ABSTRACT

Background

In India, Anantmul (Roots of Hemidesmus indicus R. Br.; Family – Asclepidaceae), Amruthphala (Fruits of Vitis vinifera L.; Family – Vitaceae) and Rakta Shalmali (Fruits of Bombax ceiba L.; Family – Bombacaceae) are commonly used as a phytotherapeutic agents for urinary problems. However, the systematic scientific evaluation in this regard has not been reported for these plants.

Aims and Objectives

To ascertain the scientific validity for folklore uses of these selected plants, the study was designed and conducted in two phases; firstly to evaluate the diuretic effects and secondly, to assess their antiurolithiatic potentials. The study was further aimed to identify classes of phytoconstituents present in extracts possessing biological potentials.

Materials and Methods

H. indicus (roots), V. vinifera (fruits) and B. ceiba (fruits) were collected, authenticated, and subjected for extraction and preliminary phytochemical investigation followed by pharmacological screening of all extracts in Wistar albino rats for diuretic activity and to assess their curative effects in ethylene glycol induced hyperoxaluric rats. Urea (1 g/kg), frusemide (25 mg/kg), hydrochlorothiazide (25 mg/kg) and spironolactone (50 mg/kg) were used as reference diuretic drugs; while, Cystone (750 mg/kg) was used as standard antiurolithiatic drug, in respective study. Various parameters such as, total urine excretion and urinary concentration of Na\(^+\), K\(^+\) and Cl\(^-\) were estimated for assessment of diuretic activity.

While, for evaluation of antiurolithiatic activity, various biochemical parameters such as, urinary excretion and kidney deposition of offending salt components (Ca\(^{++}\), inorganic phosphorous, oxalate) and serum levels of (urea nitrogen, uric acid and creatinine) were estimated.

Bioactive extracts were subjected to further fractionation and separation and isolation of probable phytoconstituents using chromatographic techniques. Isolated compounds were analyzed by spectral studies.
Results and Discussion

Amongst the various extracts screened, AqE of *H. indicus* (roots), EtE of *B. ceiba* (fruits) showed significant \((P<0.01)\) dose dependent diuretic effects (higher saluretic and natriuretic indices). While AqE and EtE of *V. vinifera* (fruits) exhibited significant \((P<0.001)\) gradual rise in urine excretion; their effects on electrolytes excretion were non-significant \((P>0.05)\).

In the later study, the curative treatments with AqE of *H. indicus* (roots), EtE of *V. vinifera* (fruits) and EtE of *B. ceiba* (fruits) significantly reduced the elevated urinary oxalate, showing a regulatory action on endogenous oxalate synthesis. The increased deposition of stone forming constituents in the kidneys of calculogenic rats was also significantly lowered by curative treatment using these extracts.

Five compounds were separated, isolated and purified (>80% purity) from three bioactive extracts using preparative chromatographic techniques. Spectral study of these five isolated compounds suggests that these isolated compounds may have structural similarity to terpenoid (mono-, di-, tri-) compounds.

Conclusion

Results indicate that *H. indicus* (roots), *V. vinifera* (fruits) and *B. ceiba* (fruits) are endowed with diuretic and antiurolithiatic activities. These effects can be correlated to terpenoids isolated and identified from these plants. However, further extended study in this regard, may elucidate the molecular structure of these chemical entities.

Keywords