

# Abstract Information

<b>First Name :</b>	Sabine Adeline
<b>Last Name :</b>	Fanta Yadang
<b>Email :</b>	fantayadang@gmail.com
<b>Address :</b>	Institute of Medical Research and Medicinal Plants, Ngoa Ekelle 3054 Street, Yaoundé, Cameroon
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<b>Thematic Area :</b>	Neuropharmacology, and Ethnopharmacology
<b>Title :</b>	Protective effect of <i>Carissa edulis</i> aqueous extract against L-glutamic acid-induced neurotoxicity in mice by regulating oxidative stress and neuroinflammation
<b>Co-Authors :</b>	Fanta SA Yadang <sup>1,2*</sup> , Yvette Ngueze <sup>1,2</sup> , Germain Sotoing Taiwe <sup>3</sup> , Gabriel A. Agbor <sup>1</sup> , Nisar Ur-Rahman <sup>4</sup> , Elisabeth Ngo Bum <sup>2</sup> 1 Centre for Research on Medicinal Plants and Traditional Medicine, Institute of Medical Research and Medicinal Plants Studies, Cameroon 2Department of Biological Sciences, Faculty of Science, University of Ngaoundere, Cameroon 3Department of Zoology and Animal Physiology, Faculty of Science, University of Buea, Cameroon 4Department of Pharmacy, Comsats Institute of Information Technology, Abbottabad, Pakistan

<b>Abstract :</b>	<p>Background and objective: Glutamate is the principal excitatory neurotransmitter in the central nervous system. It has been previously reported that the over-activation of NMDA receptors with glutamate contributes to mitochondrial dysfunction, oxidative stress, and inflammation. These pathological hallmarks play a crucial role in many neurological conditions. <i>Carissa edulis</i> has been shown to possess antioxidant and anti-inflammatory properties. This study investigated the protective effect of <i>C. edulis</i> aqueous extract on L-glutamic acid-induced neurotoxic impairment in mice.</p> <p>Methods: Two-month-old mice were intraperitoneally injected with L-glutamic acid (2 g/kg) for seven consecutive days and subsequently treated with an aqueous extract of <i>C. edulis</i>. A behavioural study was conducted using an elevated plus-maze to assess spatial memory. Oxidative stress, induced by reactive oxygen species, was evaluated by measuring lipid peroxidation and antioxidant enzyme levels (MDA, catalase, and glutathione). Neuroinflammation was monitored using IL-1? and TNF-? ELISA kits, and the acetylcholinesterase activity was evaluated using the Ellman method. Additionally, brain</p>
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histopathology was examined using cresyl violet staining.

Results and discussion: *C. edulis* has decreased the latency time for mice to enter the enclosed arm when compared to the L-glutamic acid group. This suggests an improvement in spatial memory. A reduction in latency indicates better memory performance in the mice. Our data suggest that the memory-enhancing effects of *C. edulis* can be attributed to the inhibition of acetylcholinesterase activity. The treatment with *C. edulis* has decreased the MDA levels and increased antioxidant enzyme activity, suggesting that *C. edulis* offers a protective effect against the oxidative stress induced by L-glutamic acid. Furthermore, this property can be attributed to its high levels of bioactive compounds, which significantly contribute to its antioxidant activity. Additionally, there was a notable decrease in the cytokine levels (IL-1 $\beta$  and TNF- $\alpha$ ) in the mice treated with *C. edulis*, showing its anti-inflammatory properties. No pathological changes were observed in the brain sections. In conclusion, *C. edulis* aqueous extract has therapeutic effects by alleviating memory impairment and reducing oxidative stress and neuroinflammation. Therefore, *Carissa edulis* may be a potential pharmacological agent for neuroprotection in neurodegenerative diseases.

Keywords: *Carissa edulis*, L-glutamic acid, neurotoxicity, oxidative stress, inflammation.