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Alpha-Tocopherol ameliorates arsenic induced nephrotoxicity in Wistar rats

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α -Tocopherol's (Vitamin E) antioxidant and anti-inflammatory properties may help reduce the progression of fibrosis in kidney by limiting tissue damage and inflammation induced by arsenic. Knowledge of the mechanisms of action of natural medicinal substances in arsenic toxicity will be improved by the analysis of the ameliorative effects of α -tocopherol. The goal of the current investigation was to determine whether Vitamin E can protect rats from nephrotoxicity caused by sodium arsenite (NaAsO_2). Twenty-five Wistar rats were split into five groups viz: Group I with distilled water as control; Group II-IV with 8.4 (Low dose)/12.3 (Moderate dose)/16.4 mg/kg NaAsO_2 (High dose); and Group V as in Gr. IV + 50 mg/kg α -Tocopherol. Both the doses were administered orally to rats for 60 days. α -tocopherol decreased the concentration of serum parameters like urea nitrogen (UN) and creatinine (CRT) whereas increased the concentration of albumin (ALB), acid phosphatase (ACP), alkaline phosphatase (ALP) and succinic dehydrogenase (SDH) ($P < 0.05$). In comparison to control group, the transcript levels of p53 were significantly higher in the LDG, MDG, and HDG rats, respectively, by ~ 0.7 fold, ~ 0.4 fold, and ~ 0.5 fold. Similar to this, p21 transcript levels were higher in LDG, MDG and HDG groups than in those from the control group by ~ 0.2 fold, ~ 0.4 fold and ~ 0.6 fold, respectively. Additionally, as compared to rats in the control group, the levels of p27 transcripts were decreased by ~ 0.5 fold, ~ 0.5 fold, and ~ 0.4 fold in the LDG, MDG, and HDG rat populations, respectively. Co-administration of α -tocopherol with NaAsO_2 showed decreased mRNA expression of p53 and p21 followed by increased mRNA expression of p27. In this investigation, it was discovered that α -tocopherol had a protective effect against renal damage brought on by NaAsO_2 .

Keywords: DNA damage, Heavy metal contamination, Kidney, Oxidative stress, Soil pollution, Water pollution, Vitamin E