

Anat Cell Biol. 2018 Jun;51(2):119-127. English.

Published online Jun 27, 2018. <https://doi.org/10.5115/acb.2018.51.2.119>

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Ameliorative effects of *Moringa* on cuprizone-induced memory decline in rat model of multiple sclerosis

Gabriel Olaiya Omotoso,  Ismail Temitayo Gbadamosi, Theresa Titilayo Afolabi, Ahmad Bolakale Abdulwahab and Adelaja Abdulazeez Akinlolu

Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, Ilorin, Nigeria.

 Corresponding author: Gabriel Olaiya Omotoso. Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria. Tel: +234-7030505707, Email: gabrielolaiya@yahoo.com

Received December 09, 2017; Revised January 14, 2018; Accepted March 05, 2018.

Abstract

Cuprizone is a neurotoxin with copper-chelating ability used in animal model of multiple sclerosis in which oxidative stress has been documented as one of the cascade in the pathogenesis. *Moringa oleifera* is a phytochemical plant with antioxidant and neuroprotective properties. This study aimed at evaluating the ameliorative capability of *M. oleifera* in cuprizone-induced behavioral and histopathological alterations in the prefrontal cortex and hippocampus of Wistar rats. Four groups of rats were treated with normal saline, cuprizone, *M. oleifera* and a combination of *M. oleifera* and cuprizone, for five weeks. The rats were subjected to Morris water maze and Y-maze to assess long and short-term memory respectively. The animals were sacrificed, and brain tissues were removed for histochemical and enzyme lysate immunosorbent assay for catalase, superoxide dismutase, and nitric oxide. Cuprizone significantly induced oxidative and nitrosative stress coupled with memory decline and cortico-hippocampal neuronal deficits; however, administration of *M. oleifera* significantly reversed the neuropathological deficits induced by cuprizone.

Keywords:

Cuprizone; *Moringa oleifera*; Oxidative stress; Memory

Introduction

Multiple sclerosis (MS) is an autoimmune disease characterized by neuronal demyelination, astrogliosis, and microglial activation [1]. It is generally believed that MS is an inflammatory disease controlled by T cell-induced autoimmune reaction against the myelin sheath which principally affects the white matter. However, evidences have emerged that regions of the grey matter are also significantly affected [2]. As part of brain regions affected by the condition, the frontal cortex and hippocampus have been observed to be tremendously affected, thereby impairing cognitive and memory function [3]. The presence of demyelination in the hippocampal formation of individuals with MS has also been reported, and the extent of this lesion strongly relates with progression of cognitive and