

A Review On The Medicinal Exploration Of Costus Inegus (The Insulin Plant)

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➤ ABSTRACT :-

Costus igneus, popularly known as the “Insulin Plant,” is a medicinal herb recognized for its antidiabetic potential. Traditionally used in India for managing diabetes mellitus, the plant exhibits strong pharmacological actions due to its rich phytochemical profile, including flavonoids, steroids, alkaloids, terpenoids, glycosides, and saponins. Scientific studies report significant hypoglycemic, antioxidant, anti-inflammatory, antimicrobial, and hepatoprotective activities. The antidiabetic effect is attributed to enhanced insulin secretion, improved glucose uptake, and reduction of oxidative stress. This review summarizes the botanical description, phytochemistry, pharmacological actions, mechanisms of antidiabetic activity, medicinal applications, research gaps, and future prospects of Costus igneus, establishing its importance as a promising herbal therapeutic agent

KEYWORD:- Costus igneus, insulin plant, leaf, phytoconstituents, application in Ayurveda, pharmacological actions, and commercial goods.

➤ INTRODUCTION:-

The insulin plant, scientifically known as *Costus igneus*, is a herb from the Costaceae family, increasingly recognized in India for its potential to aid insulin production and manage diabetes. Its leaves are used in Ayurveda to stabilize blood glucose levels. The plant is part of a larger family with about 200 species, including the tropical *Costus igneus*, found in India and other regions like Africa and Australia. Detoxification, which involves removing harmful substances from the body, is essential due to the growing exposure to toxins in our food, water, and environment.

Medicinal plants in India:-

Since then, the study of medicinal plants has gradually developed into what it is today. In order to create a thorough catalog of therapeutic plants and data on phytochemistry, pharmacology, and The field of pharmacognosy is expanding. The majority of medicinal plants are harvested from wild populations for use in the pharmaceutical and medicine industries. Numerous plants with significant commercial value have

suffered as a result of this.

Plant Description:-

This perennial plant is upright, grows outward, and touches the ground. The leaves are round, clear, alternate, evergreen, and have parallel veining. They can reach a length of 4 to 8 inches. This tropical plant has large, smooth, spiral-shaped, dark green leaves with pale purple undersides. evergreen plant that develops from subterranean rootstocks in clusters. It has stunning 1.5-inch orange blooms that resemble cones and emerge from the tips of branches during the summer (13). The plant pierces the ground with its deep, tuberous rhizome since it is a rhizomatous shrub. The soft, juicy, cylindrical rhizome's smooth, pale brown surface has a temperature range of 30 to 40 degrees Celsius.



TABLE 1: VERNACULAR NAMES...

SR .NO	Language	Names
	GUJRATI	Pakarmul
1	English	Spiral Ginger, Spotted Spiral Ginger, Painted Spiral Ginger
2	Telugu	Peddavesiga, Yeangesha
3	Urdu	Bijasar, Dam alakhwain
4	Bengali	Piasal
5	Hindi	Banda, Bija-sal, Peisar, JARUL, Keukand

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TABLE 2: TAXONOMY.

Botanical name	Costus igneus
Domain	Eukaryota
Kingdom	Plantae
Subkingdom	Viridiaeplantae
Phylum	Tracheophyta
Subphylum	Euphyllophytina
Class	Liliopsida
Superorder	Zingiberanae
Order	Zingiberales
Family	Costaceae
Subfamily	Asteroideae
Tribe	Coreoideae
Genus	Costus
Specific epithet	Igneus

➤ Medicinal Use in Ayurvedic System :-

LEAVES :- Diabetic patients need to consume the leaves of the insulin plant daily for a month. It's important to ensure that the leaves are thoroughly chewed before being swallowed. This treatment should be followed for a full 30 days. Even allopathic doctors suggest it, and it has been proven to effectively regulate blood sugar levels.....

Rhizome:- The rhizome of the insulin plant is known for its bitter, astringent, sharp, cooling, and aphrodisiac properties. It acts as a purgative, deworming agent, detoxifier, fever reducer, and expectorant. It is beneficial for treating conditions like burning sensations, constipation, leprosy, worm infestations, skin disorders, fever, asthma, bronchitis, inflammation, and anemia.

• **Stem:-** The stem contains the terpenoid compound lupeol and the steroid compound stigmasterol.

Root:- The root contains terpenoids, alkaloids, tannins, and other compounds. High levels of iron, protein, various antioxidants (such as ascorbic acid, α -tocopherol, and β -carotene), steroids, terpenoids, and flavonoids were detected in the phytochemical analysis of *C. igneus* leaves.

Leaf		growth of CHPD crystals at maximum. But the activity was more for root and stem extracts.
	Antiproliferative	The methanolic extract could reduce the tumor size and showed 97.46% cytotoxicity.
	Anti-inflammatory	Isolated compound β -amyrin has shown 97% inhibition of paw edema at a given dose of 100 μ g.
	Prevent learning and memory deficit	<i>Costus igneus</i> treated diabetic rats maintained their innate behavior and indicated an improvement in their learning tendency. Also shown a marked improvement in the entrance latency and decrease in the time spent in the dark room.
Stem	Antiuro lithiatic	98.25% decrease in the weight of CHPD crystals has been observed
	Antioxidant	Showed significant antioxidant activity
	Antimicrobial	Methanolic extract showed significant antimicrobial activity
Root	Antibacterial	Methanolic extract indicated significant activity against for both gram positive and gram negative bacteria
	Antioxidant	Maximum activity due to the presence of highest phenol content
	Hypoglycemic	68.26% reduction of blood glucose level
	Antioxidant	Showed elevated levels of SOD, CAT, and GSH

➤ Procedure:-

Collection of the leaves:- *Costus pictus* D. Don leaves in good condition were gathered and thoroughly cleaned under running water.

Leaf drying and pulverizing: The leaves were collected and shade dried. It was powdered in a mixer. The powder was sieved in a No.60 sieve and kept in a well closed container in a dry place.

Main medicinal properties:- Antidiabetic – improves insulin secretion, reduces glucose levels

Antioxidant – protects cells from oxidative damage Antimicrobial – effective against certain bacteria and

fungi Anti-inflammatory – reduces inflammation Nephroprotective – supports kidney health

Active part of the plant: Leaves and rhizomes Scientific findings: Enhances glucose uptake in tissues

Protects pancreatic β -cells Reduces oxidative stress Safe at moderate doses in animal studies

Applications:-

Herbal antidiabetic formulations

Nutraceuticals

Natural antioxidant source

Potential for drug development

Future research needs:

Human clinical trials

Standardized dosage and extract preparation Long-term toxicity studies

➤ RESULT AND DISCUSSION:-

The blood glucose levels in normoglycemic rats were not considerably lowered by either dose. 400 mg/kg b.w. of extract significantly reduced blood glucose levels in Rats with hyperglycemia The anti-diabetic action of the methanolic extract was demonstrated by a considerable fall in serum glucose levels and an increase in liver glycogen. Additionally, it demonstrated an improvement in the lipid profile (cholesterol, triglycerides, HDL, LDL, VLDL, and phospholipids) and an increase in plasma insulin level, suggesting that it is helpful for hyperlipidemia brought on by diabetes mellitus *C. pictus* leaf extract dramatically lowered the blood glucose to near the control in diabetic rats. In vitro experiments demonstrated

C. pictus leaf extract induced Insulin secretion in pancreatic islets is promoted by glucose. Through muscarinic receptors, *C. pictus* extracts regulate glucose homeostasis and secretion. It was clear that both normal and STZ-induced diabetic rats' blood glucose levels could be effectively maintained by the aqueous solution of *C. pictus* leaves. The quantity and area of rat pancreatic islets treated with *C. pictus*

significantly increased, according to morphometric study. According to the study's first findings, leaf powder effectively lowers blood sugar....

The first stage in starting a drug design process is identifying and choosing the best drug target. The target protein for this investigation was thought to be the insulin protein. We removed the plant. insulin structures for testing as a substitute for human insulin protein from the MODBASE database (<http://modbase.Compbio.ucsf.edu/modbase-cgi/index.cgi>) [35]. Figure 1 displays two renderings of the three-dimensional (3D) structure of plant insulin that was isolated from *Canavalia ensiformis* with accession number .

Direct shoot regeneration for plant micropropagation permits lae-scale in vitro plantlet proliferation by avoiding clonal variation rather than regenerating from calli by themselves, which frequently results in somaclonal variance [10]. Within Nodal segments were removed from a 1- year-old in this study *Vernonia divergens* plant (Fig. 1) and were examined for their reaction to varying doses of plant growth regulators...

➤ SUMMARY:-

Costus igneus, commonly called the Insulin plant, has gained significant attention for its traditional and scientifically validated medicinal properties, especially its antidiabetic potential. The plant is widely used in India, where consuming its fresh leaves is believed to help regulate blood glucose levels. Research studies have confirmed that the plant contains bioactive compounds such as flavonoids, alkaloids, steroids, terpenoids, and saponins, which contribute to its hypoglycemic, antioxidant, antimicrobial, anti-inflammatory, and nephroprotective effects. Pharmacological evaluations show that extracts of *Costus igneus* help improve insulin secretion, enhance glucose uptake, reduce oxidative stress, and protect pancreatic β -cells. Various parts of the plant— especially the leaves and rhizomes—have been explored for different extraction methods (aqueous, ethanol, methanol), each showing therapeutic significance. Overall, *Costus igneus* is emerging as a promising medicinal plant for developing herbal antidiabetic formulations, natural antioxidants, and potential drug leads. However, more clinical trials, standardization, and toxicity studies are needed for its effective integration into modern medicine.

➤ CONCLUSION:-

Costus igneus, commonly known as the “Insulin plant,” shows significant medicinal potential, especially for managing diabetes. Various studies confirm its hypoglycemic, antioxidant, antimicrobial, and anti-inflammatory activities. The presence of bioactive compounds such as flavonoids, alkaloids, terpenoids, and steroids supports its therapeutic value. Traditional use and modern research both indicate that regular consumption of its leaves may help regulate blood glucose levels naturally. Although promising, further detailed clinical studies, standardization of extracts, and safety evaluations are required to establish its long-term efficacy and develop it into validated herbal formulations. Overall, *Costus igneus* stands as a valuable medicinal plant with strong prospects for future pharmacological and nutraceutical applications.

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