

LIST OF FIGURES

Figure No.	Figure captions	Page No.
1.	Classification of chronic kidney disease and symptoms	8
2.	Graphical representation for generation of ROS and RNS	17
3.	Anatomy of normal eye	25
4.	Images of some selected <i>Exacum</i> species found in India	36
5.	Distribution and relevant numbers of species of <i>Exacum</i>	37
6.	Structure of Swertiamerin	44
7.	Drug treatment protocol in rats for evaluation of nephroprotective activity	78
8.	Freshly collected <i>Exacum lawii</i> whole plant	96
9.	A. a and b) Transverse section of midrib, c and d) Stomata on lower epidermis.	98
	B. a) Transverse section of stem showing wings, b) SEM micrograph of stem, c) Transverse section of stem showed centre cylinder, d) SEM micrograph of pappi llose stem.	99
	C. a) SEM micrograph of root outer surface, b) Transverse section of root cortex, c and d) SEM micrograph of root with radial arrangement of xylem vessels	100
	D. a) SEM micrograph of root b) SEM micrograph of ovary	100
10.	Powder characteristics a) Astrosclereides, b) Needle shaped raphides, c) Tetragonal calcium oxalate crystals, d) Epidermal cells, e) spiral thickening of xylem vessels, f) narrow fibres, g) Parenchyma in cortex, h) parenchyma cell, i) sclereids, j) lignified pitted parenchyma, k) fibres and sclereids, l) cork cells, m) septate fibre, n) phloem fibre, o) starch grain	102
11.	a) Gel electrophoretogram of DNA isolated from <i>Exacum lawii</i> b) The obtained RAPD-PCR products for <i>Exacum lawii</i> showing bands of PCR amplified products of matK and rbcL universal primers. C) specifications of ladder	104

12.	In vitro antioxidant activity of ELE and its various fractions	111
13.	a) HPLC chromatogram showing peak of standard Swertiamerin, b) HPLC chromatogram of ethanolic extract of <i>Exacum lawii</i> showing peak of Swertiamerin	116
14.	GC-MS chromatogram of ethanolic extract of <i>Exacum lawii</i>	117
15.	Overlay of ultraviolet absorption spectrum of swertiamarin isolated in lab and reference standard	119
16.	FTIR spectra of isolated swertiamerin	120
17.	¹ H NMR spectra of isolated swertiamerin	122
18.	¹³ C NMR spectra of isolated swertiamerin	123
19.	LCMS spectra isolated swertiamerin	124
20.	Structure of NOS heme domain	125
21.	Swertiamarin-3NQs docking showing different bonds	125
22.	Swertiamarin-3NQs docking shows different predicted bonding interactions.	126
23.	Change in body weight during sub-acute toxicity	129
24.	Histopathology of various organs in oral toxicity study	133
25.	Effect of different doses of cislatin on blood urea and creatinine concentration	134
26.	Effect of ELE (100 mg/kg, p.o., 200 mg/kg, p.o., 400 mg/kg, p.o.) and swertiamerin (20mg/kg, p.o.) treatment on proinflammatory cytokines (IL-1 β , and TNF- α) level in HEK-293 treated with cisplatin	138
27.	Histogram showing Flow cytometric analysis of ROS production in kidney cells of respective treatment group. Along with dot plot of flow cytometric analysis represents live cells a) control group and external control (H ₂ O ₂) group. b) Toxic control (cisplatin treatment) and unstained group. c) Treatment of <i>Exacum lawii</i> extract (E400mg/kg) and Swertiamerin (S20mg/kg)	140
28.	Graph showing Geometrical mean (GeoMean) values of the fluorescence intensities of respective groups.	141

29.	DNA fragmentation of renal cells exposed to cisplatin. Each lane reflecting the presence of DNA fragments was viewed on an ethidium bromide-stained gel. Lane 1: Marker, Lane 2: control group, Lane 3: Cisplatin treated group, Lane 4: ELE 400 mg/kg treated, Lane 5: Swertiamerin 20 mg/kg treated	142
30.	Photomicrographs of Periodic acid-Schiff reagents stained kidney tissue sections showing the protective effect of ELE on cisplatin induced renal injury in experimental rats	143
31.	Effect of cisplatin, ELE and swertiamerin on cell viability. HEK 293 cells were treated with various concentrations of cisplatin for 48 hours	144
32.	Cisplatin induced marked increases in protein iNOS, ELE and Swertiamerin attenuate the cisplatin-induced renal overexpression of iNOS. The blots were stripped and reprobred for GAPDH protein as a loading control.	145
33.	Proinflammatory cytokines TNF- α and IL- β in HEK-293 treated HEK-293 cells with cisplatin (1 mg/ml), ELE (2 mg/ml) and swertiamerin (0.5 mg/ml)	146
34.	Flow cytometry analysis of intracellular ROS production by HEK-293 cells, a) untreated after exposure to b) cisplatin along with c) ELE treatment and d) Swertiamerin treatment.	147
35.	DNA fragmentation of HEK-293 cells exposed to cisplatin. Each lane reflecting the presence of DNA fragments was viewed on an ethidium bromide-stained gel. Lane a: Marker, Lane b: untreated cells, Lane c: Cisplatin treated, Lane d: cisplatin + ELE (2mg/ml) treated, Lane e: cisplatin + Swertiamerin (0.5mg/ml) treated, Lane f: ELE (2mg/ml) alone, Lane g: Swertiamerin (0.5mg/ml) alone.	148
36.	Flowcytometric analysis showing distribution of HEK-293 cell line in various phases of cell cycle, a: untreated cells, b: ELE treated alone, c: swertiamerin treated alone, d: Cisplatin treated, e: cisplatin + ELE (2mg/ml) treated, f: cisplatin + Swertiamerin (0.5mg/ml) treated.	149
37.	Morphology of HEK-293 cell line in untreated condition, treatment with ELE alone and swertiamerin alone showed adherent, flattened and elongated morphology. Cisplatin exposure causes cells less adherent, produce apoptic bodies, formation of blebs, shrinkage of cell membrane. Cisplatin+ELE and Cisplatin+swertiamerin recover	150

	the toxic symptoms and conserve the normal morphology.	
38.	Zone of Inhibition for volatile oil and extracts of <i>Exacum lawii</i> against a) pathogenic bacterial strains causing ocular infection, b) pathogenic fungal strains causing ocular infection.	151