Abbreviations: Normal rats treated with sterile distilled water (N+ sdH_2O), diabetic rats treated with sterile distilled water (D+ sdH_2O), diabetic rats treated with *Leucaena leucocephala* at dose of 250 mg per kg (D+ LL 250 mg/kg), diabetic rats treated with *Leucaena leucocephala* at dose of 500 mg per kg (D+ LL 500 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D + G 1.25 mg/kg).

Figure 4.8: Effect of *L. leucocephala* dry fruit water crude extract on enzymatic and non-enzymatic antioxidants pancreas tissue homogenate samples.

Figures shows the effect of *L. leucocephala* extract at 250 mg kg^{-1} and 500 mg kg^{-1} on (a) Glutathione peroxidase activity level, (b) Total antioxidant level, (c) Protein oxidation and (d) Lipid peroxidation on rats pancreas in STZ-induced diabetic rats. The effect of *L. leucocephala* extract on oxidative indices namely Glutathione peroxidase method, FRAP method, protein oxidation (AOPP) and lipid peroxidation (TBARS) were measured according to the methods described in sections *3.9.5.4, 3.9.5.1, 3.9.5.2* and *3.9.5.3* respectively. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: Normal rats treated with sterile distilled water (N+ sdH_2O), diabetic rats treated with sterile distilled water (D+ sdH_2O), diabetic rats treated with *Leucaena leucocephala* at dose of 250 mg per kg (D+ LL 250 mg/kg), diabetic rats treated with *Leucaena leucocephala* at dose of 500 mg per kg (D+ LL 500 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D + G 1.25 mg/kg).

Figure 4.9: Effect of *L. leucocephala* dry fruit water crude extract on enzymatic and non-enzymatic antioxidants liver homogenates samples.

Figures shows the effect of *L. leucocephala* extract at 250 mg kg^{-1} and 500 mg kg^{-1} on (a) Glutathione Peroxidase activity level, (b) Total antioxidant level, (c) Protein oxidation and (d) Lipid peroxidation on rats liver in STZ-induced diabetic rats. The effect of *L. leucocephala* extract on oxidative indices namely Glutathione Peroxidase methods, FRAP method, protein oxidation (AOPP) and lipid peroxidation (TBARS) were measured according to the methods described in sections *3.9.5.4, 3.9.5.1, 3.9.5.2* and *3.9.5.3* respectively. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: Normal rats treated with sterile distilled water (N+ sdH_2O), diabetic rats treated with sterile distilled water (D+ sdH_2O), diabetic rats treated with *Leucaena leucocephala* at dose of 250 mg per kg (D+ LL 250 mg/kg), diabetic rats treated with *Leucaena leucocephala* at dose of 500 mg per kg (D+ LL 500 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D + G 1.25 mg/kg).

Figure 4.10: Effect of *L. leucocephala* dry fruit water crude extract on enzymatic and non-enzymatic antioxidants brain homogenates samples.

Figures shows the effect of *L. leucocephala* extract at 250 mg kg^{-1} and 500 mg kg^{-1} on (a) Glutathione Peroxidase activity level, (b) Total antioxidant level, (c) Protein oxidation and (d) Lipid peroxidation on rats brain in STZ-induced diabetic rats. The effect of *L. leucocephala* extract on oxidative indices namely Glutathione Peroxidase methods, FRAP method, protein oxidation (AOPP) and lipid peroxidation (TBARS) were measured according to the methods described in sections *3.9.5.4, 3.9.5.1, 3.9.5.2* and *3.9.5.3* respectively. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: Normal rats treated with sterile distilled water (N+ sdH_2O), diabetic rats treated with sterile distilled water (D+ sdH_2O), diabetic rats treated with *Leucaena leucocephala* at dose of 250 mg per kg (D+ LL 250 mg/kg), diabetic rats treated with *Leucaena leucocephala* at dose of 500 mg per kg (D+ LL 500 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D + G 1.25 mg/kg).

Figure 4.11: Effect of *L. leucocephala* dry fruit water crude extract on enzymatic and non-enzymatic antioxidants kidney homogenates samples.

Figures shows the effect of *L. leucocephala* extract at 250 mg kg^{-1} and 500 mg kg^{-1} on (a) Glutathione peroxidase activity level, (b) Total antioxidant level, (c) Protein oxidation and (d) Lipid peroxidation on rats kidney in STZ-induced diabetic rats. The effect of *L. leucocephala* extract on oxidative indices namely Glutathione peroxidase methods, FRAP method, protein oxidation (AOPP) and lipid peroxidation (TBARS) were measured according to the methods described in sections *3.9.5.4, 3.9.5.1, 3.9.5.2* and *3.9.5.3* respectively. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: Normal rats treated with sterile distilled water (N+ sdH_2O), diabetic rats treated with sterile distilled water (D+ sdH_2O), diabetic rats treated with *Leucaena leucocephala* at dose of 250 mg per kg (D+ LL 250 mg/kg), diabetic rats treated with *Leucaena leucocephala* at dose of 500 mg per kg (D+ LL 500 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D + G 1.25 mg/kg).

Figure 4.12: Effects of *L. leucocephala* dry fruit water crude extract at 250 mg kg^{-1} and 500 mg kg^{-1} on diabetic rats liver.

Panel (a)-(e) showed rats liver section stained with Hematoxylin and Eosin as described in method *Section 3.9.6*. The magnification was 400X for all panel. Panel (a) showed normal rats liver section. It showed normal hepatic structure, hepatic lobules, radiating plates or strands of cells, portal vein (pv), narrow sinusoids and Kupffer cells. Panel (b) showed the untreated diabetic rats liver. It showed lots of RBC congestion, increased in Kuppfer cells, karyolysis (ky) and pyknotic (pn) nuclei and dilation sinusoids.

Figure 4.12: Effects of *L. leucocephala* dry fruit water crude extract at 250 mg kg^{-1} and 500 mg kg^{-1} on diabetic rats liver.

Panel (a)-(e) showed rats liver section stained with Hematoxylin and Eosin as described in method *Section 3.9.6*. The magnification was 400X for all panel. Panel (c) showed the effects of *L. leucocephala* at 250 mg kg^{-1} on diabetic rats liver. Legends: normal central vein (cv), normal hepatocytes and arrangements, no fatty changes, very less RBC infiltration (red arrow). Panel (d) showed the effects of *L. leucocephala* at 500 mg kg^{-1} on diabetic rats liver. Legends: normal central vein (cv), normal hepatocytes, no fatty changes and very less RBC infiltration, dilated sinusoids (light orange arrow).

Figure 4.12: Effects of *L. leucocephala* dry fruit water crude extract at 250 mg kg^{-1} and 500 mg kg^{-1} on diabetic rats liver.

Panel (a)-(e) showed rats liver section stained with Hematoxylin and Eosin as described in method *Section 3.9.6*. The magnification was 400X for all panel. Panel (e) showed the effects of Glibenclamide 1.25 mg kg^{-1} on diabetic rats liver. Legends: moderate RBC congestion (red arrow) but less compared to negative control, lots of lymphocytes infiltration (white arrow).

Figure 4.13: Effects of *Leucaena leucocephala* dry fruit water crude extract at 250 mg kg^{-1} and 500 mg kg^{-1} on diabetic rats' kidney.

Panel (a)-(e) showed rats kidney section stained with Hematoxylin and Eosin as described in method *Section 3.9.6*. The magnification was 400X for all panel. Panel (a) showed the effects of sterile distilled water 4 ml mg kg^{-1} (placebo) on normal rats kidney. Legends: normal capillaries (white arrow), normal capsular space (black arrow), normal podocytes (orange arrow), macula densa (blue arrow), parietal blade of Bowman's capsule (green arrow), mesangial cells (grey arrow). Panel (b) showed the untreated diabetic rats kidney. Legend: moderately dilated of capillaries (white arrow) and increased in capsular space (black arrow). Panel (c) showed the effects of *Leucaena leucocephala* at dose of 250 mg kg^{-1} on diabetic rats' kidney. Panel (d) showed the effects of *Leucaena leucocephala* at 500 mg kg^{-1} on diabetic rats' kidney. Legend: slightly dilated of capillaries (white arrow). Panel (e) showed the effects of Glibenclamide 1.25 mg kg^{-1} on diabetic rats kidney. Legends: enlargement of glomerulus / capsular space (black arrow) and dilated capillaries (white arrow).

Abbreviations: Normal rats treated with normal saline (N+ Normal saline), diabetic rats treated with normal saline (D+ Normal saline), diabetic rats treated with *Leucaena leucocephala* partially purified water-hexane at dose of 25 mg per kg (D+ LL He 25 mg/kg), diabetic rats treated with *Leucaena leucocephala* partially purified water-ethyl acetate at dose of 25 mg per kg (D+ LL Et 25 mg/kg), diabetic rats treated with *Leucaena leucocephala* partially purified water-aqueous at dose of 25 mg per kg (D+ LL Aq 25 mg/kg), diabetic rats treated with *Leucaena leucocephala* partially purified water-hexane at dose of 50 mg per kg (D+ LL He 50 mg/kg), diabetic rats treated with *Leucaena leucocephala* partially purified water-ethyl acetate at dose of 50 mg per kg (D+ LL Et 50 mg/kg), diabetic rats treated with *Leucaena leucocephala* partially purified water-aqueous at dose of 50 mg per kg (D+ LL Aq 25 mg/kg), diabetic rats treated with glibenclamide at dose of 1.25 mg per kg (D+ G 1.25 mg/kg).

Figure 4.19: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized pancreas pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized pancreas pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (a) shows the effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on Glutathione peroxidase activity level in pancreas in STZ-induced diabetic rats. Panel (b) shows the effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats pancreas FRAP. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; ** denotes $p < 0.01$ and *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Glutathione peroxidase in pancreas

G 1.25 > *LL* He 50 > *LL* Aq 50

17.54 > 9.39 > 5.78

Total antioxidant in pancreas

G 1.25 > *LL* He 25 > *LL* He 50 > *LL* Aq 25 > *LL* Et 25 > *LL* Aq 50 > *LL* Et 50

45.41 > 34.00 > 33.65 > 30.97 > 29.44 > 25.73 > 13.73

Protein oxidation in pancreas

LL Et 25 > *LL* He 25 > *LL* Aq 25 > G 1.25 > *LL* Aq 50 > N. saline > *LL* Et 50 > *LL* He 50

31.75 > 36.04 > 39.13 > 40.17 > 74.42 > 80.67 > 83.08 > 84.16

Lipid peroxidation in pancreas

LL He 25 > *LL* Et 25 > *LL* Aq 25 > *LL* Aq 50 > *LL* Et 50 > N. saline > G 1.25

10.27 > 20.44 > 23.00 > 24.15 >32.56 > 33.00 > 34.70

Figure 4.18 : The order of potency in descending order for glutathione peroxidase activity, total antioxidant, protein oxidation and lipid peroxidation level in pancreas; sub-chronic study.

The glutathione peroxidase unit is nmol NADPH/min/mg of protein and for all non-enzymatic antioxidants are μmol mg^{-1} protein.

Abbreviations: refer to page 153.

Figure 4.19: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized pancreas pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized pancreas pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (c) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats pancreas AOPP. Panel (d) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats pancreas MDA. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; ** denotes $p < 0.01$ and *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Figure 4.20: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized pancreas pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized pancreas pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Figures shows effect of *L. leucocephala* water-solvents partially purified extract at 25 mg kg^{-1} and 50 mg kg-^{1} on (a) Glutathione peroxidase activity level (b) Total antioxidant (c) Protein oxidation and (d) Lipid peroxidation on rats pancreas in STZ-induced diabetic rats. Panel (c) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats pancreas AOPP. Panel (d) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats pancreas MDA. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; ** denotes $p < 0.01$ and *** denotes $p < 0.001$.

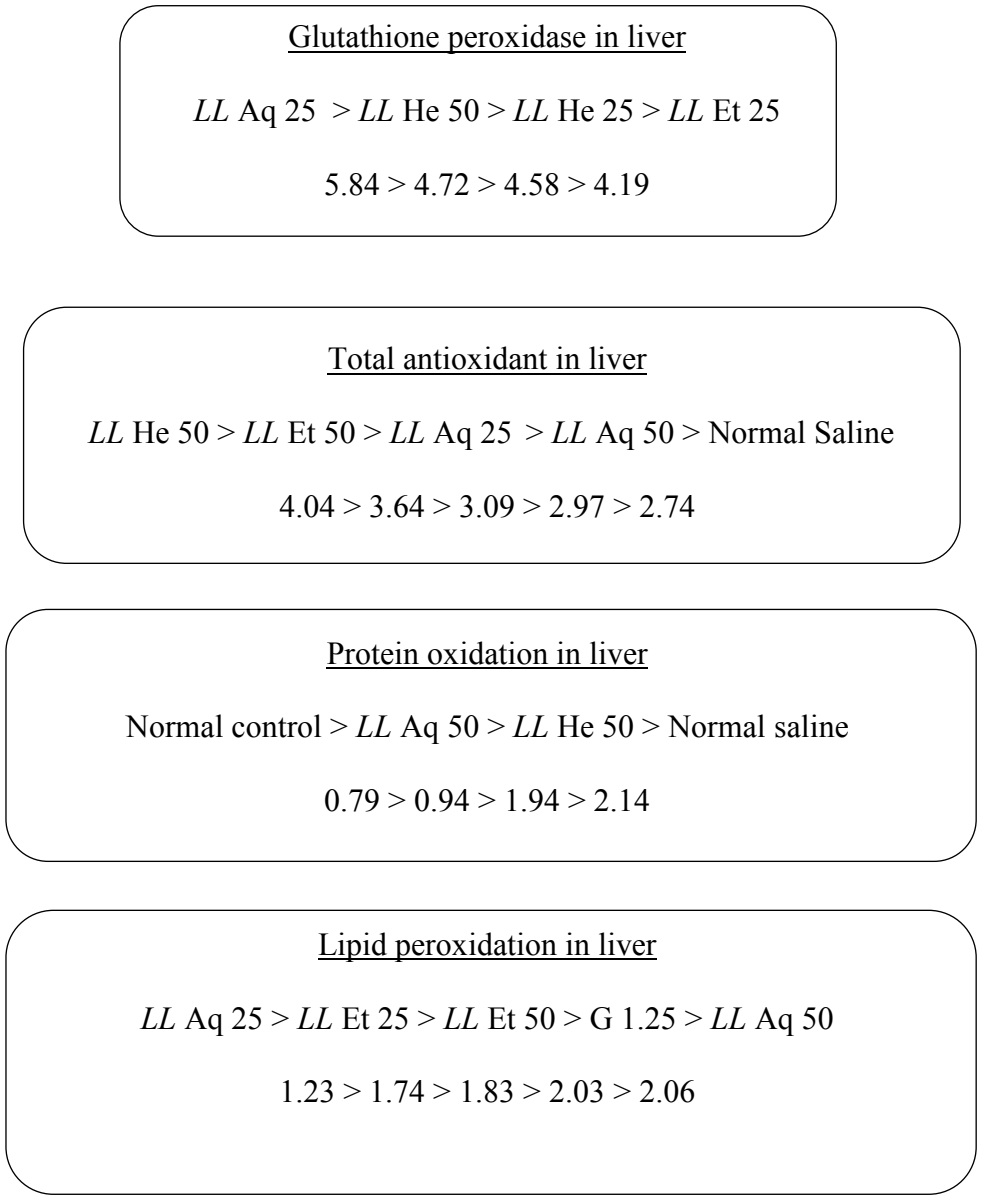

Figure 4.20: The order of potency in descending order for glutathione peroxidase activity, total antioxidant, protein oxidation and lipid peroxidation level in liver; sub-chronic study.

The glutathione peroxidase unit is nmol NADPH/min/mg of protein and for all non-enzymatic antioxidants are μmol mg^{-1} protein.

Abbreviations: refer to page 153.

Figure 4.21: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized liver pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized liver pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (a) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on Glutathione peroxidase activity level in liver in STZ-induced diabetic rats. Panel (b) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats liver FRAP. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Figure 4.21: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized liver pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized liver pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (c) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats liver AOPP. Panel (d) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats liver MDA. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Glutathione peroxidase in brain

LL He 25 > *LL* He 50

0.21 > 0.16

Total antioxidant in brain

LL Aq 25 > *LL* Aq 50 > *LL* He 50 > *LL* Et 25 > *LL* Et 50 = *LL* He 25 > G 1.25

1.70 > 1.63 > 1.38 > 1.24 > 1.16 = 1.16 > 1.09

Protein oxidation in brain

LL Aq 25 > *LL* Et 25 > *LL* He 25 > *LL* Aq 50 = *LL* Et 50 > *LL* G 1.25 > *LL* He 50

1.32 > 2.59 > 3.82 > 6.51= 6.51 > 7.19 > 7.20

Lipid peroxidation in brain

LL Aq 25 > *LL* He 25 > *LL* Et 25 > *LL* Aq 50 > *LL* Et 50

2.19 > 2.22 > 2.53 > 2.67 > 3.15

Figure 4.22 : The order of potency in descending order for glutathione peroxidase activity, total antioxidant, protein oxidation and lipid peroxidation level in brain; sub-chronic study.

The glutathione peroxidase unit is nmol NADPH/min/mg of protein and for all non-enzymatic antioxidants are μmol mg^{-1} protein.

Abbreviations: refer to page 153.

Figure 4.23: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized brain pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized brain pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (a) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on Glutathione peroxidase activity level in brain in STZ-induced diabetic rats. Panel (b) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats brain FRAP. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test.

*** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Figure 4.23: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized brain pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized brain pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (c) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats brain AOPP. Panel (d) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats brain MDA. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Glutathione peroxidase in kidney

LL Et 50 > *LL* He 50 > *LL* Et 25 > *LL* Aq 50 > *LL* Aq 25 > *LL* He 25

1.73 > 1.65 >1.46 >1.29 >1.09> 0.96

Total antioxidant in kidney

LL Aq 50 > Normal control > *LL* Et 50 > *LL* He 50 = *LL* He 25 > G 1.25 > *LL* Aq 25

4.36 > 4.25 > 3.94 > 3.29 = 3.29 > 3.15 > 2.88

Protein oxidation in kidney

LL He 50 > *LL* Aq 25 > *LL* Et 50

1.57 > 1.66 > 2.17

Lipid peroxidation in kidney

LL He 50 = *LL* Et 50 > G 1.25 > *LL* Aq 25 > *LL* Aq 50

2.57 = 2.57 > 2.65 > 2.79 > 3.82

Figure 4.24 : The order of potency in descending order for glutathione peroxidase activity, total antioxidant, protein oxidation and lipid peroxidation level in kidney; sub-chronic study.

The glutathione peroxidase unit is nmol NADPH/min/mg of protein and for all non-enzymatic antioxidants are µmol mg^{-1} protein.

Abbreviations: refer to page 153.

Figure 4.25: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized kidney pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized kidney pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (a) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on Glutathione peroxidase activity level in kidney in STZ-induced diabetic rats. Panel (b) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats kidney FRAP. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Figure 4.25: Effect of *L. leucocephala* water-solvents partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles on homogenized kidney pooled samples; sub-chronic study.

The effect of *L. leucocephala* water-hexane partially purified extracts on enzymatic and non-enzymatic antioxidants *in vivo* profiles were measured on homogenized kidney pooled samples by using Glutathione peroxidase methods (*Section 3.9.5.4*), total antioxidant using FRAP method (*Section 3.9.5.1*), protein oxidation using AOPP method (*Section 3.9.5.2*) and lipid peroxidation using MDA method (*Section 3.9.5.3*) in sub-chronic study. Panel (c) shows effect of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats kidney AOPP. Panel (d) shows effects of *L. leucocephala* water-hexane partially purified extracts at 25 mg kg^{-1} and 50 mg kg^{-1} on rats kidney MDA. Comparison were made between each group and negative control. Results presented are mean ± SEM. Statistical significance was calculated based on Student's t-test; *** denotes $p < 0.001$.

Abbreviations: refer to page 153.

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as a method in *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (a) showed normal rats liver. Legends: normal central vein (blue arrow), normal hepatocytes and arrangements, no fatty changes, no RBC infiltration and no lymphocytes infiltration. Panel (b) showed the untreated diabetic rats liver. Legends; dilated sinusoids, (light orange arrow), RBC infiltration (red arrow) and lymphocytes infiltration (white arrow).

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as in method *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (a) showed normal rats liver. Legends: normal central vein (blue arrow), normal hepatocytes and arrangements, no fatty changes, no RBC infiltration and no lymphocytes infiltration. Panel (b) showed diabetic rats liver treated with Normal saline at dose of 4 ml/kg. Legends; dilated sinusoids (light orange arrow), RBC infiltration (red arrow) and lymphocytes infiltration (white arrow).

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as in method *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (c) showed effects of *Leucaena leucocephala* water-hexane partially purified at dose of 25 mg kg^{-1} on diabetic rats liver. Legends: RBC infiltration (red arrow). Panel (d) showed effects of *Leucaena leucocephala* water-hexane partially purified at dose of 50 mg kg^{-1} on diabetic rats liver. Legends: RBC congestion (red arrow), lymphocytes infiltration (white arrow), Kupffer cells (green arrow).

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as in method *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (e) showed effects of *Leucaena leucocephala* water-ethyl acetate partially purified at dose of 25 mg kg^{-1} on diabetic rats liver. Legends: Central vein, RBC congestion and Kupffer cells. Panel (f) showed effects of *Leucaena leucocephala* water-ethyl acetate partially purified at dose of 50 mg kg^{-1} on diabetic rats liver. Legends: central vein, RBC congestion, Kupffer cells.

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as in method *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (g) showed effects of *Leucaena leucocephala* water-aqueous partially purified at dose of 25 mg kg^{-1} on diabetic rats liver. Legends: Severe RBC infiltration and worse dilated sinusoid. Panel (h) showed effects of *Leucaena leucocephala* water-aqueous partially purified at dose of 50 mg kg^{-1} on diabetic rats liver. Legends: RBC infiltration and congestion, worsely dilated sinusoid.

Figure 4.26: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats liver; sub-chronic study.

Figure 4.26 (a)-(i) showed normal and diabetic rats liver section stained with Hematoxylin and Eosin as in method *Section 3.9.6*. The magnification was 100X for panels (a)-(i). Panel (i) showed effects of Glibenclamide at dose of 1.25 mg kg^{-1} on diabetic rats liver. Legends: RBC infiltration (red arrow).

Figure 4.27: Effects of *Leucaena leucocephala* water-solvents partially purified extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats kidney; sub-chronic study.

Figure 4.27 (a)-(i) showed normal and diabetic rats kidney section stained with Hematoxylin and Eosin as method in *Section 3.9.6*. The magnification was 400X for panels (a)-(i). Panel (a) showed normal rats kidney. Legends: normal capillaries (white arrow), normal capsular space (black arrow), normal podocytes (orange arrow), macula densa (blue arrow), parietal blade of Bowman's capsule (green arrow) and mesangial cells (grey arrow). Panel (b) showed effects of Normal saline on diabetic rats kidney. Legends: enlargement of glomerular capillaries (white arrow) and capsular space (black arrow). Panel (c) showed effects of *Leucaena leucocephala* water-hexane partially purified extract at dose of 25 mg kg^{-1} on diabetic rats kidney. Legends: glomerulus appear similar to panel (a). Panel (d) showed effects of *Leucaena leucocephala* water-hexane partially purified extract at dose of 50 mg kg^{-1} on diabetic rats kidney. Legends: mesangial space becomes larger by deposition of extracellular matrix (grey arrow).

Figure 4.27: Effects of *Leucaena leucocephala* water-solvents partially purified, extracts at dose of 25 mg kg^{-1} and 50 mg kg^{-1} on diabetic rats kidney; sub-chronic study.

Figure 4.27 (a)-(i) showed normal and diabetic rats kidney section stained with Hematoxylin and Eosin as method in *Section 3.9.6*. The magnification was 400X for panels (a)-(i). Panel (e) showed effects of *Leucaena leucocephala* water-ethyl acetate partially purified extact at dose of 25 mg kg^{-1} on diabetic rats kidney. Legends: increased amount of mesangial matrix (grey arrow). Panel (f) showed effects of *Leucaena leucocephala* water-ethyl acetate partially purified extract at dose of 50 mg kg^{-1} on diabetic rats kidney. Legends: increased amount of mesangial matrix (grey arrow) and enlargement of glomerular capillaries (white arrow). Panel (g) showed effects of *Leucaena leucocephala* water-aqueous partially purified extract at dose of 25 mg kg^{-1} on diabetic rats kidney. Legends: increased amount of mesangial matrix (grey arrow) and enlargement of capsular space (black arrow). Panel (h) showed effects of *Leucaena leucocephala* hexane-aqueous partially purified extract at dose of 50 mg kg^{-1} on diabetic rats kidney. Panel (i) showed effects of Glibenclamide at dose of 1.25 mg kg^{-1} on diabetic rats kidney. Legends: enlargement of glomerular capillaries (white arrow).