

Cichorium intybus attenuates streptozotocin induced diabetic cardiomyopathy via inhibition of oxidative stress & inflammatory response in rats

M. Khan, D. Ahmed. DEPARTMENT OF PHARMACEUTICAL SCIENCES, SIHAS, SAM HIGGINBOTTOM UNIVERSITY OF AGRICULTURE TECHNOLOGY AND SCIENCES (SHUATS), Allahabad, India.

Introduction: The aim of the present study was to investigate the effects of Cichorium intybus (CIE) on lipid peroxidation activities of both enzymatic and non-enzymatic antioxidants, inflammatory mediators, myocardial enzymes and histopathology of cardiac tissues in experimental diabetic cardiomyopathy (DCM). India is pertinently contemplated as the diabetic capital of the world with the peak members of 60 million diabetics when contrasted with the quantity of diabetic patients around the globe which is expanding quickly and is relied upon to achieve 439 million by 2030 [1]. The long term complications of diabetes are of great concern. However, there is an increasing recognition that diabetes patients suffer from an additional complication termed diabetic cardiomyopathy (DCM). Diabetic cardiomyopathy, as an independent diabetic cardiovascular complication, is characterized by hypertension or valvular heart disease, the myocardial dysfunction in the absence of coronary artery disease [2] [3].

Methods: Diabetic cardiomyopathy was induced by single intraperitoneal injection of STZ (40mg/kg) combined with high energy intake in rats. Seed extract of Cichorium intybus (250mg/kg & 500mg/kg) was administered orally once a day for 3 weeks. Phytochemical investigations of seed extract revealed the presence of some active ingredients such as alkaloids, tannins, saponin, phenols, glycosides, steroids, terpenoids and flavonoids. An elevation of the levels of aspartate aminotransferase (AST), lactate dehydrogenase (LDH), superoxide dismutase (SOD), thiobarbituric acid reactive substances (TBARS), blood glutathione (GSH), TNF- α and IL-6 and a reduction in the levels of catalase (CAT) was observed following the STZ treatment. Oxidative stress was accompanied by myocardial degeneration as evidenced by histopathological examination of cardiac tissues.

Results: Administration of CIE reduced the lipid peroxides level in heart. Serum levels of AST, GSH, LDH and SOD were brought down to physiological levels by CIE in STZ induced DCM rats. CIE also markedly down-regulated serum TNF- α and IL-6 levels. Catalase that was reduced in serum was brought back to near normal level. The extensive necrotic changes of cardiac tissue by STZ was minimized to normal morphology upon CIE administration.

Conclusions: The present study shows that the administration of Chicory extract reduces the tissue specific marker enzymes, lipid peroxides, GSH and pro-inflammatory cytokines which are elevated in response to acute administration of STZ thereby demonstrates its cardio-protective effect.

References:

1. Shaw JE et al. (2010). **87**: 4-14.
2. Westermann D et al. (2009). **58**: 1373-1381.
3. Falcao-Pires I et al. (2012). **17**: 325-344.