicals such as alkaloids, carbohydrates, reducing sugar, flavonoids, proteins and amino acids, phytosterol, phenolic compounds, saponins, quinones and coumarins was discovered in the chosen plants. The GC-MS analysis of the extract exhibits the presence of 58 compounds. Among these identified phytocompounds, n-Hexadecanoic acid has been proven as hypocholesterolemic. In this study aqueous extract of the PHF-HOPE was evaluated for total antioxidant activity, and phenolic and flavonoid contents. The phenolic and flavonoid contents were found to be 241.287$\pm$0.31 mg/g GAE and 941.37±0.83 mg (RE/G/ml), respectively. In vitro antioxidant tests of DPPH and FRP, showed a rise in radical scavenging activity with increasing concentration. In comparison to conventional ascorbic acid (IC50 = 64.6±0.05 mg/ml), PHF-HOPE extracts are effective H_2O_2 scavengers (IC50 = 597.8±0.21 mg/ml). Following this the extract was tested for anti-hyperglycemic activity in alloxan induced diabetic

rats. Administration of PHF-HOPE extract (200 mg/Kg and 400 mg/Kg) in diabetic rats showed considerable reduction in fasting blood glucose and glycated hemoglobin. The supplementation of HPF-HOPE extract also had a significant effect on the enzyme activity in vivo. Treatment with PHF-HOPE dosages (400 mg/kg BW), the elevated levels of total cholesterol (TC), triglyceride (TG), low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), HBA1C, serum urea, creatinine level, SGOT and SGPT, were 90.28±4.15b, 88.18±2.46b, 39.64±0.75b, 14.75±0.30b, 0.63±0.3b, 21.62±1.29b, 0.41±0.0287b, 111.63±5.46c and 86.31±5.17c (markedly decreased) whereas high-density lipoprotein (HDL) (39.77±1.82b) and liver glycogen (5.11±0.30b) levels (increased) compared to diabetic control (DC). Meanwhile, superoxide dismutase (SOD) and Catalase assay (CAT) levels increased considerably, although malondialdehyde (MDA) levels dropped in comparison to diabetic control (DC). The histology of the rats' pancreatic tissue demonstrated that the quantity and size of pancreatic Islets of Langerhans β-cells had been restored.

As a result of this research, it is possible to conclude that PHF-HOPE has anti-diabetic and antioxidant effects in vivo. The presence of possible antioxidants might explain the overall activity.