CONCLUSION

A considerable amount of research is being done to find new anti-diabetic formulations that might be used to treat diabetes. There are a number of problems and limitations facing allopathic medicine nowadays. As an alternative to these synthetic chemicals, hypoglycemic medications derived from plants have the potential to be utilized in traditional medicine to prevent diabetes. The investigation and potential benefits of several medicinal plants for different forms of diabetes have been reported in a plethora of scientific journals. Metabolic abnormalities and the development of diabetes are two conditions that these plants can help alleviate. The present thesis offers a large amount of empirical evidence that supports the antioxidant and anti-diabetic capabilities of HOPE. The hypoglycemic and antidiabetic effects of the fruit, peel, pulp, and leaves of *Phyllanthus emblica*, *Punica granatum*, *Hodgsonia heteroclita*, and *Bambusa balcooa* were used to choose the herbal extracts that would be mixed with water. We chose these herbs for our research because they have a long history of use in traditional medicine and since in vitro hypoglycemia investigations have shown very little about them. The most direct and speedy approach to ascertaining authenticity, innocence, and maybe quality is through organoleptic traits. The material is fawn brown in colour, has a granular texture, and smells and tastes unpleasant.

The brown powdered microscopic analysis showed the presence of epidermis, fibre, stone cells and pitted vessels.

Preliminary powder blends were evaluated on the basis of bulk density, angle of repose, Hausner ratio and Carr's index. The result of the physical evaluation of powder indicated that the parameters were satisfactory.

Heavy metals, including cadmium, bismuth, and lead, were discovered to be absent in HOPE extract, suggesting no heavy metal contamination and hence safe incorporation as a component in various herbal compositions.

In qualitative testing, the presence of numerous phytochemicals such as saponins, alkaloids, tannins, carbohydrates, flavonoids, anthraquinones, glycosides, reducing

sugars, and so on was discovered in the chosen plants. Higher levels of phenolics, flavonoids, total antioxidant capacity, and activity in the total reducing power assay were found in the quantitative test, particularly in the aqueous HOPE extract. In the in-vitro antioxidant tests of DPPH, FRP and H_2O_2, an increase in radical scavenging activity was reported with increasing concentration.

The GC-MS analysis of the extract reveals the existence of 58 compounds, one of which, n-Hexadecanoic acid, has been shown to be hypocholesterolemic.

In an in-vivo investigation, the high levels of blood lipid and HBA1C profile caused by alloxan were significantly reduced following treatment with HOPE extract of both dosages. Following alloxan administration, there was a considerable rise in the concentrations of TC, TG, LDL, and VLDL, as well as a reduction in the concentration of HDL. However, after therapy with the test medicine HOPE extract at both doses, there was a drop in TC, TG, LDL, VLDL, and an increase in HDL levels.

Serum urea, creatinine, SGOT, and SGPT levels were substantially higher in the alloxan group than in the control group. There was a reduction in serum urea, creatinine, SGOT, and SGPT concentrations after HOPE therapy. Diabetes was discovered to have low levels of total protein and hepatic glycogen. However, there was a considerable increase in total protein in the HOPE and glibenclamide groups, but no change in hepatic glycogen.

Meanwhile, substantial increases in antioxidant enzymes such as SOD, CAT, and MDA were seen in the HOPE and glibenclamide groups, which were suppressed by alloxan administration.

The regeneration of β-cells in the pancreatic area of experimental rats was confirmed by histopathological study of the pancreas, making HOPE a good natural antioxidant and anti-diabetic medication.

This study found that HOPE extract includes natural phytocompounds with antioxidative and antihyperglycemic effects that might be utilized to successfully treat diabetes mellitus. Furthermore, it may provide a new perspective in the creation of innovative drugs to control diabetes mellitus, ultimately enhancing the quality of life and prognosis of those living with the condition. As a result, the research findings may yield novel outcomes in the disciplines of pharmaceutical science.