PREFACE

Advancement of herbal medicine has a relatively long history, peppered with promises, some successes, and several disappointments. In recent years scientific investigation on traditional and folk medicinal knowledge and plants used in those has opened a new dimension to fight disease in better way. Over the years the interest has, as a result, waxed and waned, but there has been absolute forward momentum, which has brought us to this important point. Built up a bridge between “folk medicinal information and scientific investigation” is a key point for success and advancement of research in this field. It has been an important responsibility also exciting and rewarding to work on folk medicine.

The role of oxidative stress in the pathophysiology of different disorders like hepatotoxicity, nephrotoxicity, diabetes, pain, inflammation, cardiovascular diseases etc have well acknowledged. Incidence hepatotoxicity and nephrotoxicity have been increased widely along with increased use of allopathic medicines. In recent times several allopathic medicine are in use in the treatment of pain, inflammation, cough etc, but most of the responsible of several adverse effects. Drug resistance infection again possesses a serious question on the effectiveness of the current therapy.

The research work embodied in this thesis to collect ethnomedicinal information which are the key part of indigenous people of North East India, and use those information for scientific investigation. Phyllanthus acidus and Marsilea minuta are the common and traditionally important medicinal plants in the ethnic communities of in this region. 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**

Investigation of folk medicinal plants, isolation and characterisation of the compound(s) from them can play a pivotal role in curing diastases and can open new vistas in the therapy of different diseases. *Marsilea minuta* (Marsileaceae) and *Phyllanthus acidus* (Phyllanthaceae) are common folk medicinal plant of North East India used to cure different ailments, but several recuperative potential of the plants was still undefined.

Methanol extract of *P. acidus* (MEP) and methanol extract of *M. minuta* (MEM) demonstrated higher significant (*P*< 0.01) in *in vitro* and *ex vivo* antioxidant activity as compared with their ethyl acetate and petroleum ether extract. MEP and MEM (500 mg/kg) exhibited strong analgesic-antiinflammatory activity and antitussive-expectorant activity respectively. Thus, MEP and MEM were fractionated with petroleum ether, ethyl acetate and methanol successively and selected for further studies. Higher dose (150 mg/kg) of methanol fraction of MEP (MFP) and methanol fraction of MEM (MFM) showed better *in vivo* pharmacological activity compare to other fractions.

At 150 mg/kg, MFP and EFP (ethyl acetate fraction from *P. acidus*) inhibited writhing response by 83.95% and 82.08%. Fraction also found highly effective against tail immersion test and formalin test. Anti-inflammatory activity of fractions also confirmed by inhibition of carrageenan-induced paw oedema and cotton pellet induced inflammation. Further investigation of fractions could be beneficial to find a better treatment strategy for pain and inflammation.
MFM and EFM at 150 mg/kg significantly (P<0.001, 0.05) increased latency period and reduced the number of coughs induced by ammonium liquor and SO$_2$. MFM (150 mg/kg) exhibited high phlegm eliminating effect evident by the 82.89% increase in the concentration of phenol red. The results justify the traditional uses of the plant.

Both the plant fraction showed concentration dependent moderate anti-TB activity. MIC value of methanol and ethyl acetate fractions of both plants against microbial strain H37RV was 50 µg/ml. An advanced research of these fractions of *M. minuta* will help to find exact mechanism of action for the observed anti-TB activity.

MFP and MFM showed potent DPPH$^\bullet$ scavenging (IC$_{50} = 22.1\pm0.04$, 14.2±0.02 µg/ml respectively), NO$^\bullet$ scavenging (IC$_{50} = 6.9\pm0.09$ and 22.2±0.38 µg/ml respectively), total antioxidant activity and lipid peroxidation inhibition effect. MFP and MFM showed strong hepatoprotective effect against paracetamol induced toxicity which was evident by the significant restoration of serum liver enzymes, bilirubin, and lipid profile. Fractions also increased the depleted endogenous antioxidant enzyme and reduced glutathione level in paracetamol treated animals. MFP and MFM exhibited nephroprotective protective effect against cisplatin induced toxicity which was evident by the restoration of blood urea nitrogen, creatinine, uric acid, total protein, albumin level and reduced the concentration of the kidney tissue MDA, a lipid peroxidation index. The protective effect of MFP and MFM against drug induced toxicity could be due to the inherent antioxidant and free radical scavenging principle(s) contained in the fractions.

A flavonoid from *P. acidus* and a saponin from *M. minuta* was isolated and characterised by spectral investigation. These compounds showed potent antioxidant activity which could be a used in the treatment/prevention of oxidative stress related
diseases in future. Thus, the both the plants can be viewed as potential source of new and effective drug therapy/formulation.