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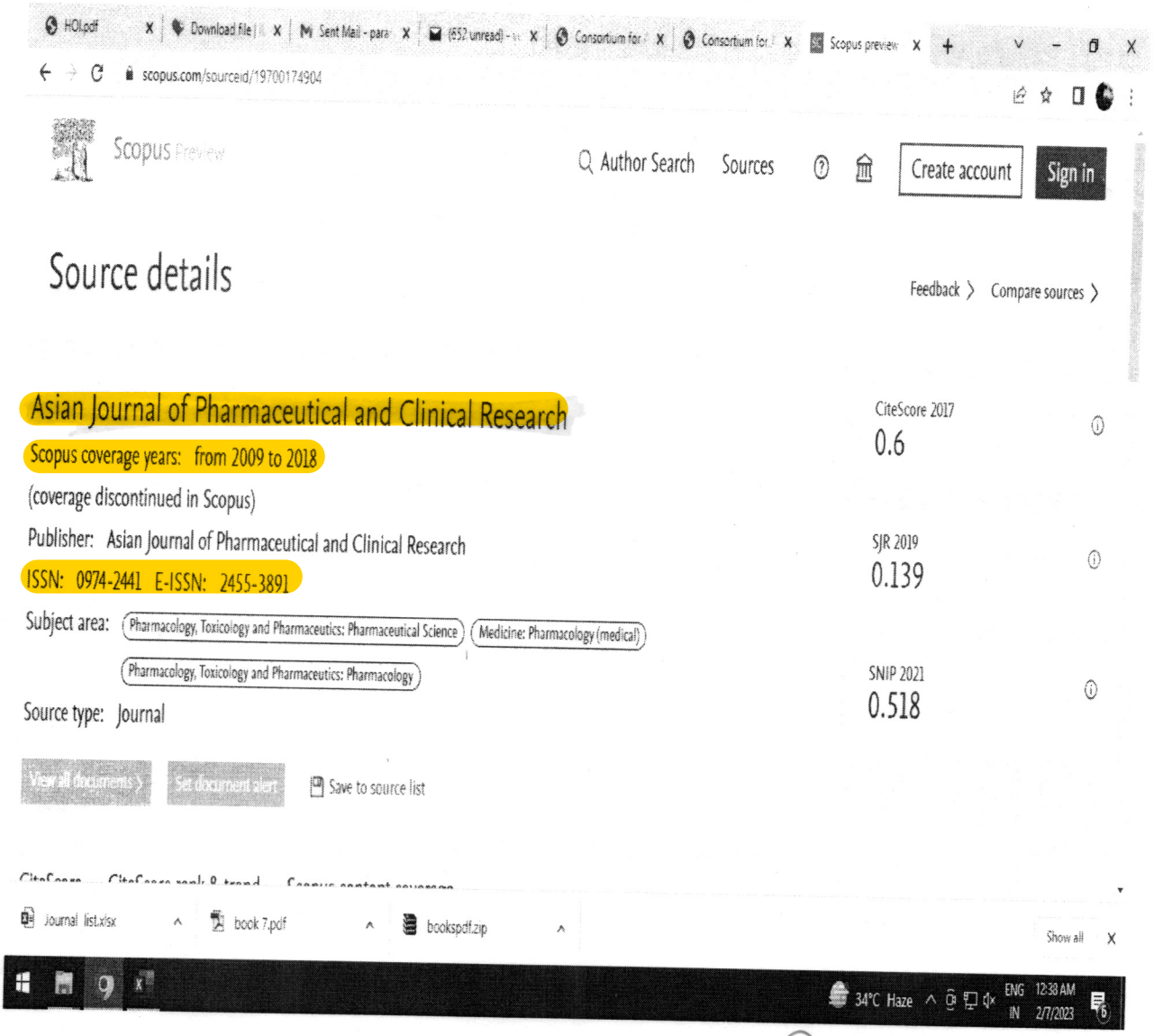

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Research Article

ANTIDIABETIC ACTIVITY OF *SENNA SURATTENSIS* IN ALLOXAN-INDUCED DIABETIC RATS

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ABSTRACT

Objective: *Senna surattensis* is a shrub plant which has been known for its diverse biological and pharmacological properties. This study is aimed to evaluate the antidiabetic activity of ethanolic extracts of *S. surattensis* (EESS) leaves in alloxan-induced diabetic rats.

Methods: Experimental diabetes was induced by injection of a single dose of alloxan (120 mg/kg, intraperitoneal). Adult male Wistar albino rats were divided into five groups; normal control, diabetic control, diabetic EESS (200 mg/kg body weight (bw), diabetic EESS (400 mg/kg bw), and diabetic glibenclamide (5 mg/kg bw). Extracts were treated concurrently for 21 days. Blood samples were collected and centrifuged for estimation of fasting blood glucose (FBG), bw, serum biomarkers, lipid profile, total protein, albumin, and glycosylated hemoglobin (HbA1C) contents.

Results: The increase in FBG, bw, liver biomarkers serum glutamic oxaloacetic transaminase, serum glutamic pyruvic transaminase, alkaline phosphatase, free fatty acid, phospholipids (PL), triglycerides, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, total protein, albumin, and HbA1C content were recorded in diabetic control rats. Daily oral administration of EESS treatment significantly ($p<0.01$) reverted the levels of serum biomarkers and enzymes activities to near normal values. A similar reduction was produced in FBG after 21 days of extract administration which compared significantly ($p<0.01$) with the control group and glibenclamide treated groups.

Conclusion: The results suggest that EESS has anti-diabetic activity in diabetic rats, thereby justifying its traditional claim and augmenting it into the present system of medicine.

Keywords: *Senna surattensis*, Alloxan, Hyperglycemia, Diabetes mellitus, Hypolipidemic.

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INTRODUCTION

Diabetes mellitus is a group of metabolic disorder is characterized by hyperglycemia and disturbances of carbohydrate, lipid, and protein metabolisms. Long-term hyperglycemia during diabetes causes glycation of body proteins that lead to secondary complications affecting kidney, eye, nerve, and arteries. It is considered as one of the five leading causes of death in the world [1]. Altogether diabetes has shadowed the spread of modern lifestyle, and it can be associated to surge overweight and sedentary inhabitants [2]. The global problem of diabetes mellitus stances massive social expenses and has chief implications for all healthcare structures. Diabetic dyslipidemia results in accumulation of excess free fatty acids (FFA), which are converted to triglycerides (TGs) in the liver. The consequence of fat accumulation is increased small dense low-density lipoprotein cholesterol (LDLc) and TGs levels and decreased high-density lipoprotein cholesterol (HDLc), which contributes to cardiovascular risk in diabetes. It is now well-known that the hyperlipidemia signifies a major risk factor for the premature development of diabetes and its complications.

Experimental models using animal provide clear clues for the understanding of the molecular and pathological state of diabetes mellitus and are valuable for the screening of drugs for the prevention and management of diabetes. The pathophysiology of diabetes involves a very complex cascade of several interrelated mechanisms. Alloxan is a universally used chemical to produce experimental diabetic animals in the labs for its ability to damage insulin-producing beta cells. It is generally accepted that free radicals generated by alloxan cause beta cell injury that is key to its part as a diabetogenic agent. As it has been widely accepted that alloxan selectively destroys the insulin-producing beta cells found in the pancreas; hence, it is used to induce diabetes in laboratory animals.

There is increasing demand by patients to use natural products with anti-diabetic activity due to side effects associated with the use of oral hypoglycemic agents. Many of the currently available oral hypoglycemic drugs possess a number of serious toxic effects [3]. Meanwhile, the management of diabetes mellitus without adverse effects is still a major challenge. Dietary involvement, mostly the practice of traditional medicine derived from natural sources, is a major strength in the management of diabetes [4].

Traditionally, a number of plants have been used in various herbal preparations in the management of diabetes and only a few of them have been proven scientifically. Plant drugs are considered to be less toxic and free from side effects than synthetic ones [5]. *Senna surattensis*. (*Caesalpiniaceae*) is commonly known as *Glaucous cassia* and distributed throughout India. It is commonly used in folk medicine as antihyperglycemic for the management of diabetes mellitus [6,7]. The plant is also known for its use in gonorrhea blennorrhea and jaundice. Bark, aerial parts and leaves are useful in for the management of diabetes and gonorrhea [8]. The plant found to contain anthraquinone, flavonol glycosides, chrysophanol, physcion, kaempferide, and quercetin [9]. The extracts of *S. surattensis* have been shown to have antimicrobial, antihyperlipidemic, antioxidant, and hepatoprotective activities [10-13]. We have also previously demonstrated the hypoglycemic effect of ethanolic extracts of *S. surattensis* (EESS) using *in vitro* models of diabetes mellitus [14]. Literature surveys have yielded scanty information on the pharmacological properties of *S. surattensis* for diabetes management. However, no systematic study was carried out on the leaf extracts of *S. surattensis* for its *in vivo* anti-diabetic activity using an animal model. Hence, the present study first time aimed to investigate the anti-diabetic activity of leaf extracts of *S. surattensis* using alloxan treated diabetic rats to ascertain the scientific basis for the use in the treatment of diabetes mellitus. Here, the antihyperglycemic

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