Contents

Chapter I. Introduction ................................................................. 1
Chapter II. Review of literature .................................................... 25
Chapter III. Materials and methods ................................................ 51

3.1 Materials ............................................................................... 51
   3.1.1 Chemicals ....................................................................... 51
   3.1.2 Diagnostic reagents and kits ........................................... 52
   3.1.3 Animals ......................................................................... 52

3.2 Methods .................................................................................. 52
   I. Blood biochemical profile and antioxidant status.

3.2.1 Biochemical profile
   3.2.1.1 Experimental design .................................................. 52
   3.2.1.2 Collection of blood samples ....................................... 53
   3.2.1.3 Estimation of glucose ............................................... 53
   3.2.1.4 Estimation of total cholesterol ................................. 54
   3.2.1.5 Estimation of serum total protein ............................. 54
   3.2.1.6 Estimation of serum albumin ..................................... 55
   3.2.1.7 Estimation of serum triglycerides .............................. 55
   3.2.1.8 Estimation of serum total bilirubin ......................... 56
   3.2.1.9 Estimation of serum creatinine ................................. 56
   3.2.1.10 Estimation of serum urea ........................................ 57
   3.2.1.11 Estimation of serum uric acid .................................. 57
   3.2.1.12 Estimation of serum sodium and potassium ............ 58

3.2.2 Liver marker enzymes
   3.2.2.1 Aspartate transaminase and Alanine transaminase ....... 58
   3.2.2.2 Alkaline phosphatase ............................................... 59
   3.2.2.3 Gamma glutamyl transferase .................................... 59

3.2.3 Blood antioxidant status
   3.2.3.1 Preparation of 1:20 haemolysate ............................... 60
   3.2.3.2 Estimation of Hemoglobin ....................................... 60
   3.2.3.3 Superoxide dismutase .............................................. 61
   3.2.3.4 Catalase .................................................................. 62
3.2.24 Insulin ................................................................. 81
3.2.25 Hexokinase ............................................................. 82
3.2.26 Phosphoglucoisomerase .......................................... 83
3.2.27 Pyruvate kinase ....................................................... 83
3.2.28 Glucose 6-phosphatase .............................................. 84
3.2.29 Fructose 1, 6-bisphosphatase ..................................... 85

3.3 Statistical analysis ................................................................ 85

Chapter IV. Effect of aspartame on blood biochemical profile and antioxidant status in liver and brain

4.1 Results
4.1.1 Effect of aspartame on blood biochemical profile ............ 87
4.1.2 Effect of aspartame on serum sodium and potassium ....... 88
4.1.3 Effect of aspartame on liver marker enzymes .................. 88
4.1.4 Effect of aspartame on blood antioxidant enzymes .......... 89
4.1.5 Effect of aspartame on reduced glutathione in blood ....... 90
4.1.6 Effect of aspartame on lipid peroxidation in blood .......... 90
4.1.7 Effect of aspartame on liver antioxidant enzymes .......... 91
4.1.8 Effect of aspartame on reduced glutathione in liver ........ 92
4.1.9 Effect of aspartame on lipid peroxidation in liver .......... 92
4.1.10 Effect of aspartame on brain antioxidant enzymes ......... 93
4.1.11 Effect of aspartame on reduced glutathione in brain ...... 94
4.1.12 Effect of aspartame on lipid peroxidation in brain ........ 94
4.1.13 Effect of aspartame on histopathology ......................... 95

4.2 Discussion ...................................................................... 97

Chapter V. Effect of aspartame on neurochemistry

5.1 Results
5.1.1 Effect of aspartame on acetylcholine esterase ............... 113
5.1.2 Effect of aspartame on Na⁺ K⁺-ATPase and Ca²⁺-ATPase ................................................................. 114
5.1.3 Effect of aspartame on electrolyte contents ................. 114
5.1.4 Effect of aspartame on apoptosis ................................. 115
5.1.5 Effect of aspartame on brain amino acids ..................... 117
Chapter VI. Effect of aspartame on food intake, body weight and glucose homeostasis in diabetic and non diabetic conditions

6.1 Results

6.1.1 Effect of aspartame on food intake
6.1.2 Effect of aspartame on body weight
6.1.3 Effect of aspartame on glucose, lactate, glycated hemoglobin and C-reactive protein
6.1.4 Effect of aspartame on insulin
6.1.5 Effect of aspartame on glycolytic enzymes
6.1.6 Effect of aspartame on gluconeogenic enzymes

6.2 Discussion

Chapter VI Summary and conclusion

Bibliography

Publications