7. SUMMARY:

(1) Large number of herbs are known to possess hepatoprotective properties. About 90 herbs are found to be incorporated in various commercially available hepatoprotective formulations but the frequency of few herbs is quite large. Majority of the hepatoprotective herbal formulations have gained high reputation and the top position as one of the best remedy for jaundice because as yet modern system of medicine has not found any remedy for the jaundice. With this high hepatoprotective reputation of the herbs and their formulations, the need for their quality becomes a prime factor for their efficacy. But the quality of the frequently added herbs and their formulations have also as yet not been studied well. Hence it was thought worth to select top graded known hepatoprotective herbs and their formulations for the present study.

(2) The four herbs selected are annual and growing wildly during rainy season. Ancient literature has suggested the use of entire plant in the medicine but in practical only aerial parts are more frequently found to be in use. The selected herbs are:
   (i) *Eclipta prostrata* (Family - Asteraceae),
   (ii) *Andrographis paniculata* (Family - Acanthaceae),
   (iii) *Phyllanthus amarus* (Family - Euphorbiaceae),
       Formerly *P. amarus* was identified as *P. niruri*. Other species of *Phyllanthus* growing in India are *P. fraternus, P. debilis, P. maderaspetensis, P. virgatus, P. urinaria* etc. These species can be easily differentiated from *P. amarus* by their taste which is bitter only in *P. amarus* and number of sepals which are 5 in this herb and six in others.
   (iv) *Solanum nigrum* (Family - Solanaceae)
       Even though aerial parts (sometimes root also) are used in the medicine, the fruits are more frequently used. The literature mentions use of mature fruits only, immature fruits being slightly toxic in nature.

(3) All these four herbs were evaluated morphologically and microscopically. Even though some of the literature describe their microscopical characters, it was found to be inadequate and hence the detailed microscopy of each and every part of the drug was carried out. The findings which differed from the previous reports of these herbs are as follows:
   *E. prostrata*:
   (i) Prisms of Ca-oxalate were noticed in the parenchymatous cells of cortex and pith while earlier report mentioned acicular crystals.
   (ii) Presence of spindle shaped cystolith in the simple covering trichome of the leaf and oval to oblong cystolith in the parenchymatous cells of the lamina and midrib have been reported here for the first time.
   (iii) Certain leaf constants like stomatal index, palisade ratio and vein islet number were determined which has not been reported earlier.
   *P. amarus*:
   Three types of stomata; anisocytic, paracytic and anomocytic were noticed in the leaf and clusters and prisms of Ca-oxalate crystals in the parenchymatous cells of the leaf and stem. Earlier workers have mentioned only one or two types of stomata from these
three types and have reported either cluster or prisms or rosettes of Ca-oxalate in the leaf and stem.

_S nigrum_:

(i) Microsphenoids of Ca-oxalate crystals were found plenty throughout the parenchymatous cells of the root. Earlier worker could not clarify these content as Ca-oxalate crystals.

(ii) Besides this, certain characters of the fruit like, striated cuticle of the epicarp, lignified testa with outgrowth of non-lignified thin hairs and prisms of Ca-oxalate crystals which were noticed in the cells of mesocarp have not been reported earlier.

(4) The quality of the fresh and market herbs was determined by determining certain constants like water and alcohol soluble extractive, total and acid insoluble ash and the results were compared with the results reported earlier.

(5) The quality of the herb was further tested by their TLC studies and also by determining the m.p., UV and IR characteristic of the isolated active compounds.

(6) Polyherbal market formulations (PHMF) of these herbs were also studied on TLC to know the presence of their active constituents.

(7) HPTLC and HPLC studies of these herbs and their PHMF (excepting _S nigrum_ and its PHMF for HPTLC) were also studied. It gave a good idea regarding the quality of the fresh herb, dried market herb and the various antihepatotoxic formulations.

(8) Quercetin glucoside, the antihepatotoxic principle of the herb is reported for the first time in the Indian species of _S nigrum_. Its antihepatotoxic activities were also studied.