Acknowledgements

It is my great privilege to acknowledge my deep sense of gratitude to my most helpful and kind supervisor, Dr. Jogen Chandra Kalita for his able guidance, for his never-ending encouraging words to gear me up and his criticisms at times to show me the right path. His keen interest and observation in the work enabled me to successfully complete my research work.

I am extremely thankful to Prof. A. Barkataky (Ex-Head, Zoology Dept.) and Prof. D.K. Sharma, Head, Department of Zoology, Gauhati University for providing necessary facilities and for their constant support and encouragement.

I express my deep sense of gratitude to the University Grants Commission, India, for the financial support without which it would not have been possible to carry out my investigation.

I express my thanks to all other teachers of Zoology Department, Gauhati University, for their support and kindness.

I am extremely thankful to Dr. Utpal Dutta, Sr. Lecturer, Handique Girls' College for his valuable suggestions and constant encouragement during the research works.

I am very much grateful to Dr. Pritam Mohan, Asstt. Prof., Division of Pharmacology and Toxicology, College of Veterinary Science, Assam Agricultural University, Khanapara, Gauhati, for his valuable help in handling and taking care of the experimental animals and in preparation of extract, without which it would not have been possible to carry out my research works.

Thanks are due to Dr. K.K. Barua, Assoc. Prof., Physiology and Biochemistry Division, College of Veterinary Science, Assam Agricultural University, Khanapara, Gauhati, for helping me with Radio-immunoassay of insulin levels of animals despite of his busy schedule.

I also want to thank Dr. A. Sarmah, Prof., Microbiology division, College of Veterinary Science, Assam Agricultural University for helping me with studies of immune status of the animals. I also thank my teacher Dr. T.K. Chaudhury, Prof., Cell Biology and Immunology Lab, North Bengal University for his kind help and support in this study.

I extend my sincere thanks to Dr. Aditya Langthasa, MD. and Dr. Dipu Marne, MD., Specialists in medicine, Haji Abdul Majid Memorial Hospital and Research Centre, Hojai, for their valuable suggestions and help.

I also extend my sincere thanks to Dr. K.P. Roy, Pathologist and Mr. T. Raju, Laboratory Technician, Haji Abdul Majid Memorial Hospital and Research Centre, Hojai, for helping me in carrying out histological work.
I am extremely thankful to my senior colleagues Dr. Abhijit Kataky, Head, Zoology Department, Hojai College; Mr. P. Bagchi and Ms. Sarmistha Paul for their constant help and support.

I am also extremely grateful to The Principal, Hojai College, for giving me this opportunity to carry out my research works and constant help and support.

I wish to express my deep sense of gratitude to Mr. Nabin Kemprai and Mr. Rana Lal Biswas (Scientific assistants) for their constant help and support. I also wish to thank Mr. Ashok Narzary and Mr. Nabin Kemprai for helping me in carrying out the ethno-botanical survey in remote villages of Hojai and Karbi Anglong.

I am extremely grateful to Dr. Manjit Saikja, Mr. Utpal Phukan, Prof. S.K. Borthakur and Botanical Survey of India, Shillong, for helping me with the identification of the medicinal plants.

Thanks are due to the traditional healers and local informants of Karbi Anglong for sharing their knowledge and their hospitality, especially Mr. A. Basumatary, a most revered traditional healer of village Borthol, Karbi Anglong, for sharing his valuable knowledge on uses of numerous medicinal plants.

I wish to thank my teachers Dr. Ashim Kumar Chakravarty, Dr. Tapas Kr. Chaudhury, Dr. Anand Mukerjee, Dr. Joydeb Pal, Dr. Debesh Chandra Deb, Department of Zoology, North Bengal University, for their encouraging words and suggestions.

With deep sense of gratitude, love and pleasure, I thank my mom for her untiring support and my beloved dad (who left me forever amidst my research work) for his untiring help and support during my research works. I also thank my younger brother Mr. Srang Basumata for his help and encouragement. Thanks are also due to my elder brothers Mr. Rup Kr. Basumata and Mr. Shakti Kr. Basumata for their constant help and encouragement.

Lastly, but not the least, I thank my father-in-law, Mr. D. Boro, my husband Dr. Jagadish Basumatary, my kids Phoebe and Flora for their patience and untiring encouragement which helped me to complete this thesis successfully.

Caroline Basumatary
Chapter I: Introduction

1.1. Definition of Diabetes Mellitus.

1.2. Worldwide prevalence of diabetes mellitus.

1.3. Current approach to the management of diabetes.


1.5. Traditional knowledge of indigenous communities.

Chapter II: Literature Review

2.1. Etiological classification of diabetes mellitus

2.2. Epidemiology of diabetes in India.

2.3. New glucose lowering agents.

2.4. Plants with possible beneficial properties in the treatment of diabetes.

2.5. Animal models in the study of diabetes.

2.6. Present concern.

2.7. About the plant used in the present investigation.

2.8. Aim of the present study.

Chapter III: Materials and Methods.

3.1. Study area and ethnographic background.

3.1.1. Methods of survey.

3.1.2. Collection of plant materials.

3.2. Plant materials.

3.2.1. Preparation of the extract and administration.

3.3. Chemicals.

3.4. Anaesthesia.
Chapter IV:

3.5. Animals.

3.5.1. Experimental animal groups

3.5.2. Collection of blood samples from the animals.


3.6.1. Estimation of glucose levels.

3.6.2. Estimation of triglyceride levels.

3.6.3. Estimation of cholesterol levels.

3.6.4. Estimation of Insulin levels.

3.6.5. Estimation of % Hb₁c

3.6.6. Estimation of serum GOT.

3.6.7. Estimation of serum GPT.

3.6.8. Estimation of serum AP.

3.7. Induction of diabetes in the animals.

3.8. Evaluation of effect of CLE, TLE, and LLE on serum glucose and triglyceride levels.

3.9. Toxicity evaluation of CLE-treated animals.

3.9.1. Histo-pathological examination.

3.10. Evaluation of effect of CLE on serum glucose, insulin, triglyceride, and cholesterol levels.

3.11. Evaluation of immune status of the hyperglycaemic control and CLE-treated rats.

3.11.1. Studies of phagocytosis of peritoneal macrophages.

3.11.2. Evaluation of antibody titres.


Chapter IV: Results.

4.1. Ethnobotanical survey.

4.2. Induction of diabetes by 50% Fructose (fructodex).

4.3. Effect of CLE, TLE and LLE on fructose-induced hyperglycaemic rats.
4.4. Toxicity evaluation.

4.5. Effect of CLE (100mg and 300mg) on serum glucose, Insulin, triglyceride and cholesterol levels.


4.7. Glycaemic control and changes in islet morphology of hyperglycaemic control and hyperglycaemic CLE-treated animals.

Chapter V: General Discussion and conclusion

References: i - xxxi