Preface

In 21st century, herbal medicine has moved from the fringe to the mainstream as huge numbers of people seek relatively safe, cost effective healthcare remedies. Traditional/folk medicine has been developed from generation to generation, spread throughout the world and significantly contribute in development of different systems of herbal medicine. Researches on medicinal plants are not only imperative for the healthcare system but also can play a vital role in economic development. Biopiracy, lack documentation of indigenous knowledge and lack of research based on folk information are the limiting factors for the growth of Indian herbal medicine worldwide.

Recent literatures widely acknowledge the role of oxidative stress in the pathophysiology of different disorders like hepatotoxicity, nephrotoxicity, diabetes, cardiovascular diseases etc. In recent time use of allopathic medicines are increasing widely which are an important grounds of hepatotoxicity and nephrotoxicity. Diabetes mellitus especially type 2 diabetes mellitus became pandemic throughout the globe. Helminth infections are generally less or not fatal, they are connected with high rates of morbidity, with chronic infection frequently leading to anemia and malnourishment.

The research work embodied in this thesis is planned to perform an ethnomedicinal survey in state Tripura, India, and use those information for scientific investigation. *Meyna spinosa* and *Leea asiatica* are the common and traditionally important medicinal plants in the ethnic communities of Tripura. The aim of the present
study is to investigate the therapeutic effectiveness of the two plants based on their folk uses. In addition, active phytoconstituents will be isolated through column chromatography, which is incorporated in eight chapters.

ABSTRACT

*Meyna spinosa* (Rubiaceae) and *Leea asiatica* (Leeaceae) have traditionally been used to treat various diseases by the ethnic people of Tripura, India, but recuperative potential of the plants was remained undefined. Oxidative stress is believed to be involved in the pathogenesis of many diseases. Investigation of traditional medicinal plants will ensure to find phytoconstituents with antioxidant potential, which will pave the way of their successful integration into a public health framework.

*In vitro* and *ex vivo* antioxidant activity of methanol, ethyl acetate and petroleum ether extract of the *M. spinosa* and *L. asiatica* leaves were investigated using different assay method. Methanol extract of both plant showed concentration dependent and higher significant (*p* < 0.01) effect free radical scavenging and antioxidant activity as compared with ethyl acetate and petroleum ether extract. Thus, methanol extract of *M. spinosa* (MEMS) and methanol extract of *L. asiatica* (MELA) were fractionated with petroleum ether, ethyl acetate and methanol successively and selected for further studies. Methanol fraction of MEMS (MFMS) and ethyl acetate fraction of MELA (EFLA) showed better *in vivo* pharmacological activity compare to other fractions. MFMS and EFLA showed potent DPPH radical scavenging (*IC*$_{50}$ = 10.6±0.02 and 9.5±0.01 µg/ml respectively), nitric oxide scavenging (*IC*$_{50}$ = 16.6±0.02 and 13.0±0.0 µg/ml respectively) activity, total antioxidant and lipid peroxidation inhibition effect. MFMS and EFLA at 150 mg/kg showed hepatoprotective effect against paracetamol induced toxicity which was evident by the significant decrease in serum glutamic oxaloacetate transaminase,
glutamate pyruvate transaminase, alkaline phosphatase, bilirubin, cholesterol, triglycerides level by fraction treatment. Treatment with the extract/fraction also restored the depleted antioxidant defense system evident by the increased level of superoxide dismutase, catalase, glutathione peroxidase, and reduced glutathione in the liver in paracetamol treated animals. At 159 mg/kg dose, MFMS and EFLA also showed protective effect against cisplatin induced nephotoxicity which was evident by the significant restoration of blood urea nitrogen, creatinine, uric acid, total protein, albumin level and reduced malondialdehyde by fraction treatment. The fractions also decreased the kidney tissue lipid peroxidation. Results suggest that the hepatoprotective and nephroprotective effect of MFMS and EFLA could be due to the inherent antioxidant and free radical scavenging principle(s) contained in the fractions.

The present research also established that higher dose (150 mg/kg) methanol and ethyl acetate fraction of *M. spinosa* have beneficial effects, in reducing the elevated blood glucose level (63.4 and 53.8% after 21 days treatment), α-amylase activity and lipid profile of type 2 diabetic rats, which likely due to the increase in insulin secretion or ameliorating insulin sensitivity or due to the inhibition of α amylase activity.

Anthelmintic activity of fractions of *L. asiatica* was also investigated against Indian adult earthworms (*Pheretima posthuma*). Ethyl acetate fraction showed better paralysis activity (13.99±0.59), while methanol fraction showed better death time (63.76±0.73 min) as compared with other fractions at a dose of 50 mg/ml concentration.

A fatty alcohol was isolated from *L. asiatica* and a flavonoid was isolated from *M. spinosa* which showed potent antioxidant activity; could be a future drug molecule in the treatment of various oxidative stress related diseases. Thus, results are justifying the
claim made by folk medicinal user and both the plants can be viewed as potential source of new and effective drug therapy/formulation.