



Research 3:

Spirulina ameliorates oxidative damage and inflammation in rotenone induced neurotoxicity in male mice

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Background: Rotenone, a chemical compound produced naturally by leguminous plants, has conventionally been used as a pesticide by blocking the uptake of oxygen by body cells. Our study aimed to investigate the effect of spirulina on oxidative damage, inflammation, and neurotoxicity in male mice treated by rotenone. **Methods:** The experimental animals were being divided into five groups. Group (I) served as control that received dimethyl sulfoxide (DMSO); Group (II) mice treated with rotenone (1.5 mg/kg,s.c.3 times per week); Group (III) mice received rotenone/L-dopa (25 mg/kg, P.O. daily); Group (IV) and Group (V) mice treated with rotenone/spirulina (200 and 400 mg/kg, P.O. daily) respectively for two weeks. **Results:** Rotenone-treated mice showed impaired motor coordination and activity in wire hanging, wood walking, open field, and stair tests. Also, rotenone treatment caused elevation in striatal levels of MDA; NO; TNF- α ; IL-1 β and caspase 3 and decrement in Bcl-2; dopamine and GSH levels. Furthermore, there was severe neuronal degeneration, striatal DNA fragmentation, and an increase in striatal 8-OHdG levels and MTH1 expression in the rotenone group. On the other hand, spirulina treatment prevented rotenone-induced motor deficits, striatal DNA fragmentation and showed good restoration of the substantial neurons with reservation of the normal dark appearance. Also, rotenone-induced biochemical changes were

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ameliorated by spirulina treatment as dopamine, Bcl-2, and GSH levels were increased and striatal MDA, TNF- α , IL-1 β , and caspase 3 levels were decreased. Therefore, natural products as spirulina could reverse rotenone-induced neurotoxicity in male mice due to their anti-inflammatory and antioxidant properties.

Keyword: Spirulina, neurotoxicity, rotenone, oxidative stress, inflammation, Parkinson's disease

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