9. SUMMARY

Ayurveda is an ancient system of medicine of Indian subcontinent. Today in India, Nepal and Sri Lanka, Ayurveda is used by a number of people and is also gaining popularity in the west. Now it has become an integral part of Indian traditional system of medicine. Using plant sources for illness has been a practice as old as mankind. But the major lacuna for all these medical systems is lack of proper scientific evidence. Hence the present study was aimed as a small step towards explaining of particular selected plants. Plants were selected for three chronic problems namely Ulcer, hepatotoxicity and cognitive problems for establishing their efficacy in accordance with modern scientific system namely, allopathy.

The documents many of which are of great antiquity, revealed that plants were used medicinally in China, India, Egypt and Greece long before the beginning of the Christian era. Most of the medicinally active substances identified in the nineteenth and twentieth centuries were used in the form of crude extract.

Drugs (Plants) were selected for four chronic problems namely Ulcers, Hepatotoxicity, Memory loss and Urolithiasis. The plants were chosen after consultation with the practitioners of the respective medical systems.

In the light of the foregoing, the author has selected the following 22 important medicinal plants, which are available abundantly throughout the state of Andhra Pradesh are used till today by the rural people for various treatments. The studies were carried out to give a scientific evidence and support on the usage of these plant drugs.

Crude extracts tested were Wedelia calendulacea (WC), Pongamia pinnata (PP), Selaginella bryopteris (SB), Cissampelos muronata (CM), Ginkgo biloba (GB), Vitex nigundo (VN), Picrasma quassioides (PQ), Solanum xanthocarpum (SX), Purarea tuberose (PT), Achillea millfolium (AM), Ficus bengalensis (FB), Sida cordifolia (SC), Tephrosia purpurea (TP), Trichopus zeylanicus (TZ), Withania somnifera (WS), Daucus carota (DC), Glycosmis
pentaphylla (GP), Mikania cordata (MC), Morina oleflera (MO), Asparagus racemosus (AR), Macrtyloma uniflorum (MU) and Melia azadiracta (MA). All these plant extracts were tested for Antiulcer, Hepatoprotective, Nootropic and Antiurolithiatic activity.

The Institutional Animal Ethics Committee approved the study protocol for all the above (IAEC/HCOP/01/2009, IAEC/HCOP/01/2009, IAEC/HCOP/06/2010).

The results of preliminary phytochemical screening revealed the results that CM, VN, SX, AM, SC, TZ, WS and GP showed the presence of alkaloids. CM, FB, MO and AR showed the presence of Carbohydrates and reducing sugars WC, PP, SB, GB, PQ, PT, FB, WS and AR showed the presence of Glycosides. CM, VN, MO and MU showed the presence of Proteins and amino acids. PP, GB, MO, MU and MA showed the presence of Phenolic compounds and tannins. AM, SC, TZ, DC, MC and MO showed the presence of Volatile oils

Acute toxicity studies revealed that Aqueous extracts were found to be safe even at the dose of 8 g/kg body weight. The animals did not show any significant gross behavioral changes except for an increase in urination. All the aqueous extracts were found to be very safe. The doses selected for screening the Antiulcer, Hepatoprotective, Nootropic and AntiUrolithiatic activities were 200 mg/kg and 400mg/kg body weight. From the acute toxicity studies, the doses for further studies were chosen in logarithmic progression of 200 and 400 mg/Kg body weight as suggested by Turner.

In the present study Aspirin Plus pylorus ligation induced gastric Ulcer was adopted to screen the antisecretory activity of plant extracts. WC extract produced 61.76% ulcer inhibition at 400mg/kg body weight, when compared to the standard drug ranitidine 50mg/kg body weight, which produced 62.6%. PP, SB, PQ, produced 56.14%, 86.3% and 64.63% ulcer inhibition at 400mg/kg when compared to standard drug ranitidine i.e 56.78%, 88.13% and 68.52% ulcer inhibition respectively.
In HCl - Ethanol induced ulcer model 400mg/kg body weight of SX, WC, PQ and VN produced 59.91%, 88.87%, 72.24% and 85.3% ulcer inhibition when compared to the standard drug Sucralfate 100mg/kg body weight which produced 57.12%, 90.80%, 75.01% and 91.50% ulcer inhibition respectively.

In Water immersion stress induced ulcer model 400mg/kg body weight of PQ, WC, SX and SB produced 84.11%, 96.34%, 90.12% and 82.75% ulcer inhibition when compared to the standard drug Omeperazole 20mg/kg body weight, which produced 82.17%, 99.30%, 94.52% and 89.50% ulcer inhibition respectively.

WC and PQ showed significant % ulcer inhibition in three models i.e Aspirin Plus pylorus ligation induced gastric Ulcer, HCl - Ethanol induced ulcer and Water immersion stress induced ulcer, whereas SX produced significant % ulcer inhibition effect in HCl - Ethanol induced ulcer and Water immersion stress induced ulcer. SB showed significant % ulcer inhibition effect in Aspirin Plus pylorus ligation induced gastric Ulcer and Water immersion stress induced ulcer. VN produced significant % ulcer inhibition effect in HCl - Ethanol induced ulcer, it produced 85.31% protection when compared to standard, which produced 91.50% ulcer inhibition. PP showed significant % ulcer inhibition effect in Aspirin Plus pylorus ligation induced gastric Ulcer, it produced 56.14% protection when compared to standard, which produced 56.78% ulcer inhibition.

The efficacy of any hepatoprotective drug is dependent on its capacity of either reducing the harmful effect or restoring the normal hepatic physiology that has been disturbed by a hepatotoxin. AM and FB showed more potent activity than sylimarin to restore the normal hepatic physiology in albino rats by decreasing serum AST, ALT, ALP, total bilirubin, liver weight and sleeping time and by increasing serum protein levels respectively. Apart from AM and FB other extracts like MO and TZ showed equipotent results compared to sylimarin. S.C and D.C produced significant effect by reducing the liver weight in paracetamol intoxicated rats.
Asparagus Racemosus (AR) is an Ayurvedic rasayana possessing multiple neuropharmacological activities. Results of present study support the previous evidence of recent investigation that demonstrated that methonolic root extract of Asparagus recemosus enhances memory and protects against amnesia in rodent models. However, our study demonstrates memory enhancing effect on elevated plus maze with aqueous root extract of Asparagus recemosus. The mechanism underlying the memory enhancement is not clear. Ojha et al., (2010) reported that methanolic extract of Asparagus recemosus dose-dependently inhibited acetyl cholinesterase enzyme in specific brain regions (prefrontal cortex, hippocampus and hypothalamus).

This clearly indicates that the mechanism involved in nootropic action of Asparagus racemosus may be due to inhibition of acetyl cholinesterase enzyme and hence elevation of acetylcholine levels which maintains the normal cognitive function in the brain. Furthermore, a comparative study indicated that both Convolvulus pluricaulis choisy and Asparagus racemosus have improved the cognitive function in young and old mice. This provides evidence that Asparagus racemosus memory enhancing effect was observed in different species as well as different age group of animals. An ayurvedic formulation chyawanprash that comprises asparagus racemosus was found to be effective in improving the memory in mice models.

In the present study a significant increase in urinary excretion of calcium, oxalate, magnesium and phosphate was observed four weeks after implantation of foreign body. The increase in urinary excretion of calcium, oxalate, magnesium and phosphate in the present study may be due to the formation of mixed type of stones, magnesium ammonium phosphate and traces of calcium and oxalate. The reason may be the elevated magnesium level has prevented the deposition of calcium oxalate where magnesium has formed soluble complex with oxalate and has decreased the ability to form calcium oxalate. This is in accordance with reports of Moor and Gowland (1975).
Treatment with aqueous extract of **MU** and **MA** caused a significant reduction in urinary excretion of calcium, oxalate, magnesium and phosphate in both the preventive and curative group animals, when compared to their respective controls. This explains the efficacy of the aqueous extract of **MU** and **MA** in both preventing and also in dissolving the pre-formed magnesium ammonium phosphate type of stones.