

Nitrate-Induced Biochemical and Histopathological Changes in the Kidney of Rats: Attenuation by Hyparrhenia hirta

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Abstract : The present study investigated the protective role of *Hyparrhenia hirta* against sodium nitrate (NaNO₃)-induced nephrotoxicity. A high-performance liquid chromatography coupled with a mass spectrometer (HPLC-MS) method was developed to separate and identify flavonoids in *Hyparrhenia hirta*. Seven flavonoids were identified as 3-O-methylquercetin, luteolin-7-O-glucoside, luteolin, apigenin-7-O-glucoside, apigenin-8-C-glucoside, luteolin-8-C-glucoside and luteolin-6-C-glucoside. Wistar rats were randomly divided into three groups: a control group and two treated groups during 50 days with NaNO₃ administered either alone in drinking water or co-administered with *Hyparrhenia hirta*. NaNO₃ treatment induced a significant increase in plasma levels of creatinine, urea and uric while urinary level decreased significantly. Nephrotoxicity induced by NaNO₃ was characterized by significant increase in creatinine clearance. In parallel, a significant increase in malondialdehyde level along with a concomitant decrease in total glutathione content and superoxide dismutase, catalase and glutathione peroxidase activities were observed in the kidney after NaNO₃ treatment. The histopathological changes in kidney after NaNO₃ administration were shrunken. There were renal tubule cell degeneration and infiltration of mononuclear cells. Most glomeruli revealed shrinkage, a wide capsular space and a peri-glomerular mononuclear cells infiltration. *Hyparrhenia hirta* supplementation showed a remarkable amelioration of the abnormalities cited above. The results concluded that the treatment with *Hyparrhenia hirta* had a significant role in protecting the animals from nitrate-induced kidney dysfunction.

Keywords : flavonoids, *hyparrhenia hirta*, kidney, nitrate toxicity, oxidative stress, rat

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