Ameliorative effects of Spirulina platensis against lead-induced nephrotoxicity in newborn rats: Modulation of oxidative stress and histopathological changes

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Abstract

Our experimental work was aimed at evaluating the safety and protective effects of dietary *spirulina* supplementation on the kidney of newborn rats, the offspring of lead contaminated lactating mothers. Female rats were randomly divided into four groups: group I (control) was given a normal diet, group II (positive control, S) received a diet enriched with *spirulina*, group III received only lead through drinking water (Pb), and group IV received both a diet enriched with *spirulina* and lead contaminated water (S Pb). The treatment of pregnant rats with lead administrated in drinking water, from the 5th day of pregnancy until day 14 after delivery, induced an increased level of renal lipid peroxidation, protein carbonyl, hydrogen peroxide and advanced oxidation protein product, a decreased renal content of glutathione and antioxidant enzyme activities such as superoxide dismutase, catalase and glutathione peroxidase in newborns. A statistically significant increase of renal DNA, mRNA, hematological parameters as well as in plasma urea and creatinine serum levels and lactate dehydrogenase was seen in pups, while those of uric acid declined. Interestingly, these biochemical modifications were accompanied by a significant decrease of lactate dehydrogenase in kidney, plasma alkaline phosphatase and gamma glutamyl-transpeptidase levels, urinary levels of creatinine and urea. Conversely, supplementation of lead-treated mother's with *spirulina* alleviated hematotoxicity induced by lead as evidenced, by restoring the biochemical markers cited above to near normal levels. Nevertheless, the distorted histoarchitecture in rat kidney attenuated following spirulina supplementation. It can be then concluded that spirulina is an important protective source against kidney impairments.

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