CHAPTER 7: SUMMARY AND CONCLUSION

The proposed work was comprised of investigation of antioxidant, antidiabetic and hepatoprotective activity of the selected medicinal plants i.e. roots of Bauhinia variegata Linn, bark of Tectona grandis Linn and fruits of Schrebera swietenioides Roxb, since they were not explored for these activities.

These plant parts were collected, authenticated, powdered and obtained powder was subjected for standardization with different parameters. The standardized powders were subjected for the extraction with 95% ethanol and petroleum ether 40-60°C by soxhlet apparatus and with water by cold maceration method. These extract were concentrated, dried and the yield, color and consistency were recorded. These extracts were stored in a refrigerator at 2-8°C until usage.


Antioxidant or free radical scavenging activity of these selected medicinal plants different solvent extracts were investigated by using DPPH model system. On the basis of obtained IC$_{50}$ value, ethanolic extract of Bauhinia variegata root, ethanolic extract of Tectona grandis bark and ethanolic extract of Schrebera swietenioides fruit were found to be having potent antioxidant activity hence these extract were further subjected for antidiabetic & hepatoprotective activity study.
Ethanolic extract of selected medicinal plants were found safe (no mortality) at the dose of 2000 mg/kg body weight, hence 1/10\textsuperscript{th} of this lethal dose i.e. 200 mg/kg was taken as effective dose (therapeutic dose).

Diabetes mellitus is a chronic metabolic disorder characterized by a high blood glucose concentration-hyperglycemia, caused by insulin deficiency, often combined with insulin resistance. Hyperglycemia occurs because of uncontrolled hepatic glucose output and reduced uptake of glucose spills over into the urine (glycosuria) and causes an osmotic diuresis (polyuria), which in turn results in dehydration, thirst and increased drinking (polydypsia).

Overall results show that ethanolic extract of *Bauhinia variegata* root, *Tectona grandis* bark and *Schrebera swietenioides* fruit possesses marked antihyperglycemic activity by improvement of glucose tolerance test and by lowering the blood glucose levels in alloxan-induced diabetic rats in single dose (acute) and multi dose (sub acute) treatment study. These extracts had shown highly significant prevention of reduction in body weight from 5\textsuperscript{th} day onwards. The hypoglycemic effect comparable to Glibenclamide suggested that the active fractions may act by regenerating the β cells in alloxan-induced diabetes. After administration of these extract to rats, it was found that TC, TG, LDL and VLDL level of all tested rats were significantly decreased and at the same time HDL level was increased. This provided evidence in favor of the view that these extracts could play an important role in treating diabetic/ hyperlipidemic patients. Histological examination of pancreas of these animals showed comparable regeneration of Islets of Langerhans and β cells by ethanolic extract of *Bauhinia variegata*, *Tectona grandis*, *Schrebera swietenioides* and Glibenclamide standard drug, which were earlier, necroses by alloxan.
Liver is a versatile organ in the body concerned with regulation of internal chemical environment. Therefore, damage to the liver inflicted by hepatotoxic agents is of grave consequence. There is an ever increasing need for an agent which could protect liver damage.

The ethanolic extract of *Bauhinia variegata* root, *Tectona grandis* bark and *Schrebera swietenioides* fruit were screened for the hepatoprotective activity. In the present study, CCl₄ was used as a hepatotoxic agent. It is well established that hepatotoxicity by CCl₄ is due to enzymatic activation to release CCl₃ radicals in free state, which in turn disrupt the structure and function of lipid and protein macromolecules in the membrane of the cell organelles. The results obtained form CCl₄ induced hepatotoxic model in the healthy male Wister rats (150-200 gm), indicates that after the treatment with CCl₄ there was significant rise in SGOT, SGPT, ALP and total bilirubin levels as compared to control animals. Treatment with ethanolic extract of *Bauhinia variegata* root, *Tectona grandis* bark and *Schrebera swietenioides* fruit inhibited, CCl₄ induced increase in SGOT, SGPT, ALP and total bilirubin activities when compared with CCl₄ treated group. The histological observation revealed that *Bauhinia variegata* root, *Tectona grandis* bark and *Schrebera swietenioides* fruit ethanolic extract treated liver found to have normal architecture with very mild fatty changes when compared with CCl₄ treated liver, which signifies hepatoprotective activity of these selected medicinal plants.

The ethanolic extract of *Bauhinia variegata* root, *Tectona grandis* bark and *Schrebera swietenioides* fruit were fractionated with different solvents by column chromatography. These obtained column fractions were characterized by qualitative chemical test and TLC, which shown the presence of following important phytoconstituents,
• sterols & flavonoids in *Bauhinia variegata* root ethanolic extract column fraction

• quinones & sterols in *Tectona grandis* bark ethanolic extract column fraction &

• triterpenoids in *Schrebera swietenioides* fruit ethanolic extract column fraction

**Conclusion:**

Ethanolic extract of *Bauhinia variegata* root, *Schrebera swietenioides* fruit & *Tectona grandis* bark shown hypoglycemic, hepatoprotective and antioxidant action.

- It is conceivable that antioxidant / free radical scavenging activity of these extracts is one of the mechanism associated with antidiabetic & hepatoprotective effect.

- Another mechanism is presence of phytoconstituents such as sterol, quinone, triterpenoids and flavonoids in these selected traditional plants extract, which are proven effective as antidiabetic and hepatoprotective phytoconstituents.

- The other mechanism is regeneration and moderate expansion of cellular population and size of islet of Langerhans and β cells by these extracts in antidiabetic activity.

- The mechanism for antihyperglycemic activity may be by improving insulin secretion and increasing the hepatic glycogen.

However, further pharmacological and molecular level investigations are needed to study the mechanism of action of these plant extracts.