

Kinetics of Inhibition of Xanthine Oxidase by Lycium Arabicum and Its Protective Effect against Oxonate-Induced Hyperuricemia and Renal Dysfunction in Mice

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Abstract : Purpose: To evaluate the in-vitro inhibition of xanthine oxidase (purified from bovine milk) by extracts of Lycium arabicum, as well as its in vivo hypouricemic and renal protective effects. Methods: Four extracts of Lycium arabicum, methanol (CrE), chloroform (ChE), ethyl acetate (EaE) and aqueous (AqE) extracts, were screened for their total phenolics and potential inhibitory effects on purified bovine milk xanthine oxidase (XO) activity by measuring the formation of uric acid or superoxide radical. The mode of inhibition was investigated and compared with the standard drugs, allopurinol, quercetin, and catechin. To evaluate their hypouricemic effect, the extracts were administered to potassium oxonate-induced hyperuricemic mice at a dose of 50 mg/kg body weight. Results: The results showed that EaE had the highest content of phenolic compounds and was the most potent inhibitor of uric acid formation ($IC_{50} = 0.017 \pm 0.001$ mg/mL) and formation of superoxide ($IC_{50} = 0.035 \pm 0.001$ mg/mL). Lineweaver-Burk analysis showed that CrE and EaE inhibited XO competitively, whereas the inhibitory activities exerted by ChE and AqE were of a mixed type. Intraperitoneal injection of L. arabicum extracts (50 mg/kg) elicited hypouricemic actions in hyperuricemic mice. Hyperuricemic mice presented a serum uric acid concentration of 4.71 ± 0.29 mg/L but this was reduced to 1.78 ± 0.11 mg/L by EaE, which was the most potent hypouricemic extract. Conclusion: L. arabicum fractions have a strong inhibitory effect on xanthine oxidase and also have a significantly lowering effect on serum and liver creatinine and urea levels in hyperuricemic mice.

Keywords : lycium arabicum, uric acid, creatinine, superoxide, phenolic compounds, flavonoids, hyperuricemia

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