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Evaluation of Hepatic and Renal Toxicities of the Aqueous Extract of *Costus Speciosus* (J.König) Sm leaf in Animal Model; Biochemical and Histopathological Perspectives

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Abstract

Introduction: *Costus speciosus* (CS) plant ('Thebu' in sinhala), is popular among Sri Lankans as an antidiabetic agent and many of its pharmacological properties have scientifically proved. This study was designed to investigate the effects of long-term CS leaf aqueous extract (cslwex) therapy on, liver and kidney of healthy and insulin-resistance-induced (IR) Wistar rats. **Methods:** CS fresh leaf powder(400 g) was refluxed in distilled water(2L) at 50°C for 6 hours. Excess water was removed under the reduced pressure at 60°C followed by freeze drying, until a constant weight of cslwex was obtained. Wistar rats (170-250 g) were divided into 9 groups (n=5 each) and labled A-I. IR was induced in groups D-I by feeding a modified high-fat-diet for three months. Cslwex oral treatment was conducted daily for 12 weeks as follows. Group A-Distilled water 1 mL, Group B-1500 mg/kg, Group C-3000 mg/kg, Group D-Distilled water 1 mL, Group E-1500 mg/kg, Group F-2000 mg/kg, Group G-2500 mg/kg, Group H-3000 mg/kg CSlwex, Group I-Pioglitazone 20 mg/kg. At the end, serum was analysed for ALT,AST and Creatinine. Histopathology of liver and kidney were observed for toxicity due to cslwex. **Results:** No significant increase in ALT or AST were found in IR rats, compared to IR controls (ALT-34.77±6.19IU/L, p=0.304; AST-137.55±9.83 IU/L, p=0.928). Also, cslwex did not change ALT and AST of healthy rats. Serum creatinine of either IR or healthy rats were not increased than their controls (IR-34.53 ± 1.38 μmol/L; healthy -42.56 ± 3.2738 μmol/L). No features of liver or renal toxicity were observed histopathologically, in any dose of cslwex treated IR or healthy rats. **Conclusion:** In conclusion, 1500-3000 mg/kg doses of Cslwex did not initiate hepatic or renal toxicity even at 12 weeks continuous therapy. Hence these higher doses could be used safely in long-term and justifies the possibility of use in day-today life as well as a remedy in traditional medicine for the proved pharmacological effects.

Keywords: *Costus speciosus, insulin resistance, liver, kidney, toxicity*