Chlorophytum borivilianum Root Extract Maintains near Normal Blood Glucose, Insulin and Lipid Profile Levels and Prevents Oxidative Stress in the Pancreas of Streptozotocin-Induced Adult Male Diabetic Rats

Nelli Giribabu1, Kilaru Eswar Kumar2, Somesula Swapna Rekha3, Sekaran Muniandy4, Naguib Salleh1

1. Dept of Physiology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia.
2. Pharmacology Division, A.U. College of Pharmaceutical Sciences, Andhra University, Visakhapatnam-530 003, Andhra Pradesh, India.
3. Department of Zoology, Sri Venkateswara University, Tirupati - 517502, Andhra Pradesh, India.
4. Department of Molecular Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

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Abstract
The effect of C. borivilianum root on blood glucose, glycated hemoglobin (HbA1c), insulin and lipid profile levels in diabetes mellitus are not fully understood. This study therefore investigated the effect of C. borivilianum root on the above parameters and oxidative stress of the pancreas in diabetes. Methods: C. borivilianum root aqueous extract (250 and 500 mg/kg/day) was administered to streptozotocin (STZ)-induced male diabetic rats for 28 days. Body weight, blood glucose, HbA1c, insulin, lipid profile levels and glucose homeostasis indices were determined. Histopathological changes and oxidative stress parameters i.e. lipid peroxidation (LPO) and antioxidant enzymes activity levels of the pancreas were investigated. Results: C. borivilianum root extract treatment to diabetic rats maintained near normal body weight, blood glucose, HbA1c, lipid profile and insulin levels with higher HOMA-β cell functioning index, number of Islets/pancreas, number of β-cells/Islets however with lower HOMA-insulin resistance (IR) index as compared to non-treated diabetic rats. Negative correlations between serum insulin and blood glucose, HbA1c, triglyceride (TG) and total cholesterol (TC) levels were observed. C. borivilianum root extract administration prevented the increase in lipid peroxidation and the decrease in activity levels of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) with mild histopathological changes in the pancreas of diabetic rats. Conclusions: C. borivilianum root maintains near normal levels of these metabolites and prevented oxidative stress-induced damage to the pancreas in diabetes.

Key words: Chlorophytum borivilianum, diabetes, glucose, lipid profile, pancreas, oxidative stress.

Introduction
Diabetes mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia [1]. As a consequence, diabetics have high risk of developing metabolic related complications such as ketoacidosis, hyperosmolar non-ketotic coma (HONK) [2], atherosclerosis [3], coronary artery disease [4] and pancreatitis [5]. These increased risks were due to co-existence of hyperlipidemia, which was characterized by hypertriglyceridemia, reduced high-density lipoprotein (HDL) and increased low density lipoprotein (LDL) cholesterol levels.

Oxidative stress plays important role in the pathogenesis of diabetes and its complications [7]. Oxidative stress is caused by increased free radical formation, which were generated through several mechanisms such as glucose auto-oxidation, protein...