LIST OF FIGURES

Fig. 1.1: Process of Carcinogenesis.
Fig. 1.2: The estimated new cases and death for all cancer types for 2013 (American Cancer Society, 2013).
Fig. 1.3: Trends in female breast cancer incidence rates, 1973-2006 (Jemal et al., 2010).
Fig. 1.4: Chart of breast cancer incidence in India (NCRP, 2006).
Fig. 1.5: Anatomy of the breast (Source: siteman.wustl.edu).
Fig. 1.6: Figure portraying stages of ductal carcinoma (Source: bccancer.bc.ca).
Fig. 1.7: A depiction of lobular carcinoma in situ (Source: cancer.gov).
Fig. 1.8: Types of invasive carcinoma of the breast (Source: breastcancercare.org.uk).
Fig. 1.9: A representation of inflammatory breast cancer (Source: virtualmedicalcentre.com).
Fig. 1.10: Molecular targets of chemopreventive agents in cancer (Thambi Dorai, 2004).
Fig. 1.11: *Rheum emodi* Wall. ex Meissn., A) plant at natural habitat, B) dried rhizome.
Fig. 1.12: *Oroxylum indicum* (L.) Vent., A) tree at natural habitat, B) dried stem bark.
Fig. 2.1: Overview of caspases in apoptotic pathways (Orrenius et al., 2003).
Fig. 2.2: Portrayal of mechanisms behind dysregulated apoptosis and cancer (Wong, 2011).
Fig. 3.1: Solvent extraction via soxhlet (A) and maceration (B).
Fig. 3.2: Concentration of extract using Rotavapor R-215 (BÜCHI Labortechnik AG, Switzerland).
Fig. 3.3: Principle of the cellular DNA fragmentation ELISA (Roche instruction manual, 2005).
Fig. 3.4: Portrayal of column chromatography of sample MCO.

Fig. 4.1: Dose-dependent cytotoxicity of PHO (A) and PCO (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.2: Dose-dependent cytotoxicity of CHO (A) and CCO (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.3: Dose-dependent cytotoxicity of EHO (A) and ECO (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.4: Dose-dependent cytotoxicity of MHO (A) and MCO (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.5: Dose-dependent cytotoxicity of PHR (A) and PCR (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.6: Dose-dependent cytotoxicity of CHR (A) and CCR (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.7: Dose-dependent cytotoxicity of EHR (A) and ECR (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.8: Dose-dependent cytotoxicity of MHR (A) and MCR (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.9: Dose-dependent cytotoxicity of AHR (A) and ACR (B) on MDA-MB-231 and WRL-68 cells.

Fig. 4.10: IC$_{50}$ of *O. indicum* - soxhlet extracts (A) and their cumulative ranking (B).

Fig. 4.11: IC$_{50}$ of *O. indicum* - macerated extracts (A) and their cumulative ranking (B).

Fig. 4.12: IC$_{50}$ of *R. emodi* - soxhlet extracts (A) and their cumulative ranking (B).

Fig. 4.13: IC$_{50}$ of *R. emodi* - macerated extracts (A) and their cumulative ranking (B).

Fig. 4.14: Levels of apoptotic DNA fragments in, PHO (A) and MHO (B) treated MDA-MB-231 and MCF-7 cells.

Fig. 4.15: Levels of apoptotic DNA fragments in, ECO (A) and MCO (B) treated MDA-MB-231 and MCF-7 cells.
Fig. 4.16: Levels of apoptotic DNA fragments in, PHR (A), CHR (B), EHR (C) and AHR (D) treated MDA-MB-231 and MCF-7 cells.

Fig. 4.17: Levels of apoptotic DNA fragments in, PCR (A), ECR (B), MCR (C) and ACR (D) treated MDA-MB-231 and MCF-7 cells.

Fig. 4.18: Percentage caspase-3 activation by plant extracts compared with V (10 µM vincristine) and 0.1 mM H₂O₂ as positive controls.

Fig. 4.19: TLC of MCO showing separated compounds with 60% hexane in ethyl acetate.

Fig. 4.20: TLC of isolated compounds (A) C1, (B) C2, (C) C3, (D) C4 and (E) C5 through column chromatography.

Fig. 4.21: Dose dependent cytotoxicity of compounds C1 (A), C2 (B), C3 (C), C4 (D) and C5 (E) in MDA-MB-231 cells.

Fig. 4.22: Dose-dependent increase of apoptotic fragments by Vincristine (A), C1 (B), C3 (C) and C4 (D) in MDA-MB-231 cells.

Fig. 4.23: Percentage caspase-3 activation by compounds C1, C3 and C4 compared with V (10 µM vincristine) and 0.1 mM H₂O₂ as positive controls.

Fig. 4.24: UV-Visible spectrum of compound C4 portraying the λmax.

Fig. 4.25: Figure displaying a single peak to ensure the purity of compound C4 by gradient HPLC.

Fig. 4.26: ¹H NMR spectrum of compound C4.

Fig. 4.27: ¹³C NMR spectrum of compound C4.

Fig. 4.28: Mass spectrum of compound C4.

Fig. 4.29: FTIR spectrum of compound C4 showing the functional groups.