SYNOPSIS

Evaluation of antioxidant, anti-inflammatory and anticancer properties of *Calotropis gigantea* latex with special reference to apoptosis

Thesis submitted for the degree of
Doctor of Philosophy (Science)
of
Vidyasagar University
2016

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Synopsis

Since antiquity plants have been used as a source of therapeutic agents and are playing an important role in primary health care and in the indigenous system of medicine to fight against diseases. *Calotropis gigantea* Linn. (*C.gigantea)* of family Asclepiadaceaea common wasteland weed, grows widely throughout the Indian subcontinent.The root, stem, leaves, flower and latex of *C. gigantea* are reported to be utilized in traditional medicine.The sub-acute toxic effects of ethanol (EECGL) and water (WECGL) extract of *Calotropis gigantea* latex was studied in mice and chemical screening was also performed.The in-vitro antioxidant, anti-inflammatory, antimitotic potentialas well as the antineoplastic activities of the *C. Gigantean* latex extracts were investigated. Chemical screening analysis showed that the latex extracts of *C. gigantea* possessed flavonoids, alkaloids, triterpinoids, saponin, glycoside, cardiac glycosides. Chemical characterization studies revealed the presence of uscharin , calotoxin, frugoside, lupeol etc in these latex extracts. Acute and sub-acute toxic studies revealed that EECGL and WECGL not toxic for brine shrimp (*A. salina*) and slight edema on abdominal area and thoracic cavity was observed in zebra fish embryos at 2000 µg/ml. No significant difference was observed in relative organ weights and haematological, hepatic and renal biomarkers up to the dose level of 500mg/kg body wt. /day for 28 days in mice.EECGL and WECGL exhibited enhanced DPPH, nitric oxide, hydroxyl radical, hypochlorous acid, superoxide anion lipid peroxidation and peroxynitrite free radical scavenging activities. The extracts showed significant anti-inflammatory action by it's in *vitro* HRBC membrane stabilizing and protein denaturation inhibiting activity as well as by preventing carrageenan induced paw edema in mice. EECGL and WECGL were cytotoxic to Jurkat cells and increased intracellular ROS generation and chromatin condensation in Jurkat cell. *C.gigantea* latex extracts were found to be antimitotic in *Allium cepa* root tip cells at the concentration of 100mg/ml.Studies on cell viability, chromatin condensation, DNA fragmentation nitric oxide release level, reactive oxygen species formation and mitochondrial

membrane potential, cell cycle analysisin Dalton's Ascitic Lymphoma (DLA) cells revealed that the latex extracts were capable to produce significant anticancer and apoptotic effects in DLA cells. Prominent reduction in body weight, tumour volume and increase in mean survival time was observed in DLA-bearing Swiss albino mice. Treatments with EECGL and WECGL were associated to increased cytotoxicity, chromatin condensation, DNA fragmentation, ROS and NO generation, oxidative stress, as well as up-regulation of pro-apoptotic and down-regulation of anti-apoptotic proteinsin Ehrlich Ascites Carcinoma (EAC) cells.*In vivo* study revealed significant diminution in body weight, tumour volume and antioxidant enzymes activitiesand increase in mean survival time in EAC-bearing mice. Both of ethanol (EECGL) and water (WECGL) extract of *Calotropis gigantea* latex exhibited cytotoxic, apoptotic, antineoplastic and antioxidant potential against Jurkat, DLA and EAC cells through the induction of apoptosis and oxidative stress and EECGL is more potent than WECGL.