PREFACE

Herbal drugs have great growth potential in the global market. Natural product research continues to explore Indian Traditional Medicines to develop new novel drugs. The problem encountered by the scientists as well as the consumers is the lack of proper standardisation techniques. We have a great folkloric assistance by means of *Ayurveda* and *Vaidyas* those practicing traditional medicine. It is the need of the hour to validate their claim by using modern technique.

In this work we have focused on the significance, guidelines and the research methods in order to develop standard herbal medicines which will gain international acceptance. Chromatographic fingerprinting techniques are most significant methods which can be used for the routine herbal drug analysis and for quality assurance. The WHO guideline parameters are discussed. Some *in vivo* and *in vitro* models for antidiabetic, antihypertensive, diuretic and antioxidant studies carried out in order to provide simple and effective assessment of the biological screening of botanicals by using different models without going for extensive extraction and purification steps.

Chapter 1 deals with the discussion on general information about herbal remedies, their history, Indian system of medicine, their advantages and plant used in different system of medicine. The disease diabetes mellitus, its status and scenario in India has been discussed. Hypertension, hypertension in diabetes mellitus patients and the correlation between these two disorders have also been discussed.

The chosen plant *Scoparia dulcis* Linn., which can be effective against these two disorders as per the information gathered from local Vaidyas and traditional healers, has been recorded. According to them the leaf of the plant is used for antidiabetic activity and the whole plant is used in case of hypertension. The plant is used for a number of other ailments traditionally, but our focus is on these two very dreaded diseases.

After the assortment of the plant an extensive review regarding the pharmacognostical, phytochemical and pharmacological aspect of the plant has been
done. The detail literature review was discussed. From the literature review it was found that no work has been done for its antihypertensive activity and a little work has been done for the antidiabetic activity.

In this chapter the review of the plant profile is given. The presence of phytoconstituent was also reviewed that revealed certain clues regarding its antidiabetic and antihypertensive activities.

In chapter 2 aim and objective of the work has been discussed.

Chapter 3 deals with the work plan for the detail phyto-pharmacological study. It was planned to add two other activities such as in vitro antioxidant and in vivo diuretic activity with antidiabetic and antihypertensive activities respectively, because they have got close relation with these activities. The antioxidant activity is interrelated to the antidiabetic activity and the diuretic activity aids to antihypertensive activity.

In chapter 4, all the experimental work starting from collection and authentication of the plant to the pharmacological activities has been described. The plant was collected from the local area of Barpali, Bargarh, Odisha, India and authenticated from the Botanical survey of India, Kolkata. After drying and size reduction the plant was stored for further studies.

The macroscopy, microscopy and physical constants of the plant parts were performed. The data found regarding these studies was not reported earlier. Then, phytochemical evaluation was done. In the preliminary phytochemical screening the presence of the phytoconstituents in the powder of whole plant has been ascertained. Basing on the extractive value of different extracts the methanolic extract was selected for further studies. The powdered drug was extracted with methanol by cold and hot extraction processes. After that, TLC fingerprinting of the methanolic extract was done. Further, column chromatography has been done to isolate the compounds responsible for the pharmacological activities. Some single spots from the different fractions of the column chromatography were observed, for which some extensive study is required to identify these constituents. The determination of different
phytoconstituents through assay method using UV spectrophotometer has been carried out.

In the pharmacological evaluation we first went for the acute toxicity study and on that basis we have determined the doses for further studies. We performed the antidiabetic study both on *in vitro* and *in vivo* models and found positive results for both the models. Further we performed the antioxidant activity of MESD and WESD for comparison, which showed positive result to provide substantiation for its antidiabetic activity, because there is a link between the antioxidant and the antidiabetic activity. The diuretic activity was performed using two different doses of MESD. The observation showed furosemide like activity of the MESD, which help us to ascertain its antihypertensive activity. Finally, the antihypertensive activity for both *in vitro* and *in vivo* models was performed. The activity was carried out in *in vitro* models on MESD and WESD. As MESD showed better result, the *in vivo* test was performed for only this extract which showed significant reduction in systolic blood pressure on DOCA induced hypertensive rats.