Title : Determination of Acetylcholinesterase Activity and Brain Histology of Cyclophosphamide-Induced Neurotoxicity in Rat Treated with Protein Hydrolysate from *Arthrospira platensis*

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ABSTRACT

Cyclophosphamide is an immunosuppressant agent commonly used as a chemotherapeutic drug. However, it induces the production of reactive oxygen species, leading to neurotoxicity and cognitive impairment. The search for bioactive compounds from natural sources with neuroprotective properties has gained increasing attention among researchers. Therefore, this study aimed to evaluate the neuroprotective efficacy of protein hydrolysate from *Arthrospira platensis* (PS) in CP-induced neurotoxicity in rats. Male rats were divided into four groups: a normal control, a negative control, and two treatment groups. neurotoxicity was induced by administering CP at a dose of 200 mg/kg. The normal and negative control groups received distilled water orally for 14 days, while the treatment groups received PS at doses of 3 and 6 mg/kg. Acetylcholinesterase (AChE) activity in hippocampus, cerebral cortex and serum were measured, and brain histopathology was examined. The results showed a significant (p<0.05) decreases in AChE activities in the cerebral cortex and hippocampus of CP-induced rats treated with PS at 3 mg/kg compared to the normal and negative controls. However, PS at both doses significantly increased (p<0.05) AChE activity in the serum. CP did not alter the normal structure of the cerebral cortex but significantly reduced the pyramidal cell population in various regions of the Cornu Ammonis of the hippocampus. Treatment with PS at a high dose effectively restored hippocampal structural alterations. In conclusion, protein hydrolysate derived from *A. platensis* exhibited neuroprotective effects and may help mitigat CP-induced neurotoxicity in rats.

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