



Cassia Fistula As A Medicinal Plant

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ABSTRACT:

Medicinal plant species contain vast and unexploited riches of chemical substances with high medical potential, making these plant species valuable as biomedicine sources. *Cassia fistula* Linn, which belongs to the family Leguminosae, is a medium-sized tree, and its different parts are used in ayurvedic medicine as well as home remedies for common ailments. It is a native of tropical Asia. It is widely cultivated in South Africa, Mexico, East Africa, and Brazil. It is used to treat skin diseases, fever, abdominal pain, and leprosy. : Ayurvedic medicines are considered carminative and laxative. The plant is beneficial for chest complaints, eye problems, colds, heart and liver problems, and rheumatism. It is used to treat hematemesis, itching, dermal cell tumors and diabetes. Phytochemical studies show that it is an important and beneficial medicinal plant. C. Fistula are known to be important sources of secondary metabolites, especially phenolic compounds. Pharmacological activities include antibacterial and antifungal, antidiabetic, antifertility, anti-inflammatory antioxidant, hypatoprotective, antitumor, wound healing, and antipyretic activities. . Cassia fistula has been shown to exhibit significant antibacterial properties, encouraging its public use as a general remedy in the treatment of certain diseases.

KEYWORDS:

Cassia fistula ,Medicinal plant,Ayurvedic medicine , Antimicrobial agent, Anti-inflammatory activity.

INTRODUCTION:

People have known about medicinal plants for centuries. Practitioners of traditional medicine have described the therapeutic benefits of various plant species for a variety of diseases. [1,2] The antibiotic properties of medicinal plants have been reported worldwide. The World Health Organization estimates that 80% of the world's population uses plant extracts or their active ingredients as folk remedies in traditional medicine. [1,3] Infectious diseases that cause many diseases can be controlled with medications. Antibiotic resistance creates dangerous situations in treatment. The pharmaceutical industry is producing many new antibiotics; Microbial resistance to this drug increases. In many cases, the disease can and does spread through synthetic drugs used as antibiotics. [1,4]

Cassia fistula, belonging to the family Leguminosae, was selected to expand the spectrum of antibiotics in natural products. In Indian literature, it is explained that the plant is beneficial for skin diseases, liver diseases and cancer, and it is recommended to be used in the treatment of blood vomiting, itching, vitiligo and diabetes. [1,5, 6] It has been determined that the fiber and mucilage part of the plant can be used as medicine in the treatment of hypercholesterolemia [1,7].

Many medicinal plants have been used in the treatment of diseases in daily life around the world for many years. The interest in medicinal plants shows that many laws regarding the value of natural products in medicine are known to be valid. *Cassia* (Leguminosae) is a subspecies of the Indian oriole (also known as Golden Shower) found in many countries in Asia, including South Africa, Mexico, China, the West Indies, East Africa, and Brazil. It is an ornamental tree with beautiful yellow flowers.

This plant is widely used by tribal people to treat various ailments such as ringworm and other fungal diseases of the skin. The Malayalis tribe of India use it to heal the nose. The pulp of the ripe fruit has a small, pleasant laxative effect and is also used as an antifungal. Native Americans use the leaves to treat pain, the flowers as a laxative, and the fruits as anti-inflammatory, antipyretic, abortive, sedative, laxative, and refrigerant. The plant is beneficial for chest complaints, eye problems, colds, heart and liver problems, and rheumatism. It is used to treat hematemesis, itching, dermal cell tumors and diabetes. In addition to its medicinal properties, its extracts are also recommended for pest and disease control. *Cassia fistula* has been shown to exhibit significant antibacterial properties, encouraging its public use as a general remedy in the treatment of certain diseases.

The whole plant is used to treat diarrhea; seeds are used to treat skin diseases; The flowers and fruits are traditionally used to treat skin diseases, fever, abdominal pain and leprosy.

Cassia plant parts are known to be important sources of secondary metabolites, especially phenolic compounds. *Fistucacidin* (3,4,7,8,4'-pentahydroxyflavan) was first extracted from the tree. *Kaempferol* and *proanthocyanidins* were isolated from the acetone extract of the flower. *Bianthraquinone glycosides fistulin* and *kaempferol* and *rhein* were isolated from the ethanolic extract of *Cassia* flowers (Kumar et al., 1966). The flowers were reported to contain phenol and its derivatives, as well as some alkaloids. Traces of triterpenes have been found in both flowers and fruits. The compound *3B-hydroxy-17-norpimar-8(9)-en15-one* was isolated from *Cassia* barks. We screened *Cassia fistula* flower extracts against pathogenic bacteria and fungi to find new sources of antimicrobial activity. In this article, we report the antibacterial and antifungal effects of different solvents and chemical isolates of *Cassia* flowers. [8]

In this study, hydroalcoholic extracts of *Cassia fistula* leaves were tested against pathogenic bacteria and fungi to identify new sources of antimicrobial activity. [1]

PLANT PROFILE:

Table 1: Taxonomic classification of *Cassia fistula*[9,10,11]

Kingdom	Plantae
Subkingdom	Tracheobinota
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Sub class	Rosidae

Order	Fabales
Family	Leguminosae
Subfamily	Caesalpinaceae
Genus	<i>Cassia</i>
Species	<i>Fistula</i>

Table2: Vernacular Names [12,13]

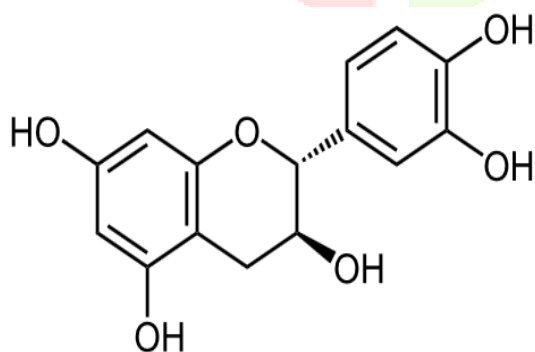
Marathi	Bahava
English	golden shower, Indian laburnum
Hindi Gujarati	Bandarlathi, bharva, suvarna
Malayalam	Tengguli, rajah
Gujarati	Girmala
Sanskrit	saraphala, survanaka, argwadha, rajtaru
Tamil	kavani, konnai, tirukontai, sarakkonne, Raelachettu
Telugu	Kakkemara
Bengali	amultash, sondal, sonali
Punjabi	Amaltaas, Kaniyaar, Girdnalee
Oriya	Sunaari
Urdu	Amaltaas
Arab	Khayarsambhar, chaiyaphruek, khuun
Thai	Canâfistula mansa, chácara, Guayaba cimarrona
Spanish	Bâton casse, casse doux, casse espagnol
Trade name	Indian laburnum

**CASSIA FISTULA**

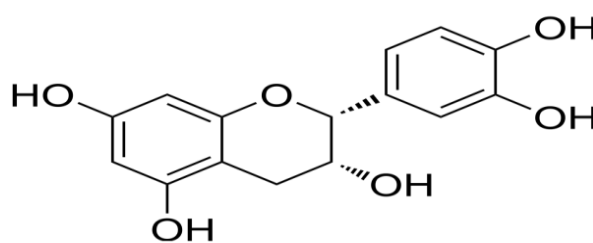
CHEMICAL CONTITUENTS:[14]

Table no.3

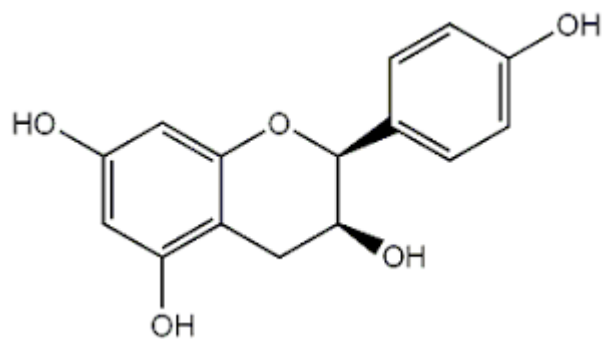
Plant parts	Constituents
Leaves	It contain [-] epiafzelechin , [-] epiafzelechin-3-oglucoside ,[-] epicatechin , procyanidin B2,bioflavonoids , triflavonoids , rhein, rhein glycoside ,sennoside A ,sennoside B , chrysophanol, heptacosanyl-5-hydroxypentadec-2-enoate, octacosan-5, and 8-diol
Bark	It contain lupeol, β -sitosterol, and hexacosanol
Pods	It contain rhein glycoside and ferulic acid, ceryl alcohol, anthraquinone, and tannin
Flowers	It contain kaempferol, leucopelargonidin tetramer, rhein, fistulin, and triterpene
Seeds	It contain glycerides with linoleic, oleic, stearic, and palmitic acids as chief fatty acids and traces of caprylic and myristic acids [18]. others: 5-(2-hydroxy phenoxy methyl)furfural, (2's)-7-hydroxy-5-hydroxymethyl-2-(2'-hydroxypropyl) chromone, benzyl 2-hydroxy-3, 6-dimethoxybenzoate, and benzyl 2 β -o-d-glucopyranosyl-3, 6-dimethoxybenzoate together with other compounds, (2's)-7-hydroxy-2-(2'-hydroxypropyl)-5-methylchromone, and two oxyanthraquinones, chrysophanol, and chrysophaneinhanein
Heartwood	It contain fistucacidin [3,4,7,8,4- pentahydroxyflavan



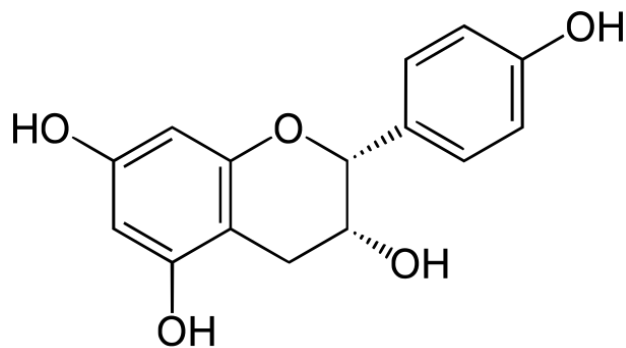
(+) Catechin



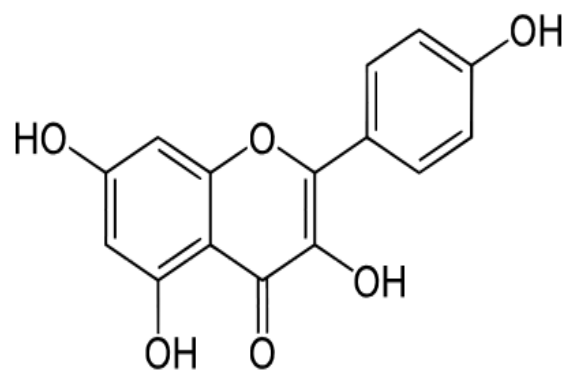
(-) Epicatechin



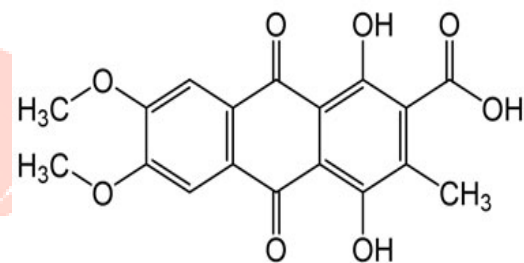
(+) epiafzelechin



(-) epiafzelechin



Kaempferol



Fistulic acid

GEOGRAPHICAL SOURCE:

Deciduous monsoon forests and mixed monsoon forests throughout most of India reach altitudes of up to 1,300 meters in the foothills of the Himalayas. It is found as a common tree in the Deccan and Konkan region in Maharashtra. The plant is grown as an ornamental.[15]

TRADITIONAL USES:

Its roots are used as a tonic, astringent, antipyretic and a powerful laxative. Alcoholic extract of the root can be used to reduce fever. The roots are used to treat chest pain, joint pain, migraines, and bloody diarrhea. Root extract reduces blood sugar levels by 30%. The root is used to treat fever, heart disease, fecal retention, and bile. The aqueous extract of the root bark has anti-inflammatory activity. Its roots are used in the treatment of heart diseases, cholera, rheumatism, bleeding, wounds, ulcers, boils and various skin diseases. Grind cassia leaves into a thick paste and mix with coconut oil. Use this solution on burned skin twice a day. The bark can be used to treat amenorrhea, breast pain and swelling. The bark is a tonic and anti-diarrheal; It is also used in the treatment of skin problems. Powder or decoction of the bark is used to treat leprosy, jaundice, syphilis and heart disease. Leaf extract reduces the mutagenicity of *E. coli*. The leaves have a laxative effect and can be used externally as an emollient; The ointment is used to treat chilblains, insect bites, swelling, rheumatism and facial nerve. The leaves have anti-cyclic and laxative properties; They are used to treat jaundice, hemorrhoids, rheumatic ulcers, and can also be used topically to treat rash, ringworm, and eczema. Mix the leaves and bark with oil and apply to

pustules and insect bites. The juice of its leaves is used to treat skin diseases. The juice of the leaves can be used as a dressing for ringworm, reducing itching and swelling. The pulp around the seeds is a mild laxative. Both the leaves and flowers have a laxative effect, as does the pulp. Add some salt and honey to the burnt ashes of bean pods and take 3 to 4 times to relieve the cough.

The fruit is used as a laxative and to treat snake bites. Flowers and pods are used as a laxative, antipyretic, choleric and astringent. 50% ethanol extract of peanut showed anti-fertility in female albino rats. Apply the heated beans to the area of your neck that is swollen from the cold. It is reported that this fruit is effective in treating asthma. Pulp can be given in the liver. This medication is used as an analgesic and antipyretic; It is used to treat malaria and fever. It can also be used in blood poisoning, anthrax, antidyentery, leprosy and antidiabetic to eliminate swelling. Flower extracts inhibited ovarian function and stimulated uterine function in albino rats. Its fruit is used in the treatment of diabetes, to reduce fever, as a sedative to relieve pain and fever in the body, and to treat chest pain, throat discomfort, pain pressure, eye pain and cognition. The pulp is used to treat constipation, colic, chlorosis and urinary tract diseases. The seeds are emetic, used for constipation and have laxative properties. The seeds are slightly sweet and have laxative, carminative, cooling, appetizing and antipyretic effects. They are used to treat jaundice, excess bile, skin diseases and throat inflammation. Dried seeds have significant hypoglycemic activity. Seed powder is used in the treatment of amebiasis. [13]

PHARMACOLOGICAL ACTIVITIES:

Antioxidant Activity:

Antioxidants are compounds that neutralize free radical attacks and therefore reduce the risk of disease. [16,17] Due to the abundance of antioxidants, the antioxidant properties of natural products have been shown to be therapeutic against many diseases. Medicinal plants contain many important substances such as tocopherols, flavonoids, polyphenols and some essential amino acids. All of these components play a role in healing. Phenols, especially bioflavonoids, are good antioxidants and play an important role as free radical scavengers. [16,18,19,20] *C. fistulae* has long had an important place in disease control because it contains many antioxidants. A recent study evaluated the antioxidant and protective properties of *Clostridium fistula*. Oxidative damage caused by hydrogen peroxide in red blood cells, results *C. The ethanol extract of fistula showed a high antioxidant activity and more than 90% protection against red blood cells, while the aqueous extract of C. fistula showed 75% antioxidant and protection activity. [16,21]*

Another study evaluated the antioxidant activity of fistula bark, stems, leaves and roots, and the results showed that bark extracts of different ages showed higher antioxidant activity. [16,22] Studies were conducted on albino mice to examine the antioxidant activity of aqueous and methanol extracts of *Candida. Fistula*.

The results confirmed that both extracts exhibited significant in vitro antibacterial activity induced by DPPH, nitric oxide and hydroxyl radicals. [16,23] Previous studies have shown that ethyl acetate extract exhibits high antioxidant activity, the order of antioxidants is ethyl acetate extract > methanol extract > n-hexane extract, and the antioxidant lasts for 5 hours, 65.98%, 58.19%. and 32.66%. [16,24] Another important study is to investigate the antioxidant activity of fistula using 90% ethanol extract of leaves and 90% methanol extract of stem skin, pulp and flowers. It shows reducing power, peroxidation inhibition, O₂- and DPPH free radical scavenging ability, and high antioxidant activity. [16,25] Previous studies have examined the antioxidant activity of the n-hexane fraction (NHF), ethyl acetate fraction (EAF) and aqueous fraction (AQF) of *C. fistula* L. peels and examined the results regarding Ethyl Acetate content.

It has been shown to be strong in antioxidant reaction in the determination of EAF, NHF and AQF. [16,26] The antioxidant effect of *C. fistula* (Linn.) flower extract was evaluated, and the results showed that it reduced the activity of antioxidant enzymes including superoxide dismutase, catalase, glutathione peroxidase, glutathion reductase and glutathione decreased to near normal levels. [16,27]

Antioxidant properties of fruit pulp extracts have been examined. The results showed that the fruit pulp hydroalcoholic extract exhibited antioxidant activity by inhibiting DPPH and hydroxyl radicals, total phenolic content and reducing potency activity. [16,28]

Wound Healing Activity:

Many medicinal plants have been found to play a role in wound healing and have also been found to play a role in wound healing. An important finding showed that mice treated with *Clostridium fistulas* showed better wound closure, better wound tissue repair, and improvement in histopathological parameters associated with wound healing. [16,29]

Another study was conducted to examine the wound healing effect of methanol extract ointment in two wound models, including excisional and inclusion wound model mice, and the results confirmed that the two different types of ointment had a significant response in both. cases. pain model test [16,30].

Antifungal and Antibacterial Activity:

Diseases associated with microbial infections are one of the leading causes of morbidity and mortality worldwide, especially in developing countries. Today, antibiotic-based treatments are effective in controlling the disease, but can lead to resistance. Many plants and their products have been shown to play an important role in controlling infectious diseases by destroying cells. However, *Candida fistulas* play an important role in the treatment of infectious diseases, especially since they affect many bacterial species. [16]

Antibacterial and antifungal activity of hydroalcoholic extracts of *Candida fistula* leaves. The *fistulas* were tested against Gram-positive, Gram-negative and fungal species, and the results showed that the bacteria tested had a significant effect on the growth of the bacteria. [16,31] An important study evaluated the antibacterial and antifungal properties of *fistula* extracts against Gram-positive and Gram-negative human pathogenic bacteria and fungi, showing how the crude extract can strengthen the immune system in general. [16,32]

Other studies have evaluated the inhibitory effects of methanol and ethanol extracts of *Clostridium fistula* on Gram-positive and Gram-negative bacteria, and both extracts were effective against three species: Gram-positive bacteria, including *Staphylococcus aureus* and *Staphylococcus. epidermidis* and *Bacillus cereus*, and two Gram-negative bacteria, including *Escherichia coli* and *Klebsiella pneumoniae*. [16,33]

The antibacterial properties of various extracts such as hexane, chloroform, ethyl acetate, methanol, and water were evaluated, and the results showed that all extracts killed bacteria and exhibited antibacterial activity against Gram-positive bacteria. In gram positive bacteria. - Bacteria are harmless, sensitive only to *Pseudomonas aeruginosa* extract. [16,8] Other studies have found plant protease inhibitors such as *staphylococcus aureus* to be very effective against *Staphylococcus aureus*, *Escherichia coli*, *Bacillus subtilis*, and *Bacillus subtilis*. According to pneumonia [16,34], methanol extract of *fistula* seeds is effective against the tested bacteria, and the minimum inhibitory concentration value is in the range of 1.563~50.00 mg/ml [16,35]. Basic studies have shown that the isoflavone bioconine A compound has a 50% efficacy (EC 50) value of 18.96 µg/mL against *Leishmania Chagasian* promastigotes and is also effective against T. The EC 50 value is 18.32. µg/mL and 2.4 times higher than benzimidazole. [16,36]

Antitumor Activity:

Medicinal plants have a long history in treating cancer through traditional medicine such as Unani, Ayurveda and Traditional Chinese Medicine. Many plants and their products, such as dates, nuts and black cumin, have been shown to prevent cancer by increasing the amount of fat. There are many effective cancer treatment products derived from natural sources. [16,37]

An important study was performed to check the effects of the methanolic extract of *C. fistula* seed on the growth of Ehrlich ascites carcinoma and on the life span of tumor-bearing mice, and the results revealed that the extract increased life span and decreased tumor volume and viable tumor cell count. [16,38] A study was performed on the human colon adenocarcinoma cell line COLO 320 D to evaluate the anticancer activity of rhein, and results revealed that rhein showed 40.59%, 58.26%, 65.40%, 77.92%, and 80.25% cytotoxicity at 200 µg/mL concentration for 6, 12, 24, 48, and 72 h incubation time. [16,39]

A study evaluating the antibacterial activity of various fruit extracts against human lung cancer (SiHa) and breast cancer (MCF-7) cells and cell lines showed that the activities of genes and the nervous system were regulated. [16,40] Additionally, rhein also inhibits the growth of cancer cells, including human breast cancer (SiHa), breast cancer (MCF-7), and hepatocellular carcinoma (HepG2) at low doses. [16,41]

Antifertility Activity:

The role of medicinal plants and their products in reproduction and the regulation of reproductive hormones has been reported. An important study based on animal models showed that oral administration of fistula seed extract (i.e., aqueous extract) at doses of 100 and 200 mg/kg body weight to female rats was effective in pregnancy weeks 1–5. showed that it was 500 mg/kg live weight for days. Contraception was 57.14% and 71.43%, respectively, and 100% contraception was also found [16,42].

Anti-leishmaniac activity:

This study compared the effect of cassia seed in the treatment of leishmaniasis with the effect of cassia seed concentrate, boiled and hydroalcoholic extracts in the treatment of leishmaniasis with intralesional injection of Glucantime [meglumine antimonate]. 63.6% of patients were treated with concentrated boiled extract, 52.7% with hydroalcoholic extract, and 45.5% with glucose. A total of 22 patients (40%) received the concentrated boiled extract of *C. fistulae*, while 20 patients (36.4%) received the hydroalcoholic extract of *C. fistulae*. In the Glucantime group, fistulas healed completely in 36 patients (65.5%). [13]

Anti-inflammatory Activity:

Inflammation is a physiological process in which tissue is damaged or infected, many other factors are also involved in this process, causing many pathological changes. Safe and natural treatments are needed to control the inflammatory process by altering pro-inflammatory cytokines and other factors associated with chronic pain. Flavonoids are substances found in many medicinal plants, including fistulas, and they play an important role in preventing diseases due to the abundance of antioxidants. Flavonoids have been recognized to play a role in inhibiting various enzymes activated during inflammation. [16,43]

The main findings show that *C. fistula* Linn. bark extracts were found to possess significant anti-inflammatory effects in both acute and chronic models. [16,44] The water extract of dried fruits of *Solanum xanthocarpum* Schrad and Wendl and dried pulp of *C. fistula* Linn was prepared, and anti-inflammatory activity was measured. Results revealed that among the different dose combinations of both extracts, the 1:1 combination at the 500 mg/kg dose showed a maximum percentage inhibition of 75%, which was comparable with the positive control, diclofenac sodium, which showed 81% inhibition. [16,45]

Another study was performed to test the anti-inflammatory effects of *C. fistula* as compared with phenylbutazone using carrageenin, histamine, and dextran-induced paw edema in rats, and anti-inflammatory activity against all phlogistic agents was noticed. [16,46] A study was made to evaluate the anti-inflammatory effect of *C. fistula* with different doses of ethanolic extract of leaf (ELE), and results showed that ELE significantly inhibited both the carrageenan-induced hind paw edema and cotton-pellet granuloma in a dose-dependent manner. [16,47] Another study was carried out to evaluate the anti-inflammatory activity of aqueous and alcoholic extracts of *C. Fistula* skin in subacute inflammation pattern. The results confirmed that the extract showed significant effects in the air sac granuloma and cotton ball granuloma models. [16,48]

Antileukotriene Activity:

Cassia fistula Linn also exhibits anti-allergic activities by inhibiting the production and secretion of leukotrienes. The mechanism behind this anti-allergy activity was oxidation reduction reactions causing the inactivation of 5-lipoxygenase, which ultimately leads to inhibition of leukotriene production.[49]

Cough-Suppressant Activity:

Cassia fistula Linn leaves were tested for antitussive activity by developing an induced cough model in mice. Findings showed that methanolic extracts of leaves manifested excellent activity, and the results were equivalent to those of other commercially available cough suppressant drugs.[49]

Antipyretic Activity:

Cassia fistula and its constituents show a role as anti-pyretics, and earlier findings supported the anti-pyretic effect of *C. fistula* based on the animal model. An important study was performed on experimental rats to examine the anti-pyretic activities of the ethanolic extract of *C. fistula*, and results showed that extracts at 250 and 500 mg/kg b.wt. reduced TAB vaccine-induced pyrexia after 60 min, whereas extracts at 750 mg/kg b.wt. reduced the vaccine-induced elevated body temperature after 30 min of its administration. [16,47]

Another study was aimed at evaluating the antipyretic activity of the pod of *C. fistula* Linn, and results confirmed that the methanolic extract showed antipyretic activity that was significantly higher than that of control rats. [16,50]

Laxative and Purgative Activity:

Laxative and purgative effects of *Cassia fistula* Linn were evaluated on guinea pig intestines. It was reported that *Cassia fistula* Linn pods infusion show excellent purgative action and can be comparable with Senna leaves. The toxicity profile of *Cassia fistula* pods was also analyzed, and findings showed that it does not possess any toxic effects even at a high dose of 6600 mg/kg.[49]

Hepatoprotective Effect:

Many drugs, such as high doses of paracetamol, antibiotics and antibiotics, excessive alcohol consumption, diseases and poisons cause changes in liver cells, mainly through lipid peroxidation. From this perspective, it seems that natural products play an important role in controlling the liver by excreting toxins or excreting toxins from the urine. He conducted a study based on the aqueous extract of *Campylobacter fistula* and the results showed that total bilirubin, alkaline phosphatase, serum glutamate oxaloacetate aminotransferase (SGOT), serum glutamate pyruvate aminotransferase (SGPT), aspartate aminotransferase and alanine as well as aspartate aminotransferase increased during the day. protein levels. The treatment group showed mild hepatocellular damage compared with the CCl₄-treated group. [16,51] Other studies have shown that pretreatment with *Curvularia fistula* ethanol leaf extract (500 mg/kg body weight/day for 7 days) followed by CCl₄ treatment can reverse lipid peroxidation as well as peroxidation Hydrogenase and glutathione reductase activities. The texture is normal. [16,52] The hepatoprotective activity of n-heptane obtained from *C. fistula* leaf extract was evaluated. The results confirmed that *C. fistula* leaf extract showed significant hepatoprotective activity at a dose of 400 mg/kg, which is equivalent to the commercial product.

Hepatoprotective agent. [16,53]An important study evaluated the hepatoprotective activity of n-heptane extract against acetaminophen-induced hepatotoxicity and showed that the extract at a dose of 400 mg/kg body weight was found to be beneficial by reducing blood levels. transaminases. (SGOT and SGPT), bilirubin and alkaline phosphatase. [16,54] Treatment with aqueous extracts of *C. fistula* leaves and bark reduced CCl₄-induced increases in serum enzyme and bilirubin concentrations in rats. [16,55] Other studies evaluating the hepatoprotective effects of methanol extract of *Clostridium fistula* showed that treatment with methanol extract (200 mg/kg and 400 mg/kg) resulted in biochemical changes. The near-normalization of markers is dose dependent [16,55, 56]. One study also reported hepatoprotective effects of *C. fistulae*. [16,57]

Anti-diabetic Activity:

Diabetes is a metabolic disease and a global health problem. Allopathic based medicine is used to treat diabetes and its complications, but this medicine has negative side effects. Most plants contain many substances such as glycosides, alkaloids, terpenoids, flavonoids and carotenoids, which are often associated with the activity of diabetes [16,58] and have played a role in the treatment of diabetes since ancient times. The main mechanism of action of medicinal plants in the treatment of diabetes is not fully understood, but medicinal plants are believed to play a role in increasing insulin-stimulated glucose uptake. One study showed that hexane extracts of *C. Fistula* peel at 0.15 x 0.30 x 0.45 g/kg body weight prevented blood sugar increases in diabetic rats for 30 days. [16,59] In STZ nicotinamide-induced DM rats, methanol extract of bark and leaves at a dose of 500 mg/kg showed stronger anti-hyperglycemic and antilipidemic effects than the dose of 250 mg/kg.[16 ,60] Other studies have concluded that evaluation of the anti-diabetic content of the extracts and the majority found a positive effect in reducing blood diabetes and other diabetes-related problems. [16,61]

Further studies were conducted on the synthesis of gold nanoparticles to prepare aqueous extracts and evaluate their hypoglycemic effect, and the results confirmed that fistula gold nanoparticles have good properties to prevent diabetes. [16,62] Tamarind (*Tamarindus indica*) and Tamarind (*C. The anti-hyperglycemic effect of fistula was evaluated in alloxan type diabetic rats and a decrease in blood sugar levels was observed in diabetic rats. [16,63] Oral administration of catechins (20 mg/kg body weight) for 60 days resulted in better glucose control in streptozotocin-induced diabetes in male albino Wistar rats. [16,64]*

Immunomodulatory Effect:

A study has investigated the immunomodulatory effect of *C. fistula* in rats, and the study stated that *C. fistula* shows a significant stimulation of the cell-mediated immunity and no effects on the humoral immunity. [16,65]

Larvicidal and Ovicidal Activity:

Mosquitoes are responsible for malaria, filariasis, encephalitis, yellow fever and other diseases. Preparations such as mosquito repellents and insecticides can affect human health and increase the number of mosquitoes. Many plants or their products act as insecticides and can kill or inhibit the growth of mosquitoes. They are also safe and affordable. Early studies reported the activity of different herbs and oils against mosquitoes [16, 66, 67, 68], while lemon geranium, citric acid shampoo root, and peppermint have larvicidal and growth-inhibitory effects against *Anopheles stephensi*. [16,69,70,71].

A study was conducted to test the larvicidal and ovicidal activity of methanolic leaf extract of *quinquefasciatus* against *Culex quinquefasciatus* and *Anopheles stephensi* and the results showed that the leaves etc. The extract is promising. For larvicidal and ovicidal activity. Larvicide and ovicide against *C. quinquefasciatus* and *A. stephensi*. [16,72]

Another study evaluated the larvicidal activity of different solvents of flower extracts against *Culex tritaenorrhynchus*, *Aedes albopictus*, and *Anopheles* subtypes and concluded that the use of raw flowers could control *Culex* mosquitoes. Larvae of *Aedes tritaenorrhynchus*, *Aedes albopictus* and *Aedes subpictus*. [16,73] The activity of methanol extract of leaves against *Anopheles* mosquitoes was evaluated, and the results confirmed that the leaf extract showed effective mosquito killing property against *Anopheles stephensi*. [16,74]

MARKETED PRODUCT:

<p>Cassia fistula cream</p>	
<p>cassia fistula pulp powder</p>	
<p>Golden shower tree body wash</p>	
<p>Cassia fistula extract capsule</p>	

CONCLUSION:

Extensive literature research shows that Cassia fistula is an important medicine and herb with many medicinal, herbal and medicinal spectrums. Apparently this herb is widely used in traditional medicine in India and is reported to be hepatoprotective, anti-inflammatory, antitussive, antifungal, antidiabetic and is also used for wound healing and bacterial infection pain.

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