CHAPTER 6

Discussion

Boerhavia diffusa, Saccharum spontaneum and Dalbergia latifolia reported to contain potential phytoconstituents like punarnavine, boerhavinone A, B, C, D, punarnavoside, dalbinol, dalbin, β-sitisterol, latinone, saccharan A and B components like flavonoids and polyphenolics. The present study confirmed the presence of compounds like flavonoids and phenolic in alcoholic extracts. HPTLC fingerprinting of samples showed number of compounds present when screened at 254 & 366 nm. The peaks obtained after fingerprinting were similar to the peaks of phytoconstituents studied before which could be rutin, quercetin and ephedrine. Earlier study has confirmed that flavonoids and phenolic compounds are responsible for therapeutic activities (Gul et al., 2000).

The antioxidant activity is mainly due to the redox properties (Zheng and Wang, 2001). DPPH scavenging activity between total phenolic and reductive potential was due to the donating ability of hydrogen (Miliauskas et al., 2004). Although the scavenging activity of the extracts was significantly lower than those of ascorbic acid but extract showed the proton-donating ability (Yu et al., 2002). The antioxidant potential of plants have a correlation between the phenolic content and the antioxidant activity (Zahin, et al., 2009). It has been shown that the free radicals scavenging activity of extracts in different systems may treat radical-related pathological damage. Although nitric oxide free radicals are involved in defence mechanism over production of free radicals contributes to the pathogenesis of some inflammatory diseases (Guo et al., 1999). The roots and bark extract of might contain compounds, which are capable to inhibit nitric oxide and offers scientific evidence for the indigenous system in inflammatory condition. Reducing power measured the reductive
ability of antioxidant, and transformation of Fe$^{+3}$ to Fe$^{+2}$ in the presence of the extract. The activity of antioxidants had been indicated to various mechanisms such as inhibition of chain initiation, binding of ion catalysts, decomposition of peroxides, reductive capacity and radical scavenging (Yildirim et al, 2000). The ferrous chloride reacted with peroxide molecule producing ferric chloride, reacted with ammonium thiocyanate to form ferric thiocyanate, reddish colour pigment. The changes in absorbance of extract showed the reduction of peroxide at the initial stages of linoleic acid oxidation. The phenolic compounds donate H$^+$ ion and can cease the free radical reaction of stable compounds (Farag et al., 1989).

Rats were fed a high fat diet along with simultaneous drug treatment considered to be an important factor in the study of obesity (Kusunoki et al, 2000). The final body weight gain in 60 days old rats in the HFD fed group was 135.09, 135.83 & 133.34 % (Table 5.13, 5.25 & 5.43) significantly increased (p<0.01) than the normal groups I. On treatment with sibutramine (5 mg/kg) group III, the final body weight was significantly reduced (67.19, 68.23 & 71.14 %) when compared with HFD group II animals. Body weight of rats in the BDRE, SPRE and DLBE treated groups (200 & 400 mg/kg) along with high fat diet shows significantly reduced (p< 0.01/ 61.05, 59.44, 58.61 & p<.05/ 55.09, 52.07, 53.42 %) when compared with the HFD group II animals (Table 5.13, 5.25 & 5.43). While the BDRE, SPRE and DLBE (100 mg/kg) treated group IV shows non significant reduction in body weight respectively. The extract was fractionated with hexane, chloroform, n-butanol and water. The water fraction of BDRE, SPRE & DLBE (200 mg/kg) was administered along with high fat diet, the body weight was significantly reduced (p<0.01/ 65.95, 62.75 & 61.16) when compared with group II animals. While the other fractions like Hx-F, chl-F & n-but-F showed non significant effect on body weight. Therefore BDRE, SPRE & DLBE had the ability to reduce the body weight
gain which could be due to its combined effects on the metabolic and serotonin pathways (Asghar et al., 2006). BDRE, SPRE & DLBE treated groups reduced the food intake in rats with HFD by inhibiting carbohydrate and fatty acids metabolism. This metabolic change may send a signal to the brain that result in a reduced appetite (Sullivan et al., 1974).

The relative weight of visceral fat pad depots was significantly increased (p< 0.01) in HFD group II compared with the normal group I animals. The BDRE, SPRE & DLBE treated group (V & VI) supplementing with HFD was significantly reduced (p< 0.01) the organ weight of heart, kidney, liver, spleen and uterine fat-pad weight when compared with HFD group II animals. Administration of BDRE, SPRE and DLBE (200 mg/kg) and wt-F (200 mg/kg) was able to reduce the body weight (p<0.01) due to metabolic and 5-HT pathway and it was found that the water fraction of BDRE, SPRE & DLBE shows greater significant reduction in body weight that BDRE, SPRE & DLBE of extracts. The water fraction of BDRE, SPRE & DLBE (200 mg/kg) was administered along with high fat diet, the relative fat pad weight was significantly reduced (p<0.01) when compared with group II animals. While the other fractions like Hx-F, chl-F & n-but-F showed no significant effect on relative fat pad weight. The promotion of lipolysis in adipocytes is one of the main mechanism to prevent fat accumulation (Bairras et al., 2007). Further, there have been many reports showing regional differences in adipose metabolism, including responsiveness to dietary treatments or exercise and lipolysis-promoting hormones (Doucet et al., 2002). Administration of BDRE, SPRE & DLBE (200 mg/kg) & its wt-F (200 mg/kg) was able to reduce the fat pad weight due to lipolysis of adipose tissue and it was found that the water fraction of BDRE, SPRE & DLBE shows the greater significant reduction in adipose tissue.
Dyslipidemia belongs to the disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency and was manifested by an elevation of serum cholesterol (TC), low density lipoprotein (LDL), triglyceride (TG) concentration, and decreased the high density lipoprotein protein cholesterol (HDL) concentration (Ahmad et al., 1998). Generally all lipids were absorbed into the blood in the gastrointestinal tract through a form of chylomicrons, composed of triglycerides, phospholipids and cholesterol (Guyton and Hall, 1996). The BDRE, SPRE & DLBE (200 and 400 mg/kg) treated along with high fat diet in rats for 60 days significantly decreased (p<0.01 and p<0.05) TC, HDL, VLDL, TG and LDL levels while 100 mg/kg treated group did not show any significant effect. The water fraction of BDRE, SPRE & DLBE (200 mg/kg) was administered along with high fat diet, the TC, HDL, VLDL, TG and LDL levels were significantly reduced (p<0.01) when compared with group II animals. While the other fractions like Hx-F, chl-F & n-but-F shows non significant effect on the lipid profile levels. The phytoconstituent β-sitosterol is structurally similar to cholesterol and is reported to reduce cholesterol level, LDL-cholesterol level decreased significantly in plasma (Hirunpanich et al., 2006).

The enzymes aspartat aminotransferase (AST) and alanin pyrophosphate (ALT) are present with higher concentration in the liver under normal conditions whereas during hepatic necrosis or membrane damage, these enzymes are released into the systemic circulation, as indicated by elevated serum enzyme levels. The activity of AST and ALT was sensitive indicators of acute hepatic necrosis (Hussain et al., 2012). ALT was a hepatospecific enzyme that was principally found in the cytoplasm (Nyblom et al., 2006). Administration of BDRE, SPRE and DLBE (200 & 400 mg/kg) shows liver protective effect as they significantly reduced (p<0.01, p<0.05) the elevated liver markers levels of both the enzymes. The water fraction of BDRE, SPRE &
DLBE (200 mg/kg) administered along with high fat diet the AST & ALT levels significantly reduced (p<0.01) when compared with group II animals whereas the other fractions like Hx-F, chl-F & n-but-F shows non significant effect on the liver protective enzymes (AST & ALT) levels.

The blood urea nitrogen (BUN) and creatinine were significantly increased (p<0.01) in group II animals when compared with normal group I animals. The administration of BDRE, SPRE & DLBE (200 & 400 mg/kg) along with high fat diet significantly decreased (p<0.01, p<0.05) when compared with group II animals. The wt-F of BDRE, SPRE & DLBE (200 mg/kg) along with high fat diet, the BUN and creatinine was significantly reduced (p<0.01) when compared with high fat diet. However the other fractions like Hx-F, chl-F & n-but-F shows non significant effect on BUN and creatinine levels.

In obesity, the accumulation of fat in kidney and liver causes several metabolic disorders which are associated with onset of life threatening disease. The histopathological examination of HFD fed animals showed changes in architecture with fatty generation in liver and disarrangement of glomeruli with inflammation were seen in kidney. BDRE, SPRE and DLBE (200 & 400 mg/kg) showed protective activity on liver and kidney as compared to normal group, while the administration of 100 mg/kg of each drugs did not show protective effect.