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Therapeutic Effect of Cichorium Intybus Aerial Parts Extract against Oxidative Stress and Nephropathy Induced by Streptozotocin in Rats

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Abstract : Diabetic nephropathy is an important cause of morbidity and mortality and is now among the most common causes of end-stage renal failure (ESRF) in developed countries. Thus, the aim of the present study was to investigate the phenolic compounds content of Cichorium intybus aerial parts extracts as well as the therapeutic effects on diabetic nephropathy, oxidative stress, and anti-inflammatory by characterizing biochemical, histopathological changes and immunohistochemistry in an experimental diabetic rat model as compared with Amaryl. Ten known compounds of flavonoids, coumarins and phenolic acid derivatives were isolated from the C. intybus aqueous methanolic extract. Structures of the isolated compounds were established by chromatography, UV and 1D⁄2D 1H⁄13C spectroscopy. The aqueous methanol extract of C. intybus aerial parts was administered to Streptozotocin diabetes rats at doses (100 and 200 mg/kg) for 21 days. After treatment, blood glucose, serum insulin, urea, creatinine, and TNF-α were evaluated. Enzymatic scavengers including catalase (CAT), glutathione (GSH), malondialdehyde (MDA) and nitric oxide (NO) were determined to evaluate the oxidative status in the renal tissue. Diabetic rats treated with C. intybus extract showed a dose-dependent reduction of fasting blood glucose and kidney antioxidant status in comparison to the diabetic control group. The extract was able to enhance the antioxidant defenses of the kidney by increasing the reduced GSH and CAT content and decreasing MDA content in addition to significantly decreasing kidney nitric oxide content compared to diabetic control rats. Furthermore, the histopathological findings in C. intybus extract administered rats were observed at markedly lesser extent than the diabetic control group. Also, inducible nitric oxide synthase (iNOS) levels were decreased significantly after the administration of high-dose C. intybus extract in diabetic rats. Showing significant antihyperglycemic and antioxidant properties of C. intybus aerial parts extract, which is attributed to its polyphenolic content, may offer a potential source for the treatment of diabetes.

Keywords : antioxidant activity, anti-diabetic nephropathy, cichorium intybus aerial parts, phenolic compounds
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