ABSTRACT

STUDIES ON THE PROTECTIVE EFFECT OF AQUEOUS BARK EXTRACT OF *Terminalia arjuna* AGAINST PHENYLHYDRAZINE INDUCED OXIDATIVE STRESS IN GOAT RED BLOOD CELLS

Phenylhydrazine (PHZ) is one of the most investigated intracellular free radical generating probes which promote oxidative damage in erythrocytes. *Terminalia arjuna* (TA) is an important medicinal plant widely used in the preparation of Ayurvedic formulations for over three centuries in India. The objective of the present study is to determine the PHZ induced oxidative stress mediated alterations in goat red blood cells (RBCs) membrane protein, phospholipid asymmetry, membrane bound enzymes, metabolic status and morphology of the RBC and amelioration of the same by aqueous bark extract of TA. Oxidative stress biomarkers and activities of antioxidant enzymes were determined by biochemical analysis. RBC membrane protein damage was evaluated using SDS-PAGE followed by densitometric analysis. Phospholipid asymmetry of the RBC membrane was determined by thin layer chromatography followed by phosphate estimation. Iron concentration was estimated using atomic absorption spectrophotometry (AAS). Activities of metabolic and membrane bound enzymes, ROS, superoxide anion and hydroxyl radical scavenging activities were determined by biochemical analysis. Morphological analysis of the RBCs were performed using scanning electron microscopy, flow cytometry and atomic force microscopy. Aqueous bark extract of TA protected the RBCs from PHZ induced oxidative damages *in vitro* as evident from its effect on lipid peroxidation level, reduced glutathione and protein carbonyl content and activities of antioxidant enzymes-superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and
glutathione reductase (GR). Membrane protein damage, phospholipid translocation, alterations in activities of membrane bound and metabolic enzymes and morphological alterations of RBCs induced by PHZ were also found to be protected by aqueous bark extract of TA. Thus, the present study indicated that the aqueous bark extract of TA protects against PHZ induced oxidative stress mediated damages in goat RBCs in vitro, possibly through its antioxidant activity.

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