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Antidiabetic, anti-hyperlipidemic and antioxidant activities of *Bauhinia variegata* flower extract

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ABSTRACT

To evaluate antidiabetic, anti-hyperlipidemic and antioxidant activities of ethanolic extract of *Bauhinia variegata* flower. Ethanolic extract of *B. variegata* was administered orally to Streptozotocin (STZ) induced diabetic rats once daily for 21 days. Blood glucose levels were estimated at day 0, 7, 14 and 21 by glucometer (one touch) and lipid profile and histopathological examination of isolated organs (kidney, liver and pancreas) were also estimated on 21 day. The anti-oxidant activity of *B. variegata* was evaluated by performing 1,1-diphenylpicrylhydrazyl (DPPH) and hydrogen peroxide scavenging (H_2O_2) assays. *B. variegata* flower extract showed reduction in blood glucose level (90.00 mg/dL) at highest dose 400 mg/kg when compared with diabetic control rats (224.50 mg/dL). The levels of triglycerides, total cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), very low density lipoprotein (VLDL) were restored while administrating *B. variegata*. In addition, the percentage inhibition of *B. variegata* was 86.60% and 68.47% at 100 μg/ml for DPPH and H_2O_2 radicals, respectively, which was near to standard BHT i.e. 91.63% (DPPH) and 73.42% (H_2O_2). It can be concluded from the present study that *B. variegata* possesses significant antidiabetic, anti-hyperlipidemic and antioxidant activities.

1. Introduction

Diabetes mellitus is a major cause of morbidity and mortality in the adult population and having profound impact on the quality of the human life. It may results to hypoglycemia, hyperglycemia, renal dysfunction, and cardiovascular complications (Sreedharan, 2018). It has estimated that there was a global prevalence of 425 million people with diabetes in 2017 that is expected to rise to 629 million by 2045 (Forouhi and Wareham, 2018). It represents a set of autoimmune, metabolic and genetic disorders. Etiologically diabetes can be categorized into Type 1 and Type 2; generally, type 2 diabetes (T2DM) is found in 95% of population, and 5% have type 1 diabetes (T1DM) (American Diabetes Association, 2018). T1DM is characterized by absolute insulin deficiency resulting from an autoimmune destruction of pancreatic β-cells whereas T2DM is characterized by chronic hyperglycaemia due to defective insulin synthesis, secretion and/or action (Hurtado, 2018). Factors responsible for T2DM are obesity, age, ethnicity, family history, physical inactivity and diet.

The body generates free radicals due to metabolic processes while antioxidant systems are present in the body to disarm them. This homeostasis gets disturbed due to excess free radical production, depletion of antioxidants or both. Thus, when body's antioxidant system is inadequate, cells get exposed to high levels of free radicals i.e. reactive oxygen species (ROS), reactive nitrogen species (RNS) or reactive sulphur species (RSS); the condition called oxidative stress (Corrochano et al., 2018). Oxidative stress is responsible for cell injury such as protein and lipid peroxidation, DNA fragmentation, racemization or decarboxylation of amino acids, enzyme dysfunction, breakdown of carbohydrates and aggravates various chronic diseases like diabetes, cancer, rheumatism and heart diseases (Li et al., 2015). Excess concentration of glucose in blood is one of the most important causes of diabetes secondary disorders like angiopathy, cataract, neuropathy, deficiency in the antioxidant defence system and lipid profile disorders (Ahangarpour et al., 2019). There is a strong consistent relationship between oxidative stress-induced hyperglycemia and progression of diabetic complications in patients with diabetes mellitus (Ozkaya et al., 2011).

Natural antioxidants obtained from plant matrices play an important role in protecting the body against damage from reactive oxygen species (Wang et al., 2018). *Bauhinia* is large genus comprises of 300–350 species of different trees and plants mainly found in tropical regions (Farag et al., 2015). Extracts from leaves and stem-bark of *Bauhinia* possess active constituents used for the treatment of diabetes, inflammation, hyperlipidemia, infections, pain, HIV, wound and

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