

Anti-diabetic activity of *Cassia auriculata*

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ABSTRACT

Medicinal plants have attained a significant role in health system all over the world for both humans and animals not only in the diseased condition but also as potential material for maintaining proper health. *Cassia auriculata* L. (Caesalpiniaceae) is a shrub that has attractive yellow flowers. *Cassia auriculata* was observed to have anti-diabetic activity in the present study.

Keywords : Anti-Diabetic, Insulin, Medicinal, Glucose

I. INTRODUCTION

India has one of the richest plant medical traditions in the world ensuring health security to the teeming millions. There are estimated to be around 25,000 effective plant-based formulations, used in folk medicine and known to rural communities in India. There are over 1.5 million practitioners of traditional medicinal system using medicinal plants in preventive, promotional and curative applications [12]. Since medicinal plants are nontoxic and easily affordable they play a vital role not only for pharmacological research and drug development, but also when plant constituents are used directly as therapeutic agents and as starting materials for the synthesis of drugs [9].

Diabetes mellitus arises from a deficient production of insulin by the beta cell of the pancreatic islets. Insufficient insulin results in hyperglycemia and the symptoms of diabetes, namely an excess sugar in the blood and urine, hunger, thirst and a gradual loss of weight. The disease is estimated to affect 4-5% of the population and patients are generally diabetes type 1 or type 2. Diabetes mellitus, characterized by hyperglycemia, is the most common serious metabolic disorder that is considered to be one of the five leading causes of death in the world [5].

The management of diabetes involves both the non-pharmacological and pharmacological approaches. The

non-pharmacological approach includes exercise, diet control and surgery, while the pharmacological approach includes the use of drugs such as insulin, and oral hypoglycemic agents. The present conventional drugs are not only costly but also associated with lots of adverse effects. Many herbal medicines have been recommended for the treatment of diabetes [10]. A variety of ingredients present in medicinal plants are thought to act on a variety of targets by various modes and mechanisms. They have the potential to impart therapeutic effect in complicated disorders like diabetes and its complications [14].

Various parts of herbs have been used for medicinal purpose including the treatment of diabetes mellitus. One such medicinal plant that is widely used to manage diabetes is *Cassia auriculata*. It is commonly known as "Tanner's cassia," is widely used in Indian folk medicine for the treatment of diabetes mellitus.

II. CLASSIFICATION

Kingdom : Plantae
Order : Fabales
Family : Fabaceae
Sub family : Caesalpinioideae
Tribe : Cassieae
Genus : *Cassia*
Species : *C. auriculata*

III. BOTANICAL DESCRIPTION

Cassia auriculata is a much branched shrub with smooth brown bark and closely pubescent brachlets. The leaves are alternate, stipulate, paripinnate compound, very numerous, closely placed, rachis narrowly furrowed, slender, pubescent, with an erect linear gland between the leaflets of each pair. Leaflets 16-24, very shortly stalked 2-3 cm long 1-1.5 cm broad, slightly overlapping, oval oblong, obtuse, at both ends, mucronate, glabrous or minutely downy, dull green, paler beneath, stipules very large, reniform-rotund, produced at base on side of next petiole into a filliform point and persistent. Its flowers are irregular, bisexual, yellow in colour and large, the pedicels glabrous and 2.7 cm long. The racemes are few-flowered, short, erect, crowded in axils of upper leaves so as to form a large terminal inflorescence stamens barren; the ovary is superior, unilocular, with marginal ovules. The fruit is a short legume, 7.1–10 cm long, 1.6 cm broad, oblong, obtuse, tipped with long style base, flat, thin, papery, undulately crimped, pilose, pale brown. 10-22 seeds per fruit are carried each in its separate cavity.



Figure 1: Whole plant of *Cassia auriculata*

IV. ANTI-DIABETIC ACTIVITY

Animals treated with the methanolic bark extract of *Cassia auriculata* showed a significant reduction in the blood glucose levels on the 7th day with a percentage deviation of 43.6% from the blood glucose on 1st day. On 15th day the deviation was 82.4%. The 30 days

administration of *Cassia auriculata* bark extract caused a lowering of blood glucose levels with a deviation of 80.9% when compared with the blood glucose level on 1st day [11].

Lipids play an important role in the pathogenesis of diabetes mellitus. The level of serum lipids is usually raised in diabetes and such an elevation represents a risk factor for coronary heart disease. Lowering of serum lipids levels through dietary or drugs therapy seems to be associated with a decrease in the risk of vascular disease [13]. The abnormal high concentration of serum lipids in diabetes is mainly due to the increase in the mobilization of free fatty acids from the peripheral depots, since insulin inhibits the hormone sensitive lipase. Oral administration of extracts of *C.auriculata* bark significantly decreased the serum cholesterol, triglycerides, LDL and VLDL and increased the HDL-cholesterol [4].

The diabetic hyperglycemia induces the elevation of plasma levels of urea, uric acid and creatinine, which are considered as the significant markers of renal dysfunction [2]. *Cassia auriculata* bark extract significantly decreases the levels of urea, uric acid and creatinine [1]. The excellent recovery of renal function expected with treatment of *C.auriculata* bark extract can be explained by the regenerative capability of the renal tubules [8].

Superoxide dismutase catalyses the dismutation of the highly reactive Superoxide anion to oxygen and hydrogen peroxide. Catalase and glutathione peroxidase are considered biologically essential in the reduction of hydrogen peroxide [6]. The activities of SOD, catalase and glutathione peroxidase were lowered in diabetic rats [3]. However oral administration of *Cassia auriculata* leaves and flowers extracts reversed the activities of these enzymatic antioxidants. This suggests direct or indirect antioxidant nature of *Cassia auriculata* leaves and flowers extracts, which could be due to the free radical scavenging of phytochemicals present in the *Cassia auriculata* leaves and flowers acting as a strong free radical scavenger, thereby improving the antioxidant nature in alloxan-diabetic rats [7].

V. CONCLUSION

Many traditional plant treatments for diabetes mellitus are used throughout the world. The present review study proved that the *Cassia auriculata* leaves, bark and flowers possess significant anti-diabetic activity along with potent antioxidant potential in diabetic conditions. The exact mechanism of action of herbal product is not known; therefore, further studies are needed.

VI. REFERENCES

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