CHAPTER 5

SUMMARY

Based upon the studies on the toxicity of the D-GalN/LPS on the mammalian system and the relative hepatoprotective efficiency of alcoholic extract of the *Nigella sativa* L. seed and one of the active components of the alcoholic extract thymoquinone, the following conclusions were made,

Elevation in the diagnostic marker enzymes of hepatic function indicating alterations of membrane permeability and damage during D-GalN/LPS toxication was significantly reduced by the NSE and TQ pretreatment, which strongly suggests the protective activity of NSE and TQ towards tissues by avoiding the leakage of these enzymes to the serum.

Rats given D-GalN/LPS exhibited hypoglycemia, decreased levels of protein, glycogen and decreased A/G ratio. These alterations caused by the administration of hepatotoxic was considerably prevented in the rats given prior oral administration of the NSE and TQ as evidenced by the near normal levels of protein, glucose, glycogen and A/G ratio.

The decreased levels of Hb, increased ESR, and increased levels of serum bilirubin observed in the D-GalN/LPS toxicated group was maintained at near normal levels in the NSE and TQ pretreated groups. NSE and TQ pretreatment prevented the toxin-induced prolongation of PT, PTT and increased ESR. This indicates the ability of the NSE and TQ to prevent the toxic effects of the hepatotoxin on the hematopoietic system.

D-GalN/LPS administration resulted in increased levels of lipid peroxides, decreased levels of enzymic and non-enzymic antioxidants. NSE and TQ pretreatment reduced the oxidative stress induced by D-GalN/LPs as revealed by decreased levels of lipid peroxides and increased levels of enzymic and non enzymic antioxidants, which confirmed the antioxidant activity of the NSE and TQ and the inhibitory effect on lipid peroxidation chain reaction.
A marked increase in LDL and VLDL and a considerable decrease in HDL level were noted in the rats given D-GalN/LPS toxication. The altered levels were reverted to near normalcy in NSE and TQ pretreated rats.

Increased accumulation of lipids (cholesterol, triglycerides) and decreased levels of phospholipids were noted in D-GalN/LPS administrated rats. NSE and TQ pretreatment showed a tendency for the restoration of lipids thereby showing the modulating effect of the NSE and TQ.

D-GalN/LPS hepatotoxin significantly reduced the activities of membrane bound phosphatases and levels of protein bound carbohydrate compounds. Pretreatment with NSE and TQ considerably increased the activities of membrane bound phosphatases and levels of glycoproteins towards normalcy.

NSE and TQ pretreatment brought back the altered levels of urea, ammonia and creatinine to near normal levels during D-GalN/LPS toxication in rats.

Histopathological observations of the tissues like liver and kidney confirmed the hepatoprotective effect of the NSE and TQ to maintain the normal architecture of the organs.

Alterations in the biological parameters due to D-GalN/LPS toxicities were restored to near normal levels in the NSE and TQ pretreatment. NSE showed better results and seem to be better hepatoprotective form than TQ against D-GalN/LPS. A combination of fatty acids, volatile oils and trace elements present in the NSE are believed to contribute to its effectiveness.

The NSE and TQ have hepatoprotective potential against D-GalN/LPS toxicities in normal cells. NSE and TQ exert their protection by modulating the tissue antioxidative defense system against the toxic metabolites and formed ROS.