Antioxidative and chemopreventive effects of Nephrolepis biserrata against carbon tetrachloride (CCl4)-induced oxidative stress and hepatic dysfunction in rats

Abstract

Context: Nephrolepis biserrata L. (Nephrolepidaceae) has been used in folk medicine for protection against different diseases. Objective: The current research investigated the protective effect of the methanol extract of N. biserrata leaves against carbon tetrachloride (CCl4)-induced hepatic damage in rats. Materials and methods: Total phenolic content and 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity were estimated. In addition, Sprague-Dawley (SD) rats were randomly divided into six groups: control, CCl4 (1.0 mg/kg b wt), N. biserrata extract (at doses of 125, 250, and 375 mg/kg b wt) with CCl4 and N. biserrata extract (at dose of 375 mg/kg b wt) alone. After 2 weeks all rats were sacrificed and hepatoprotective effect of N. biserrata was evaluated. Results: Our results indicated that the high total phenolic content (127.28 ± 1.57 mg GAE/g) of N. biserrata may be the major contributor to strong antioxidant activities. Moreover, N. biserrata significantly depleted the elevation of enzymatic levels of alanine aminotransferase and aspartate aminotransferase (20-93% recovery), reduced the extent of malondialdehyde (47-90% recovery), increased the level of reduced glutathione (25-39% recovery), and elevated the activities of catalase, glutathione reductase, glutathione peroxidase, glucose 6-phosphate dehydrogenase, glutathione S-transferase, and quinone reductase (5-34% recovery). Histopathological observations also revealed that N. biserrata decreased fatty degeneration and necrosis in CCl4 administered rats. Discussion and conclusion: N. biserrata has strong antioxidant activities and significant protective effects against CCl4 induced hepatotoxicity in rats.