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Echinochrome guarding effect against sodium arsenite-induced hepatorenal toxicity in rats

The persistent and accumulative qualities of the poisonous metalloid arsenic make it a ubiquitous environmental threat. Echinochrome (Ech) is a natural product that possesses antioxidative, antiviral, antialgal, anti-allergic, and antibacterial effects. The aim of this work investigates the beneficial impact of Ech on sodium arsenite-induced hepatorenal toxicity in rats. Eighteen male rats dispersed equally among three groups: control, sodium arsenate (AS), and AS + Ech. Rats were administered AS (10 mg/kg) and Ech (1 mg/kg BW) by gavage for the experimental duration of 30 days. Ech inhibits oxidative stress by improving antioxidant levels, including glutathion, catalase, and glutathione-S-transferase, with a concomitant decrease in the amounts of malondialdehyde, and nitric oxide in kidney and liver tissues. Moreover, it reduced blood concentrations of aspartate aminotransferase, alanine aminotransferase, gamma-glutamyltransferase, alkaline phosphatase, serum urea, uric acid, and creatinine. Concurrently, Ech resulted in a substantial increase in albumin and total protein levels. Additionally, Ech inhibits inflammation by reducing serum concentrations of tumor necrosis factor- α , cyclooxygenase 2, and prostaglandin E2. In conclusion, Ech mitigates arsenic-induced hepatorenal damage by inhibiting oxidative stress and inflammatory pathways.

Keywords: Echinochrome, Sodium Arsenate, Hepatorenal Toxicity, Oxidative Stress, Anti-inflammatory, Antioxidants

Biography

Dr. Ahmed Abd El Ghany Damanhory, Assistant Professor and Head of the Biochemistry Department at Batterjee Medical College, Saudi Arabia. MD holder in Medical Biochemistry from Al-Azhar University, Egypt. With over two decades of academic experience, I lead the design and delivery of preclinical medical biochemistry curricula across multiple healthcare programs. An active researcher, my scholarly work focuses on metabolic disorders, advanced biotechnology, and translational medicine, with numerous peer-reviewed publications in high-impact indexed journals.