Thymoquinone ameliorates lead-induced brain damage in Sprague Dawley rats

Khaled Radad, Khaled Hassanein, Mubarak Al-Shraim, Rudolf Moldzio, Wolf-Dieter Rausch

Abstract:

The present study aims to investigate the protective effects of thymoquinone, the major active ingredient of Nigella sativa seeds, against lead-induced brain damage in Sprague-Dawley rats. In which, 40 rats were divided into four groups (10 rats each). The first group served as control. The second, third and fourth groups received lead acetate, lead acetate and thymoquinone, and thymoquinone only, respectively, for one month. Lead acetate was given in drinking water at a concentration of 0.5 g/l (500 ppm). Thymoquinone was given daily at a dose of 20 mg/kg b.w. in corn oil by gastric tube. Control and thymoquinone-treated rats showed normal brain histology. Treatment of rats with lead acetate was shown to produce degeneration of endothelial lining of brain blood vessels with peri-vascular cuffing of mononuclear cells consistent to lymphocytes, congestion of choroid plexus blood vessels, ischemic brain infarction, chromatolysis and neuronal degeneration, microglial reaction and neuronophagia, degeneration of hippocampal and cerebellar neurons, and axonal demyelination. On the other hand, co-administration of thymoquinone with lead acetate markedly decreased the incidence of lead acetate-induced pathological lesions. Thus the current study shed some light on the beneficial effects of thymoquinone against neurotoxic effects of lead in rats.

Keywords:

Lead; Neuroprotection; Neurotoxicity; Pathology; Thymoquinone

Published In:

Experimental and Toxicologic Pathology , 66 (1) , 13-17