7. SUMMARY AND CONCLUSION

In the present study, AqE and EtE of *H. indicus* (roots), *V. vinifera* (fruits) and *B. ceiba* (fruits) were prepared and evaluated for diuretic and antiurolithiatic activity in Wistar albino rats.

The pharmacological screening including diuretic activity and evaluation of antiurolithiatic activity was carried out. The findings from present study support the folklore use of *H. indicus* (roots), *V. vinifera* (fruits) and *B. ceiba* (fruits) for their diuretic actions. Aqueous and ethanol extracts of these plants do not seem to have renal toxicity in rats at doses selected in the present study. Based on the pattern of excretion of water and electrolytes, it appears that that there are at least two types of active principals present in these extracts, one having a frusemide-like activity and the other a HTZ-like activity.

In another set of experiments, the state of hyperoxaluria induced using 0.75% ethylene glycol oral administration in rats, was significantly normalized by oral administration of AqE *H. indicus* (roots), EtE of *V. vinifera* (fruits) and EtE of *B. ceiba* (fruits).

The preliminary phytochemical investigation of *H. indicus* (roots), *V. vinifera* (fruits) and *B. ceiba* (fruits) extracts showed presence of glycosides, saponins and triterpenoids. Three extracts (AqE of *H. indicus* (roots), EtE of *V. vinifera* (fruits) and EtE of *B. ceiba* (fruits)) possessing optimum bioactivity were subjected to fractionation using non-polar to polar solvents and all fractions were further subjected to TLC/HPTLC fingerprinting. The qualitative and preparative TLC/HPTLC study established the method of isolation and purification for five different compounds. Purity of all five isolated compounds was found >80% when assessed using HPLC methods [ICH-1= 91.37%; ICV-1= 91.6%; ICV-2= 81.2%; ICB-1= 100%; ICB-2= 86%]. Spectral study using UV/Visible, FTIR, $^1$H-NMR, Mass spectroscopy was carried out for all five isolated compounds.

Volatile principles from *H. indicus* (root) were isolated by hydrodistillation and purified using solvent fractionation technique. Non-polar and polar fractions were characterized by GC-MS. A volatile compound, 2-hydroxy-4-methoxy benzaldehyde (Yield: ~2.1%; Purity: ~99.3%) was isolated and characterized from non-polar fraction. Another volatile compound, alpha-pinene (Yield: ~ 0.5%; Purity: ~ 96.4%) was isolated and characterized from polar fraction.

Although, the exact phytochemistry of isolated compounds (ICH-1, ICV-1, ICV-2, ICB-1 and ICB-2) remains unidentified; further systematic phytochemical studies would
elucidate the probable structural entities in these plants and their structure activity relationship with similar biomolecules from other lithontriptic plants.

Nevertheless, there are reports which correlate the antiurolithiatic activity of the lupeol with its diuretic potentials\textsuperscript{194,195}. Accordingly, the diuretic potentials exhibited by extracts of \textit{H. indicus} (roots), \textit{V. vinifera} (fruits) and \textit{B. ceiba} (fruits) suggest that it could also be the contributing factor for lithontriptic properties shown by these plant extracts. Diuresis reduces the risk of stone formation by forbidding the saturation product of CaOx. Further, the study of these plant extracts at molecular level would elaborate the exact modus operandi of these plant extracts as a diuretic and antilithiatic agent.

In conclusion, it is evident from the above data that the AqE of \textit{H. indicus} (roots), EtE of \textit{V. vinifera} (fruits) and EtE of \textit{B. ceiba} (fruits) are endowed with potential diuretic and lithontriptic principles, supporting folklore uses of these plants as traditional medicine. Although, the mechanism underlying this effect is still unknown, but it is apparently related to significant diuretic effects and lowering of urinary concentrations of stone forming constituents. The protective effect against oxalate induced lipid peroxidation may be contributory to the inhibition and protection from further renal damage. These effects validate the diuretic and antiurolithiatic properties of \textit{H. indicus} (roots), \textit{V. vinifera} (fruits) and \textit{B. ceiba} (fruits).