FULL ARTICLE

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Neuroprotective effect of dietary black seed flour on key enzymes linked with neuronal signaling molecules in rats exposed to mixture of environmental metals

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Abstract

The study examined the neuroprotective effect of dietary black seed flour (D-BSF) in rats exposed to mixed-metals. Animals were divided into six groups ($n = 8$): normal control rats; normal rats treated with 10 and 20% black seed flour (D-BSF), respectively; intoxicated rat; intoxicated rats treated with 10 and 20% D-BSF, respectively for 14 days. Our results revealed that neuronal signaling molecules including acetylcholinesterase (AChE), butrylcholinesterase (BuChE), adenosine deaminase (ADA), monoamine oxidase-A (MAO-A) activities, and malonaldehyde (MDA) levels in cerebral cortex were significantly ($p < .05$) higher followed by alteration in the activity of ecnucleotidase using ATP, ADP, and AMP as substrates in rats exposed to mixed metals. Remarkably, D-BSF significantly ($p < .05$) inhibited the activities of AChE, BuChE, ADA, and MAO-A with corresponding wellness of the neuronal MDA contents. However, inhibition of AChE, BuChE, ADA, MAO-A, ectoenzymes activities suggests possible mechanisms by which D-BSF prevent mixed-metal toxicity in cerebral cortex of male rats.

Practical application

Nigella sativa (Black seed) is widely used in Asian traditional medicine and some part of Africa, as prevention against several diseases such as cough, inflammation and diabetes. Previous investigations have also shown that *black seed oil* could delay carcinogenic process, inhibit inflammation and interrupt oxidative damage in nephrons. It is also commonly consumed for its supposed multifunctioning ability and neuronal promoting effects. The results of this study revealed valuable evidence concerning the possible usage of D-BSF as natural, alternative and/or complementary supplement with neuroprotective potentials. Hence, this study underscores D-BSF as functional food against neurological disorders and suggests some possible mechanisms by which it prevents mixed-metal intoxication in cerebral cortex of male rats.

KEYWORDS

cerebral cortex, dietary black seed flour, inhibition, mixed-metals, neurotoxicity, signaling molecules