Chapter 7
Summary
On vigilant analyses of the results of the present experiments, it was observed that gamma radiation exposure was responsible for damage of two important units of the cell i.e. cell membrane and nucleus. Irradiation with 5 Gy depleted two important cells of blood i.e. RBC and WBC. It was also observed that gamma radiation exposure at 5 Gy affected important organs i.e. testis and liver. The testicular damage due to irradiation was confirmed by measuring LPO level, ACP and ALP activity and also by histopathological study. Increased testicular oxidative stress and alteration in testicular toxicity markers confirmed the gamma radiation mediated damage of testes. The histopathological study showed the derangement of testicular cells within the seminiferous tubule and loss of overall testicular cells population which supported the biochemical reports. It was found that gamma radiation exerted oxidative stress on liver which was confirmed by monitoring the LPO level and overall antioxidant status of liver. The hepatic LPO level augmented and the antioxidant status depleted due to the gamma radiation exposure. It was observed that gamma radiation caused activation of nuclear translocation of NF-κB (p65), increased the tissue nitrite level and TNF-α, IL-6. These findings confirmed the gamma radiation mediated hepatic inflammation. MoLE pretreatment significantly protected the cell membrane as it decreased the membrane LPO and also protected nucleus. The leaf extract also protected the RBC and WBC. MoLE ameliorated the gamma radiation mediated testicular alterations. The leaf extract also offered protection against radiation mediated oxidative hepatic damage as it ameliorated the radiation induced hepatic LPO and overall hepatic antioxidant status. The in vitro characterization study showed that the MoLE has excellent radical scavenging activity due to the presence of ascorbic acid and polyphenols. The HPLC analysis also showed that this leaf extract contained polyphenols like quercetin, epicatechin and kaempferol. Thus it was expected that the radioprotective potential of the MoLE was mainly due to the presence of antioxidants in it. The radioprotective potentials of quercetin and epicatechin identified in MoLE was determined too. It was found that these two phytocompounds effectively ameliorated gamma radiation mediated cell membrane damage as these phytocompounds scavenged ROS; enhanced intracellular GSH content; decreased membrane LPO, % hemolysis and osmotic fragility. Like MoLE, these two phytocompounds prevented the gamma radiation mediated DNA damage. Quercetin and epicatechin protected the testis from gamma radiation mediated oxidative damage. These two phytocompounds decreased the radiation induced hepatic LPO level and increased overall antioxidant capacity. It was observed that these two phytocompounds protected liver from radiation mediated inflammation as these inhibited the
nuclear translocation of NF-κB (p 65) and decreased the level of tissue nitrite, TNF-α and IL-6. It can be assumed that gamma radiation of 5 Gy produced reactive oxygen species which ultimately exerted oxidative stress and dreaded effects on body at cellular, molecular and physiological level. MoLE, quercetin and epicatechin pre-treatment ameliorated all these gamma radiation mediated alterations.

**Probable protective mechanism of action of MoLE and two phytocompounds i.e, Quercetin and Epicatechin against gamma radiation mediated damage**