List of Figures

Figure No.

- Figure 1.1 Patterns of herbal utilization.
- Figure 1.2 Apoptosis (Programmed cell death).
- Figure 1.3 Mature Calotropis gigantea plant.
- Figure 1.4 Chemical structure of Calotropin.
- Figure 1.5 Chemical structure of Lupeol.
- Figure 2.1IR spectrum of EECGL
- Figure 2.2 IR spectrum of WECGL
- Figure 2.3 LCMS analysis of EECGL.
- Figure 2.4LCMS analysis of WECGL
- Figure 2.5 ¹H NMR analysis of EECGL.
- **Figure 2.6**¹H NMR analysis of WECGL.
- Figure 2.7 ¹³C (jmod-APT) NMR analysis of EECGL
- Figure 2.8¹³C (jmod-APT) NMR analysis of WECGL.
- **Figure 2.9** Compounds present in EECGL and WECGL with molecular weight and general chemical formula.
- Figure: 3.1. Effects of toxicants on the physiological system.
- Figure: 3.2 Brine shrimp larvae.
- Figure: 3.3. Experimental approach for zebra fish embryo toxicity screening.
- **Figure 3.4** Intracellular reduced glutathione (GSH) levels of Lymphocyte Control and EECGL and WECGL treated lymphocyte.
- **Figure 3.5** Morphological characterizations of Reactive oxygen species (ROS) formation by H2DCFDA staining using fluorescence microscopy.

Figure 3.6 Determination of the genotoxic effects of EECGL and WECGL treated with lymphocyte cell by the Comet assay.

Figure 3.7ASerum urea level after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.7BSerum creatinine after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.8Serum ALP after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.9Effect of SGOT and SGPT after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.10Effect on blood glucose level after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.11Measurement of serum cholesterol after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.12Serum total protein after treatment of EECGL and WECGL for 28 days in Swiss albino mice.

Figure 3.13Histopathological studies of EECGL treated liver tissue.

Figure 3.14Histopathological studies of WECGL treated liver tissue.

Figure 3.15Histopathological studies of EECGL treated kidney tissue.

Figure 3.18 Histopathological studies of WECGL treated kidney tissue.

Figure 4.1 Stressors or initiators of reactive oxygen species (ROS) and the biological

consequences leading to varity of physiological dysfunctions and cell death.

Figure 4.2 Inflammatory mediators.

Figure 4.3 NO scavenging activity of ethanolic (EECGL) and water (WECGL) extract of *Calotropis gigantea* latex and ascorbic acid.

Figure 4.4 DPPH scavenging activity of ethanolic (EECGL) and water (WECGL) extract of *Calotropis gigantea* latex and ascorbic acid.

Figure 4.5 Hydroxyl radical scavenging activity of EECGL, WECGL and ascorbic acid.

Figure 4.6 Hypochlorous acid scavenging activity of EECGL, WECGL and ascorbic acid.

Figure 4.7 Superoxide anion scavenging activity of EECGL, WECGL and ascorbic acid.

Figure 4.8 Lipid peroxidation scavenging activity of EECGL, WECGL and ascorbic acid.

Figure 4.9 Peroxynitrite scavenging activity of EECGL, WECGL and ascorbic acid.

Figure 4.10 Percentage inhibition of protein denaturation by EECGL, WECGL and diclofenac sodium.

Figure 5.1 In vitro cytotoxic effects of EECGL and WECGL on Jurkat cells and HLC.

Figure 5.2 Fluorescent microscopic image of Reactive oxygen species (ROS) formation by H2DCFDA staining.

Figure 5.3 Effects of EECGL and WECGL on reactive oxygen species (ROS) induction in Jurkat cell.

Figure 5.4 Fluorescent microscopic image chromatin condensation of Jurkat cells.

Figure 5.5 DNA laddering of EECGL and WECGL.

Figure 5.6 Percentage of cells in different stages of mitosis.

Figure 5.7 The effect of EECGL on percentage of cells in different stages of mitosis.

Figure 5.8 The effect of WECGL on percentage of cells in different stages of mitosis

Figure 5.9The comparative effects of EECGL and WECGL on % of cells in different stages of mitosis.

Figure 5.10shows the effect of EECGL and WECGL on mitotic index in *Allium cepa* root tips.

Figure 6.1 In vitro cytotoxic effects of EECGL and WECGL on DLA cells and MLC.

Figure 6.2 Intracellular reduced glutathione (GSH) levels of DLA Control and EECGL and WECGL treated DLA cell.

Figure 6.3Fluorescent microscopic image of Reactive oxygen species (ROS) formation by H2DCFDA staining .

Figure 6.4Effects of EECGL and WECGL on DCF fluorescence intensity in DLA cell.

Figure 6.5 Nitric oxide (NO) release and nitric oxide generation levels of EECGL and WECGL treated DLA cell.

Figure 6.6Effects of EECGL and WECGL on LDH release assay in DLA cell.

Figure 6.7Photomicrographs of representative apoptotic DLA cells treated with EECGL and WECGL.

Figure 6.8Fluorescent microscopic image of chromatin condensation of DLA cells treated with EECGL, WECGL and 5-FU along with control.

Figure 6.9Fluorescent microscopic image of AO-EtBr stained DLA cells treated with EECGL and WECGL.

Figure 6.10DNA laddering in DLA cells treated with EECGL and WECGL.

Figure 6.11Fluorescent microscopic image of mitochondrial membrane potential (MMP) of treated DLA cell.

Figure 6.12 Effects of EECGL and WECGL on mitochondrial membrane potential in treatedDLA cell.

Figure 6.13Fluorescent microscopic image of DNA damage.

Figure 6.14Percentage of tail DNA intensity of EECGL and WECGL treated with DLA cells.

Figure 6.15 EECGL and WECGL-induced apoptosis of DLA cells.

Figure 6.16 Effect of EECGL and WECGL on body weight change of DLA bearing mice.

Figure 6.17 Effect of EECGL and WECGL on Increase life span (ILS) of DLA bearing mice.

Figure 6.18 Effect of EECGL and WECGL onMean survival time (MST) of DLA bearing mice.

Figure 6.19Effect of EECGL and WECGL onTumor volume of DLA bearing mice.

Figure 6. 20 Effect of EECGL and WECGL on Tumor cell count of DLA bearing mice.

Figure 6.21 Effect of EECGL and WECGL on liver and kidney MDA after 15 days treatment in DLA bearing mice.

Figure 6.22 Effect of EECGL and WECGL on liver and kidney GSH after 15 days treatment in DLA bearing mice.

Figure 6.23 Effect of EECGL and WECGL on liver and kidney SOD after 15 days treatment in DLA bearing mice.

Figure 6.24 Effect of EECGL and WECGL on liver and kidney CATALASE after 15 days treatment in DLA bearing mice.

Figure 6.25 Effect of EECGL and WECGL on liver and kidney GPx after 15 days treatment in DLA bearing mice.

Figure 6.26 Effect of EECGL and WECGL on liver and kidney GST after 15 days treatment in DLA bearing mice.

Figure 7.1 Role of oncogenes in cancer development.

Figure 7.2 Tumor suppressor genes in cancer development.

Figure 7.3 Mechanism of apoptotic cascade.

Figure 7.4 In vitro cytotoxic effects of EECGL and WECGL on EAC cells and MLC.

Figure 7.5 Intracellular reduced glutathione (GSH) levels of DLA Control and EECGL and WECGL treated DLA cell.

Figure 7.6 (A) Measurement of mitochondrial membrane potential (MMP) of EAC cell treated with EECGL.

Figure 7.6 (B) Effects of EECGL and WECGL on reactive oxygen species (ROS) induction in EAC cell.

Figure 7.7 (A)Effects of EECGL and WECGL on mitochondrial membrane potential.

Figure 7.7(B)Effects of EECGL and WECGL on ROS.

Figure 7.8(A)Nitric oxide (NO) release and **(B)**nitric oxide generation levels of EECGL and WECGL treated DLA cell.

Figure 7.9 Effects of EECGL and WECGL on LDH release assay in EAC cell.

Figure 7.10 Photomicrographs of representative apoptotic EAC cells treated with EECGL and WECGL.

Figure 7.11Fluorescent microscopic image of chromatin condensation.

Figure 7.12Fluorescent microscopic image of AO-EtBr stained treated cell.

Figure 7.13(A)Determination of the genotoxic effects of EECGL and WECGL treated with EAC cell by the Comet assay.

Figure 7.13 (B)Percentage of tail DNA intensity.

Figure 7.14EECGL and WECGL-induced apoptosis of EAC cells.

Figure 7.15Effect of EECGL and WECGL on the expression of anti- apoptotic protein and pro-apoptotic proteins.

Figure 7.16Effect of EECGL and WECGL on body weight change of EACbearing mice.

Figure 7.17Effect of EECGL and WECGL on ILS of EAC bearing mice.

Figure 7.18 Effect of EECGL and WECGL on MST of EAC bearing mice.

Figure 7.19 Effect of EECGL and WECGL on tumor volume of EAC bearing mice.

Figure 7.20 Effect of EECGL and WECGL on tumor cell count of EAC bearing mice.

Figure 7.21 Effect of EECGL and WECGL on liver and kidney MDA in EAC bearing mice.

Figure 7.22 Effect of EECGL and WECGL on liver and kidney GSH after 15 days treatment in EAC bearing mice.

Figure 7.23Effect of EECGL and WECGL on liver and kidney SOD after 15 days treatment in EAC bearing mice.

Figure 7.24Effect of EECGL and WECGL on liver and kidney CATALASE after 15 days treatment in EAC bearing mice.

Figure 7.25Effect of EECGL and WECGL on liver and kidney GPx after 15 days treatment in EAC bearing mice.

Figure 7.26Effect of EECGL and WECGL on liver and kidney GST after 15 days treatment in EAC bearing mice.

Figure 7.27Effect of EECGL and WECGL on peritoneal angiogenesis.

Figure-7.28 Hematoxylin and eosin staining (H & E) in mice liver and kidney of control and experimental groups of mice for histopathological analysis

Figure-7.29 Antineoplastic activities of EECGL and WECGL on solid tumor.