



Effects of vitamin E and thymoquinone on physiological and histological characteristics of heat-stressed male mice

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Abstract:

Previous studies have shown that heat stress can lead to tissue damage and multiple organ dysfunctions. The present study elucidates the negative effects of heat stress and the possible protective effects of vitamin E or thymoquinone against the physiological and histological consequences of heat stress. Forty male mice were distributed into four groups as follows: group I was a control group that was orally supplemented with distilled water; group II was subjected to heat stress (HS) (at a humidity of 50 to 55% and a temperature of 42°C) for 75 days; group III was subjected to heat stress and was orally supplemented with vitamin E (20 IU/kg body weight/day for 75 days); and group IV was subjected to heat stress and was orally supplemented with thymoquinone (TQ) (5 mg/kg body weight/day for 75 days). We found that the leucocyte count, Hb, and alanine aminotransferase (ALT) were significantly decreased in the HS-treated group. In contrast, the free radical (FR) levels were significantly elevated. Moreover, histopathological and ultrastructural studies of the HS-treated group revealed dilatation of the hepatic sinusoids, interstitial hemorrhage, hepatocytes that were infiltrated with fat droplets in the liver, hemorrhage enlargement of the mitochondria and dilatation of the renal tubules. Notably, supplementation with either TQ or vitamin E completely reversed the biochemical, histopathological and ultrastructural changes that were induced by heat stress yielding levels that were similar to the control values. Taken together, our data revealed the benefits of vitamin E or TQ supplementation as a means to ameliorate the negative effects of heat stress.

Keywords:

Free radicals, heat stress, kidney, liver, thymoquinone, vitamin E.

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