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Protective Potential of Hyperhalophilic Diatoms Extract Against Lead Induced Oxidative Stress in Rats and Human HepG2 and HEK293 Cells Line

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Abstract : This work investigates the protective effects of the microalga Halamphora sp. extract (H. Ext) as a natural product on lead-intoxicated liver and kidney human cells in vitro and in vivo on rats wistar. HepG2 cells line derived from human hepatocellular carcinoma and HEK293 cells line derived from human embryonic kidney were used for the in vitro study. The analysis of the fatty acids methyl esters of the extract was performed by a GC/MS. Four groups of rats, each of which was composed of six animals, were used for the in vivo experiment. The pretreatment of HepG2 and HEK293 cells line with the extract (100 µg mL-1) significantly ($p < 0.05$) protected against cytotoxicity induced by lead exposure. In vivo, the biochemical parameters in serum, namely malondialdehyde level (MDA), superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) activities, were measured in supernatants of organ homogenates. H. Ext was found to be rich in fatty acids, essentially palmitic and palmitoleic accounting respectively 29.46% and 42.07% of total fatty acids. Both in vitro and in vivo, the co-treatment with H. Ext allowed the protection of the liver and kidney cells structure, as well as the significant preservation of normal antioxidant and biochemical parameters in rats. Halamphora extract rich in fatty acids has been proven to be effective in protection against Pb-induced toxicity.

Keywords : microalga extract, human cells line, fatty acid, lead exposure, oxidative stress, rats
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