

Content

1. Introduction:	1
2. Review of literature:	7
2.1. Source of arsenic:	7
2.2. Different forms of arsenic species present in the environment.....	9
2.3. Arsenic as an environmental contaminants and pollutants.....	10
2.4. Arsenic accumulation in foods chain.....	12
2.5. Arsenic toxicity on animal's health.....	14
2.6. Arsenic exposure and human poisoning.....	16
2.7. Effect of arsenic on various organs:	19
2.8. Pharmacokinetics of arsenicals.....	23
2.9. Absorption, Distribution and excretion of arsenicals:	24
2.10. Arsenic toxicology: cellular and metabolic.....	26
2.11. Therapeutic against arsenic toxicology.....	27
3.1. Objectives:	29
3.2. Study design:	30
4. Materials & Methods.....	31
4.1 Chemicals and Reagents.....	31
4.2. <i>Bellamyia bengalensis</i> as a therapeutic agent.....	32
4.3. <i>Bellamyia bengalensis</i> extract (BBE) preparation.....	32
4.4. Estimation of nutrient and micronutrient content in fresh <i>Bellamyia bengalensis</i>	32
4.4.1. Estimation of non-protein soluble thiol in BBE.....	32
4.4.2. Estimation of ascorbic acid, phosphorus and glycogen in BBE.....	33
4.4.3. Estimation of total protein, lipid and amino acids in BBE.....	33
4.4.4. Determination of calcium in BBE.....	33
4.5. Arsenic exposure to <i>Bellamyia bengalensis</i> and its impact	33
4.5.1. Estimation of non-protein soluble thiol (NPSH) and malondialdehyde (MDA) level in arsenic exposed <i>B.bengalensis</i>	34
4.5.2. DNA fragmentation in sodium arsenite exposed <i>Bellamyia bengalensis</i>	34
4.6. Animal Selection and Group distribution.....	35
4.7. Supplementation with BBE to arsenic-exposed Rats.....	35
4.7.1. Preparation of rat-tissue and preservation for further use.....	36

4.7.2.	Biochemical estimation of xanthine oxidase and uric acid level.....	36
4.7.3.	Biochemical estimation of Lacto peroxidase.....	37
4.7.4.	Estimation of oxidative stress markers by spectrophotometric.....	37
4.7.4.1.	Malondialdehyde (MDA) estimation by biochemical method.....	37
4.7.5.	Assay of antioxidant enzymes.....	38
4.7.5.1.	Superoxide dismutase assay by gel-zymography.....	38
4.7.5.2.	Catalase assay by spectrophotometric method.....	38
4.7.5.3.	Estimation of Conjugated Di-ene (CD) Levels.....	38
4.7.6.	Estimation of non-protein soluble thiol (NPSH).....	39
4.7.7.	Estimation of serum nitric oxide (NO) level by spectrophotometry method.....	39
4.7.8.	Estimation of serum TNF- α level by ELISA.....	39
4.7.9.	Biochemical assays of transaminase, phosphatase and total protein.....	39
4.7.10.	Detection of urea and creatinine level by biochemical method.....	40
4.7.11.	Analysis of Hematopoietic Profile.....	40
4.7.12.	Studies on histoarchitecture of rat tissue.....	40
4.7.13.	DNA fragmentation analysis in rat tissue by ladder assay.....	40
4.7.14.	Single- cell DNA damage estimation in rat tissue by COMET assay.....	41
4.7.15.	Measurement of Mitochondrial Membrane Potential	42
4.8.	In-vitro studies in tissue slices.....	43
4.8.1.	In-vitro experiment in rat liver slices and intestinal tissue.....	44
4.8.2.	In-vitro regulation of SOD activity in liver slices.....	45
4.8.3.	Catalase activity assay by gel-zymography from in-vitro studies.....	45
4.8.4.	Estimation of malondialdehyde (MDA) level from in-vitro studies.....	45
4.8.5.	Estimation of non-protein soluble thiol from in-vitro studies.....	45
4.8.6.	Comet assay in liver slice from in-vitro studies.....	45
4.8.7.	In vitro study of Catalase and SOD (Cu-Zn SOD or SOD1) activity by sodium arsenite with free phosphorus and cysteine.....	45
5.	Result	46
5.1.	Components in <i>Bellamyia bengalensis</i> tissue extract.....	46
5.2.	Arsenic toxicity in <i>B.bengalensis</i> tissue.....	47
5.3.	In-vivo.....	48
5.3.1.	Arsenic toxicity in rat liver.....	48
5.3.2.	Liver and kidney function test in rat blood serum.....	49

5.3.3. In vivo and in-vitro SOD regulation in rat liver tissue.....	51
5.3.4. DNA Fragmentation in rat liver from in-vivo assay	52
5.3.5. Single- cell DNA damage in rat tissue by COMET assay.....	53
5.3.6. Hepatic tissue architecture in rat liver.....	54
5.3.7. Qualitative and Quantitative measurement of mitochondrial membrane potential in rat liver.....	55
5.3.8. Status of Oxidative Stress and necrotic Markers in intestinal epithelial cells on rat model.....	57
5.3.9. Liver and Kidney Function Test.....	59
5.3.10. Hematopoietic Profile.....	60
5.3.11. DNA fragmentation in of intestinal epithelial cells in rat.....	61
5.3.12. Comet assay result in rat intestinal epithelial cell	62
5.3.13. Intestinal tissue architecture.....	63
5.4. In vitro study.....	64
5.4.1. MDA (malondialdehyde) and NPSH (Non protein soluble thiol) a ssay result in liver slices.....	64
5.4.2. Catalase activity in Gel-zymography in rat liver slices.....	65
5.4.3. Superoxide Dismutase (SOD) activity in Gel-zymography in rat liver slices.....	65
5.4.4. Results of in vitro study of Catalase and SOD (Cu-Zn SOD or SOD1) activity by sodium arsenite with free phosphorus and cysteinein rat liver slice.....	66
5.4.5. In- vitro comet assay studies in liver slice.....	67
6. Discussion.....	68
7. Conclusion:	80
8. Summary.....	81
9. References:	84