LIST OF PUBLICATIONS

Karthik, D. and S. Ravikumar (2011) A Study on the protective effect of *Cynodon dactylon* leaves extract in diabetic rats. *Biomedical and Environmental Sciences, 24*(2), 190–199. (Impact factor: 0.8; Elsevier Publication)


A Study on the Protective Effect of Cynodon dactylon Leaves Extract in Diabetic Rats

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Abstract

Objective: To investigate the antidiabetic, antioxidant and hypolipidemic efficacy of Cynodon dactylon in diabetic rats.

Methods: The experimental rats were randomly divided into three groups: Group I: control; Group II: Alloxan diabetic, untreated; and Group III: Alloxan diabetic treated with ethanolic extract of C. dactylon leaves (450 mg/kg/bw). Experimental diabetes was induced by alloxan in a single dose of 150 mg/kg/bw.

Results: A significant diminution of fasting blood sugar level was observed and also significant increase in HDL and decrease (P<0.05) in cholesterol, triglyceride, LDL and VLDL were observed after 15 days of treatment. The investigation also revealed, the activities of AST, ALT, ALP, AP, LDH, and CPK (P<0.05) were decreased in the extract-supplemented group. The significant decrease in protein content and SOD, CAT, GPx, and GSH (P<0.05) activity and increase in LPO in plasma were found to be ameliorated after treatment.

Conclusion: Our result supports the fact that administration of extract of C. dactylon leave is able to reduce hyperglycemia and hyperlipidemia risk and also reduced the oxidative stress in diabetic rats.

Key words: Cynodon dactylon; Ethanolic extract; GC-MS; Alloxan diabetes; Antidiabetic; Antioxidant; Lipid profile; Enzyme profile

INTRODUCTION

Diabetes mellitus is a serious, complex chronic condition, which is a major health concern worldwide. This metabolic disorder is characterized by hyperglycemia and disturbances of carbohydrate, protein and fat metabolism[1]. The number of people affected with diabetes worldwide has increased dramatically over recent years. Indeed, by 2015 it has been estimated that the diabetic population will increase to 221 million around the world[2]. The Diabetes Control and Complications Trial (DCCT) Research Group (1993) stated that tight control of blood glucose is an effective strategy in reducing clinical complications of diabetes mellitus significantly and even optimal control of blood glucose can not prevent complications suggesting that an alternative approaches is needed. Ethnobotanical field studies revealed that, a number of plant remedies were used to alleviate the symptoms of diabetes. However, only a few have been evaluated scientifically to confirm the claimed activity[3].

Hyperglycemia also causes oxidative stress, which in turn can result in cellular tissue damage. The uncontrolled hyperglycemia can lead to disturbances of the cell structure and functions of organs[4]. Diabetes is associated with the generation of reactive oxygen species (ROS) causing oxidative damage particularly to heart and kidney.

Cynodon dactylon (L.) Pers. (Fam: Poaceae) is commonly known as "Droob" in India (Arugsampul: Tamil). It is a weed and possesses varied medicinal properties. Leaf, root and rhizome of the plant have been used in folk medicine in different countries, as anti-inflammatory, anticyctic[5], antihypertensive,

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Received: July 13, 2010; Accepted: September 17, 2010
Identification and Characterization of Novel Proteins in Diabetic and Diabetic Treated [Cynodon dactylon (L.) Pers] Albino Rats

Original article

Proteome and phytochemical analysis of Cynodon dactylon leaves extract and its biological activity in diabetic rats

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Abstract

In Indian traditional system of medicine, herbal remedies are prescribed for treatment of various diseases including diabetes mellitus. In recent years, plants are being effectively tried in various pathophysiological states. Cynodon dactylon is one of them. In the present study, aqueous extract of leaves of C. dactylon was found to have potent antidiabetic, antioxidant and hypolipidemic efficacy in alloxan-induced diabetic rat. Supplementation of this aqueous extract orally at the dose of 450 mg/kg body weight per day in alloxan-induced diabetic rats. Plant extract administered for 15 days resulted in a significant reduction in fasting blood sugar level. The lipid profile shows a significant (P<0.05) decrease in HDL and increase in (P<0.05) cholesterol, triglyceride, LDL and VLDL in alloxan diabetic rats, which were normalized after the plant extract treatment. We also investigated the role of AST, ALT, AIP, AP, LDH and CK (P<0.05) activities, which were found to decrease significantly in the aqueous extract supplemented group with respect to diabetic group. C. dactylon extract were further evaluated with par chromatography coupled to mass spectrometry (GC-MS). In this, seven chemical constituents were identified from crude leaf sample. 2D electrophoresis analysis of proteins extracted from C. dactylon was performed using pH range 3–10 revealed 95 protein spots in the gel. Our findings suggested that C. dactylon aqueous extract is effective for alleviating hyperglycaemia and improving lipid profile in diabetic rats and these could be used in diabetic and coronary heart disease (CHD) management.

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Research Report

Characterization of the brain proteome of rats with diabetes mellitus through two-dimensional electrophoresis and mass spectrometry

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ARTICLE INFO
Article History:
Accepted: 18 November 2010
Available online 25 November 2010

Keywords:
Alloxan diabetes
Proteomics
Rat brain
2D electrophoresis
MALDI-TOF-MS/MS

ABSTRACT
An understanding of the diabetes-related changes in brain proteome composition in diabetes and treatment with Cynodon dactylon may provide insights to understand the brain function associated diabetes and metabolic protein mechanism responsible for this disease and in order to discover novel preventive and therapeutic drugs. We have performed a comprehensive proteomic analysis for comparison of rat brain proteome by using advanced 2-dimensional electrophoresis (2DE) combined with mass spectrometry (MALDI-TOF-MS/MS). We report here a comparison of alloxan-induced type 1 diabetic rats and C. dactylon-treated diabetic rats at 2 weeks following diabetes onset. As a result, we identified two differentially expressed proteins from rat brain. The identified proteins were functionally classified into two groups: i) metabolic signalling protein (PPP1R14D) and ii) vesicle transport signalling protein (RAB18). This study provides a preliminary reference map of normal rat brain that will form a basis for comparative studies on normal and pathological conditions of the brain connected with diabetes and may serve as a potential tool for clinical diagnosis, therapeutics and prognosis and may provide new insights into novel mechanisms and therapeutic targets for diabetes-associated neurological disorder.

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1. Introduction
Diabetes mellitus is a group of metabolic diseases characterized by high blood sugar levels that result from defects in insulin secretion from beta cells of pancreases. Numerous clinical studies have focused on the diabetes management and metabolic control to get new insights into the pathogenesis of type 1 diabetes in order to discover novel possibilities of preventive and effective treatment. Plants have an advantage in this area based on their long-term use by humans (Middle Paleolithic age some 60,000 years ago) (Solecki, 1979). According to the World Health Organization (WHO), 80% of the world’s people depend on traditional medicine and 25% of the medical drugs are based on plants for their primary health care needs (Chelliah et al., 2008). The main goals of using plants as sources of therapeutic agents are: i) to isolate bioactive compounds for direct use as drugs, e.g. digoxin; ii) to produce bioactive compounds of novel or known structures as lead compounds for semi-synthesis to produce highly active and/or lower toxicity, e.g. metformin; iii) to use agents as pharmacologic tools, e.g. mesaline; and iv) to use the whole plant or part of it as a herbal remedy, e.g. Cranberry, Echinacea (Fabricant and Farnsworth, 2003). In India, traditional healers use 2500 plant species, Cynodon is one of them.

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0006-8993/$ – see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.brainres.2010.11.086