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Liver subcellular antioxidants activity of thymoquinone (TQ) in heat stressed male rats

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The efficacy of thymoquinone (TQ), as a potent antioxidant extracted from *Nigella sativa* seed, on liver subcellular antioxidants activities has been investigated in chronic heat stressed male rats. 240 male rats were randomly divided into four equal groups, sixty males each. The animals were orally administered, for 6 weeks, with distilled water under normal ambient temperature ($21\pm1^{\circ}\text{C}$) (control group), distilled water under high ambient temperature ($35\pm1^{\circ}\text{C}$) (heat stressed males; HS group), TQ suspension (50 mg/kg, bw) under high ambient temperature ($35\pm1^{\circ}\text{C}$) (heat stressed males treated with TQ; HSTQ group), and TQ suspension (50 mg/kg, bw) under normal ambient temperature ($21\pm1^{\circ}\text{C}$) (positive control treated with TQ; TQ group). At the end of treatment period (one week), male rats were anesthetized by single injection of thiopental (100 mg/kg, i.p.), sacrificed, and weighed. Liver tissue samples were obtained for assessment of subcellular oxidants and antioxidants concentrations. Non-treated heat stressed male rats (HS group) registered significant elevation of malondialdehyde concentration, alkaline phosphatase, aspartate aminotransferase, alanine aminotransferase, superoxide dismutase, catalase as well as activities of glutathione peroxidase, glutathione transferase, and significant decline of reduced glutathione concentration and glutathione reductase activity, whereas those treated with TQ (HSTQ group) showed slight increase. In conclusion, it can be suggested that TQ has efficacy against heat oxidative stress in modulating endogenous enzymatic and non-enzymatic antioxidants under high ambient temperature in male rats.

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