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# A REVIEW ON *COSTUS IGNEUS*

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## ABSTRACT

*Costus igneus,* commonly known as insulin plant is a member of *Costaceae* & its a traditionally used medicinal herb which is native to southeast Asia. The plant was recently introduced to India & grown as an ornamental plant in Southern India. It's leaves are used as a dietry supplement in the treatment of diabetis mellitus. Several studies have been carried out to assess the plant's anti-diabetic potential. Furthermore, it has been shown to have a variety of pharmacological activities like hypolipidemic, antimicrobial, anticancerous, diuretic, antioxidant, etc. Various phytochemical investigations proven the presence of carbohadrate, proteins, tannins, flavanoids, alkaloids, steroids and appreciable amount of trace elements. This work attempts to explore the various medicinal properties of *Costus igneus* for research purpose & future friendly formulation development for the protection of human well being.

**KEYWORDS**: *Costus igneus*, diabetes mellitus, insulin plant, anti-diabetic activity, blood sugar level.

## INTRODUCTION

*Costus igneus* commonly known as the spiral flag, is a member of *Costaceae*. It is a recent introduction to India from America as a herbal remedy for diabetes and therefore commonly referred to as the "insulin plant". It is widely grown in gardens as an ornamental plant in southern India and also run wild in many places.[1] It is used in India to control diabetes, and it is known that diabetic people eat one leaf every day tokeep their blood sugar low.[2] *C. igneus* leaves were one of the plants known to be used effectively to treat diabetes by tribal populations in the Kolli Hills of Namakkal District, Tamilnadu.[3]

It is a perennial, vertical and spread plant up to about two feet high, with spiral leaves and attractive flowers.[4] In southern India, usually grows as an ornamental plant and its leaves are used for the treatment of diabetes mellitus. Several phytochemical studies proven the presence of carbohydrates, triterpenoids, proteins, alkaloids, tannins, saponins, flavonoids, steroids[5] and trace elements. Recently, a number of studies have been conducted to assess the anti- diabetic potential of this plant. In addition, it has been proven to possess various pharmacological activities such as hypolipidemic, diuretic, antioxidant, antimicrobial, anticancer.

Various important bio components are present in aqueous and methanolic extracts of *Costus igneus*. These components are flavonoids, tannins, saponins, alkaloids, glycosides, lignins and phytosterol etc. In addition to these components, another important triterpenoid component is corosolic acid. Insulin plant can have a positive effect on blood sugar levels due tothe presence of natural concentration of corosolic acid. Corosolic acid works on lipid metabolism and it act like insulin by regulating the glucose concentration into cells and out of the bloodstream. This can be effective for anyone with diabetes. In this review, we critically discuss the potential utility of several anti-diabetic biocomponents from *Costus igneus* with their possible mode of action for treatment of Type 2 diabetes.

### Taxonomy

Botanical name: *Costus igneus*
Domain: Eukaryota
Kingdom: Plantae
Subkingdom: Viridaeplantae
Phylum: Tracheophyta
Subphylum: Euphyllophytina
Infraphylum: Radiatopses
Class: Liliopsida
Subclass: Commelinidae
Superorder: Zingiberanae
Order: Zingiberales
Family: Costaceae
Subfamily: Asteroideae
Tribe: Coreopsideae
Genus: Costus
Specific epithet: Igneus[6]

**Morphology**

It is a perennial, upright, spreading plant that is about two meters high, with the highest stems falling over and lying on the ground. Leaves are simple, alternating, whole, rural, evergreen, 4-8 inches in length with parallel venation. The large, smooth, dark green leaves of this tropical evergreen have light purple undersides and are arranged spirally around stems and form attractive, arched lumps that arise from underground rootstocks. Beautiful, 1.5-inch diameter, orange flowers are produced in the warm months, appear on cone-like heads at the tips of the branches.[7] The fruits are inconspicuous, less than 0.5 inches and coloured green.

**Method of cultivation**

It grows under full sun or partial shade. It needs a fertile soil with severe humidity and is often planted near water. Reproduction is done by dividing lumps, shoots or by separating the compensators, which are formed under the flower heads. It is cultivated in the coastal zone, in the area of Uttar Kannada of Karnataka and Tamil Nadu.

**Chemical constituents**

Phytochemical screening revealed the presence of steroids, tribenzene, alkaloids, tannins, flavonoids, saponins, carbohydrates and proteins. Methanol extract was found to contain the most phytochemicals. Wild plants and callus (MS and LS medium) extracted from different solvents during preliminary screening indicate the presence of high levels of phytochemicals, such as phenols, alkaloids, flavonoids and triene compounds, in methanol extracts. Continuous screening of phytochemicals in the *Costus* leaf showed that it was rich in protein, iron and antioxidants such as ascorbic acid, beta-tocopherol, beta- carotene, triene, steroids and flavonoids.[8]

- Carbohydrates
- Triterpenoids
- Proteins
- Alkaloids
- Tannins
- Saponin
- Flavonoids
- Sterols
- Active tea extracts and essential oil
- Anti-oxidants

**Medicinal uses**

The medicinal property of the insulin plant is due to the presence of chemicals such as Terpenoids, Saponins, Flavonoids, Corosolic acid, Sapogenin, Tannins and Steroids. It has been used in Ayurveda since the olden times.

**Antidiabetic property:** It reduces sugar levels in the blood. You only need to take one leaf a day to bring your sugar level under control. In addition, it reduces the level of induced cholesterol. Diabetics usually have high cholesterol levels, which is induced due to high blood sugar levels. But once you take the *Costus igneus* plant leaf, you will see a drop in cholesterol levels.

**Healing asthma:** You can treat asthma in two ways. One is to take the short-term cure and the other is the long-term cure. Rapid asthma relieves the symptoms, but they will flare up again. The long-term cure will control inflammation in the airways and bring relief to the patient. *Costus igneus* helps to calm the smooth muscles in the lungs that tighten during the asthma attack. This helps to alleviate the symptoms of asthma.

**Helps relieve the symptoms of bronchitis:** Bronchitis occurs when the airways become narrow due to mucus and inflammation. The use of the leaves of the insulin plant helps to fight inflammation and lower cholesterol levels. This helps to remove the obstacles in the airways and improve the patient's breathing condition.

**Antioxidant properties:** Quercetin and diosgenin are the bioactive compounds in *costus igneus* that have antioxidant properties. It increases the concentration of superoxide dismutase, vitamin A, vitamin E, vitamin C, glutathione reductase, glutathione peroxidase, and catalase. It reduces the glutathione and could thus help to reduce oxidative stress and damage to healthy cells.

**Treat fever:** The insulin plant has antipyretic properties. This helps to control the fever, and the patient gets relief.

**Diuretic property:** You can have the decoction prepared with the leaves of the plant to relieve urinary problems. Use three leaves for 2 cups of water, add honey to enhance the taste. It increases sodium and potassium clearance, suggesting that it has good diuresis.

**Cures skin diseases:** *Costus igneus* shows a good protective effect for the skin. Grind a few leaves to a paste and apply it to your face and hands. Let it dry on. Do this for two weeks and you will see the firming of the skin. Due to the increased elasticity of the skin, there will be a glow.

**Cancer-preventing nature:** The phenol extract of the leaves of the plant has an anti-proliferative and anti-cancer potential. This can be seen in all parts of the plant including the bark.

**Ameliorative effect:** The study of alcohol-induced stress in the body was investigated in relation to the insulin plant. It was observed that the mitochondrial enzyme was back to normal at the end of the 21-day treatment period.

**Has antibacterial properties:** The chemicals in the plant prevent the growth of bacteria. You can use the leaf of the plant internally and externally. For people who have candidiasis of nails and hair, applying the paste of the leaves of the plant will improve the condition and alleviate the symptoms.[9]

**Antiseptic nature:** You can apply the extract of the plant to the skin and prevent antimicrobial activity. This antiseptic effect is from the outside of the body. They can effectively inhibit the growth and spread of microbes on the skin.

**Phytochemical analysis**

Phytochemical tests were conducted to find the presence of active chemical ingredients such as alkaloid, glycosides, terpenoids, steroids, flavonoids, triterpenes, phenolic and tannin compounds through the following procedure.[10]

**Test for alkaloids (Meyer's Test)**

The extract of *costus igneus* was evaporated to dryness and the residue was heated in a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Meyer's reagent. The samples were then observed for the presence of turbidity or yellow precipitation.

**Testing for glycoside**

To the solution of the extract in Glacial acetic acid, few drops of Ferric chloride and Concentrated Sulphuric acid are added, and observed for reddish brown colouration at the junction of two layers and the bluish green colour in the upper layer.

**Test for terpenoid and steroid**

4 mg extract was treated with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Then concentrated solution of sulphuric acid was slowly added and red violet colour was observed for terpenoid and green bluish colour for steroids.

**Test for flavonoid**

4 mg extract solution was treated with 1.5 ml 50% methanol solution. The solution was heated and added metal magnesium. To this solution, 5-6 drops of concentrated hydrochloric acid were added and red color for flavonoids and orange color for flavonoid were observed.

**Test for triterpenes**

300 mg of extract were mixed with 5 ml of chloroform and heated at 80°C for 30 minutes. Only a few drops of concentrated sulphuric acid were added and well mixed and observed in red color formation.

**Testing for phenolic compounds (ferric chloride test)**

300mg of extract were diluted and filtered in 5 ml of distilled water. 5% ferric chloride was added to the filtrate and observed in dark green colour formation.

## CONCLUSION

This review that have been done yet showed that *Costus igneus* is an important medicinal herb presented with various pharmacological actions. The studies have done on this plant proved that it possesses many important phytoconstituents such as conjugated flavonoids, flavones, flavonols, catechin and catechin derivatives, chlorophylls a and b, resinoids, essential oil and alkaloid named saussurine, inulin and resin etc. And these compounds found to be responsible for various pharmacological properties such as anti-diabetic effect, anti-proliferative effect, antimicrobial activity, anti-inflammatory potential, the effect on learning and memory,antioxidant activity, neuroprotective role, hypolipidemic activity etc. Further exploration of medicinal properties and various phytoconstituents responsible the pharmacological actions are required to be done to make the treatment more assuring, reliable, with fewer side effects for the welfare of mankind in the future.

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