Mysterious Traditional uses of Plant: GOLDEN SHOWER

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Abstract- **Medicinal plant species are important sources of biomedicine because they are rich in untouched chemical resources with significant therapeutic potential. Ayurveda and Chinese traditional medicine are most popular traditional medical systems that use Cassia fistula L as a significant medicinal herb. The tree, which is popularly known as "Yellow Shower," is a medium-sized deciduous tree with elongated, rod-shaped fruits that are filled with pulp and vibrant yellow blooms. Its botanical description and pharmacological characteristics, which include antibacterial, anti-inflammatory, antidiabetic, anticancer, and hepatoprotective effects, have been revised and presented in this study. Reviews of pharmacological properties of medicinal plants will provide useful information; hence, Cassia fistula L may yield significant bioactive natural product discoveries that may assist in the development of novel medications.**

Key words: **Cassia Fistula, Pharmacological activity, Traditional uses, Bioactive compounds, antibacterial study.**

INTRODUCTION

Antibiotics are most important weapons in fighting bacterial infections and benefited on large scale for the quality of human life since their introduction. However, from the past few decades, these health benefits are under risk as many commonly used antibiotics have become now less and less effective against certain dieses not, only because of adverse reactions, but also due to emergence of drug-resistant bacteria. It is essential to investigate newer drugs with new pharmacological active moiety having antibacterial activity. Drugs obtained from natural sources play a important role in the prevention and treatment of human diseases. In many developing countries like India , China , traditional medicine is one of the primary healthcare systems.[1,2] Herbs are widely exploited in the traditional medicine and their curative potentials are well documented.[3] About 61% of new drugs developed between 1981 and 2002 were based on natural products and they have been very successful, especially in the areas of infectious disease and cancer.[4] Recent trends, however, show that the discovery rate of active novel chemical entities is reducing.[5] Natural products of higher plants may give a new source of pharmacologically active moiety with possibly novel mechanisms of action.[6,7] The effects of plant extracts on bacteria have been studied by a very large number of researchers in different parts of the world.[8] Much work has been done on ethnomedicinal plants in India.[9]

Plants are rich in a wide variety of phytoconstituents such as tannins, terpenoids, alkaloids, flavonoids, glycosides, etc., which have been found in vitro to have antimicrobial properties [10,11] Herbal medicines have been known to man from ancient times. Therapeutic efficacy of many traditional plants for several disorders has been described by practitioners of ayurvedic medicine.[12] Antimicrobial properties of medicinal plants are being progressively reported from wide areas of the world. The World Health Organization estimates that plant extracts are used as folk medicine in traditional therapies of 80% of the world's population.[13] The harmful microorganisms can be controlled with ethnomedicine's and these results in the emergence of multiple drug-resistant bacteria and it has created alarming clinical situations in the treatment of infections. The pharmacological industries have produced a number of new antibiotics; resistance to these drugs by microorganisms has been progressively increased. In general, bacteria have the ability of horizontal gene transfer to transmit that acquire resistance to synthetic drugs which are utilized as therapeutic agents.[14]

In an effort to find out the spectrum of antibacterial agents from phytochemical agents, Cassia fistula belonging to Leguminosae family has been selected. In the Indian traditional medicines, this plant has been described to be useful against skin diseases, Hepatic disorders, its use into the treatment of hematemesis, pruritus, leukoderma, and diabetes has been suggested. [15,16] Besides its pharmacological uses, the plant extract is also recommended as a pest and disease control agents in India. [18-20] This plant is widely used by tribal people to treat various ailments including ringworm and other fungal skin infections.[21] The leaves are laxative, antiperiodic, depurative, anti-inflammatory, and are useful in skin diseases, boils, carbuncles, ulcers, intermittent fever, gouty arthritis, and rheumatalgia. Indian people are using the leaves to treat inflammation; Cassia fistula plant organs are known to be an important source of secondary metabolites, notably phenolic compounds.[22]

MORPHOLOGY:

This deciduous tree has complex leaves that are individually 5–12 cm long pairs, and greenish-grey bark. A semi-wild tree that bears lovely clusters of yellow blooms and is utilized for a number of purposes in traditional medicine. A fruit is a cylindrical pod with many seeds in a sweet, black flesh divided into sections that cross each other. After the blooms shed, the long, green pods turn black as they ripen. The pulp has a distinct smell, is sticky, sweet, and mucilaginous, and has a dark brown color. It also has a slightly disagreeable smell. The drug is found in thick, flat or curved pieces with an outside surface that can be smooth or rough with warty patches, green, grey, or red, an inner surface that is rough and reddish with parallel striations, a laminate structure, a distinct, sweet smell, and an astringent taste.

a tree with a straight trunk, smooth bark that ages to a dark brown color, and slender, spreading branches that reaches a height of 6 to 9 meters.

The leaves are 23–40 cm long with a glabrous primary rachis; the stipules are tiny, linear oblong, obtuse, and hairy. Leaflets are ovate or oval, oblong, acute, and measure 5 to 12.5 by 3.8 to 9.5 cm. There are four to eight pairs of leaflets. The midrib has a cuneate base and is heavily pubescent on the underside. The petioles are either pubescent or glabrous, and the major nerves are numerous, near, and visible on the underside. Lax racemes of flowers, 30 to 50 cm long; thin, hairy, glabrous pedicels, 3.8 to 5.7 cm long. oblique and rectangular segments; calyx: 1 cm long, hairy, divided at the base. Corolla in yellow with a diameter of 3.8 cm, every stamen is antheriferous.

The pods are smooth, glossy, virtually straight, pendulous, cylindric, brown-black, and indehiscent. They have 40–100 horizontal seeds buried in a reasonably palatable, dark-colored pulp. Mostly oval seeds, measuring 5 mm in thickness, 8 mm in length, and little less than half that width. Smooth and delicately striated transversely, the striations resembling tiny cracks in the fruit pods. They measure 20–27 mm in diameter and 40–70 cm in length. A little point on the rounded distal ends indicates the placement of the style. The dorsal suture is one continuous vascular strand, whereas the ventral suture is two closely spaced strands.

Thin, buff colored transverse dissepiments spaced around 0.5 cm apart split the pod internally. There is one flat, round reddish-brown seed with a distinct raphe in each compartment.



TAXONOMIC CLASSIFICATION:

Kingdom - Plantae	Vernacular names
Subkingdom – Tracheobinota	Marathi - Bahava Guajarati - Garmala
Super Division - Spermatophyta	Hindi - Sonhali, Amultus
Division - Mangoliophyta	Kannad - Kakkemara
Class – Magnoliopsida	Tamil - Shrakkonnai, Konai, Irjviruttam
Sub Class - Rosidae	Telegu - Kondrakayi, Raelachettu,
Order - Fabales	Sanskrit - Nripadruma
Family - Fabacae	Arab - Khayarsambhar
Genus - Cassia	Punjabi - Amaltaas, Kaniyaar, Girdnalee
Species - fistula	Urdu – Amaltaas
Vernacular Names: Bengali - Bundaralati, Sonalu, Soondali, Sondal	English - Golden Shower

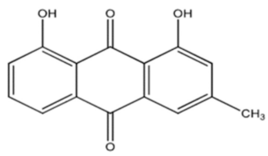
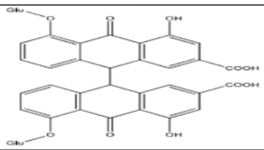
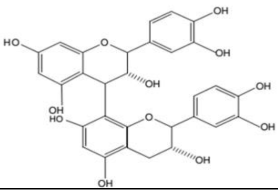
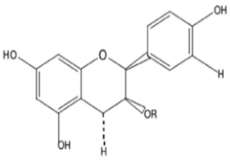
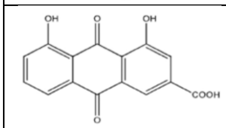
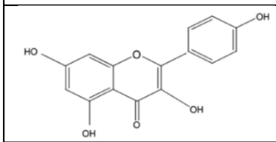
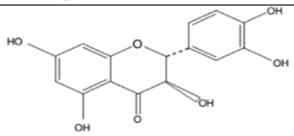
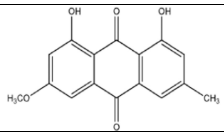
Table no.1

Phytochemical Studies:

The plant is rich in phenolic antioxidants such as anthraquinones, flavonoids and flavan- 3-ol derivatives. Cassia fistula the results shows positive for alkaloids, terpenoids, reducing sugars, saponins, tannins, carbonyl, phlobatanin, and steroids. Cassia fistula's laxative actions come from a group of well documented compounds called anthraquinone. The seeds contain approximately 2% anthraquinones, 24% crude protein, 4.5% crude fat, 6.5% crude fiber, and 50% carbohydrates. The stem bark contains two flavanol glycosides and a xanthone glycosides. The leaves have been documented with 15.88% crude protein, 6.65% crude fat, 20% crude fiber, and 39.86% carbohydrates. In addition, the plant also contains fistulic acid, rhein, rheinglucoside, galactomannan, sennosides A and B, tannin, phlobaphenes, oxyanthraquinone substances, emodin, chrysophanic acid, fistuacacidin, barbaloin, lupeol, beta-sitosterol, and hexacosanol [24].

Structures of active constituents

These are structures of active constituents of the cassia fistula plant extract.Structures of some of the phytoconstituents reported from Cassia fistula Different anthraquinones have been isolated from numerous sections of C. fistula in addition to their characterization. Various research has validated that anthraquinone glycosides like rhein, chrysophanol and physcion are present in larger quantities in mature leaves but are present in small quantities in matured pods. Consequently, for therapeutic purposes, it is prudent to extract anthraquinone glycosides from young maturing green pods instead of extracting from fully-grown pods as well as from fully-grown leaves rather than from young developing leaves [22] (Table 1).

	Chrysophanol.
	Sennosides A.
	Procyanidin B2
	Epiafzelechin.
	Rhein.
	Kaempferol.
	Catechin
	Physcion.

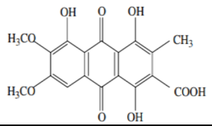
	Fistulic Acid

Table no:2

TRADITIONAL USES

The root is prescribed as a tonic, astringent, febrifuge and strong purgative. The leaves extract reduced mutagenicity in E. coli. Extract of the root bark with alcohol can be used for back wart fever. The leaves are laxative and used externally as emollient, a poultice is used for chilblains, in insect bites, swelling, rheumatism and facial paralysis. Leaves possess anti periodic and laxative properties, the leaves are used in jaundice, piles, rheumatism ulcers and also externally skin eruptions, ring worms, eczema. The leaves and bark mixed with oil are applied to pustules, insect bites. The roots are used in chest pain, joint pain, migraine and blood dysentery. The extract of the root lowered the blood sugar level up to 30 %. Leaves and flowers are both purgative like the pulp. Ashes from burnt pods mixed with little salt are used with honey taking 3- 4 times to relieve cough. Root is useful in fever, heart diseases, retained excretions and biliousness. Fruits are used as cathartic and in snake bite. Juice of leaves is used in skin diseases. Flowers and pods are used as purgative, febrifugal, biliousness and astringent. The ethanolic 50% extract of pods show antifertility activity in female albino rats. The heated pods are applied to swellings on the neck due to cold. The fruits are reported to be used for asthma. Pulp is given in disorders of liver. The drug is used as analgesic as an antipyretic, it is a remedy for malaria and fever. It is also applied in blood poisoning, anthrax and anti-dysenteric leprosy and antidiabetic, for the removal of abdominal obstruction.

The extract of the flower inhibits the ovarian function and stimulate the uterine function in albino rats. Fruits are used in the treatment of diabetes, antipyretic, abortifacient, demulcent, lessens inflammation and heat of the body; useful in chest complaints, throat troubles, liver complaints, diseases of eye and gripping. Juice of leaves is useful as dressing for ringworm, relieving irritation and relief of dropsical swelling. The pulp of the fruit around the seeds is a mild purgative. It is also used in biliousness and in diabetes. Externally, it is useful for evacuation in flatulent colic, as dressing for gouty or rheumatic joints. The pith is particularly useful if there is swelling in stomach, liver or intestine. The seeds are emetic, used in constipation and have cathartic properties.

The seeds are slightly sweet and possess laxative, carminative, cooling, improves the appetite, and antipyretic activity. They are useful in jaundice, biliousness, skin disease and in swollen throat. A seed dried produce marked hypoglycemic activity. Seed powder is used in amoebiasis. The fruit pulp is used for constipation, colic, chlorosis and urinary disorders. The bark possesses tonic and antidysentery properties, it is also used for skin complaints, the powder or decoction of the bark is administered in leprosy, jaundice, syphilis and heart diseases. The aqueous extract of the root bark exhibits anti-inflammatory activity. The root is used in cardiac disorders biliousness, rheumatic condition, haemorrhages, wounds, ulcers and boils and various skin diseases. The stem bark is used against amenorrhoea, chest pain and swellings [23].

PHARMACOLOGICAL STUDIES:

1. Antidiabetic Activity: The antidiabetic potential of the total alcoholic extract & its ethyl acetate fraction of the bark of Cassia fistula was studied in alloxan induced diabetic rats. The ethyl acetate fraction exhibited significant reduction in blood glucose levels than alcoholic extract. The activity was found comparable with standard drug glibenclamide. The mechanism of hypoglycemic and antidiabetic action of hydroalcoholic extract of Cassia fistula Linn in rats was reported. The ethanolic extract of Cassia fistula Linn Stem bark were investigated for their antihyperglycemic activity. Aqueous extract of Cassia fistula (Linn.) flowers (ACF) was screened for its antioxidant effect in alloxan induced diabetic rats. The seeds of Cassia fistula were investigated for their hypoglycemic activity. They were found to have marked hypoglycemic activity on normal albino rats but not on alloxan produced diabetic albino rats. [24]

2. Hypolipidemic Activity: The effect of 50% ethanolic extract of Cassia fistula Linn. Legume was assessed on serum lipid metabolism in cholesterol fed rats. The effect of 50% ethanolic extract of Cassia fistula legume was assessed on serum lipid metabolism in cholesterol fed rats.

3. Hepatoprotective Activity: Protective effects of cassia seed ethanol extract against carbon tetrachloride-induced liver injury in mice.

Protective effect of Cassia fistula Linn on diethylnitrosamine induced hepatocellular damage and oxidative stress in ethanol pretreated rats. Protective effect of Cassia fistula fruit extract against bromobenzene induced liver injury in mice was reported.

4. Protective effect of Cassia fistula fruit extract on bromobenzene-induced nephrotoxicity in mice was also studied.

5. Antioxidant Activity: Antioxidant activities of the aqueous (CFA) and methanolic extracts (CFM) of the Cassia fistula. Both extracts exhibited significant antioxidant activity in DPPH, Nitric oxide and Hydroxyl radical induced invitro assay methods. Both extracts showed Dose-Dependent protective effect against lipid peroxidation and free radical generation in liver and kidney homogenates. Antioxidant activity of Cassia fistula Linn) flowers in alloxan induced diabetic rats. Fruit pulp powder of Cassia fistula was investigated for its antioxidant activity both in vitro and in vivo.

6. Antipyretic Activity: The methanol extract of buds of C. fistula for its antipyretic action on normal body temperature and yeast-induced pyrexia (fever) in rats. The results obtained are comparable to those for paracetamol, a standard antipyretic agent.

7**. Anti-inflammatory Activity:** The anti-inflammatory property of aqueous extract of leaves and fruits of Cassia fistula was reported.

8. Antitussive activity: The methanol extract of Cassia fistula was investigated for its effect on a cough model induced by Sulphur dioxide gas in mice. It exhibited significant antitussive activity when compared with control in a dose dependent manner.

9. Antileishmanial activity: Hexane extract from the fruits showed significant antileishmanial activity against the promastigote form of Leishmania L. chagasi.

10. CNS activity: The methanol extract of the seed Cassia fistula was tested for different pharmacological actions in mice. A depressant action of ME was also evident from the behavioral studies on mice. These results contribute with novel antiprotozoal compounds for future drug design studies.

11. Antimicrobial Activity: Antifungal activity of leaf extract of Cassia fistula was reported Invitro Antibacterial Activity observed in Leaf and Root Extract of Cassia fistula.

Antibacterial and Antifungal activity from extract Cassia fistula, antibacterial activity of Cassia fistula was recorded and reported.

12. Antitumor activity: Effects of methanolic extract (ME) of Cassia fistula seed on the growth of Ehrlich ascites carcinoma (EAC) and on the life span of tumor bearing mice were studied. ME treatment showed an increase of life span, and a decrease in the tumor volume and viable tumor cell count in the EAC tumor hosts.

13. Larvicidal and ovicidal activity: The methanolic leaf extract of Cassia fistula was tested for larvicidal and ovicidal activity against Culex quinque fasciatus and Anopheles stephensi. The results show that the leaf extract of C. fistula is promising as a larvicidal and ovicidal agent against C. Quique fasciatus and A. stephensi.

14. Antiparasitic Activity: The fractionation through bio guided antileishmanial activity of the dichloromethane extract of Cassia fistula fruits (Leguminosae) led to the isolation of the active isoflavone biochanin A, identified by spectroscopic method.

15. Anti-itching activity: Vicharchika (eczema) is a chronic skin disease with no permanent cure in modern medicine. Raising serum IgE level is the commonest immunological marker for eczema. This study suggests of significant efficacy of Aragvadha on the patients of Vicharchika (eczema).

16. Antiulcer activity: The ethanol leaf extract of Cassia fistula Linn was evaluated for antiulcer activity against pylorus ligation- induced gastric ulcer.

17. Wound healing activity: The methanolic extract of C. fistula leaves was examined for its wound healing property in the form of an ointment in two types of wound models in rats; result showed wound contraction ability, epithelization period, tensile strength and regeneration of tissue at wound area. Formulated ointment was topically applied on the infected wound. Wound reduction rate, histological analysis, biochemical analysis, and gelatin zymography were obtained to assess the healing pattern. C. fistula treated rats showed, better wound closure, improved tissue regeneration at the wound site, and supporting histopathological parameters pertaining to wound healing.[24]

EXPERIMENTAL WORK

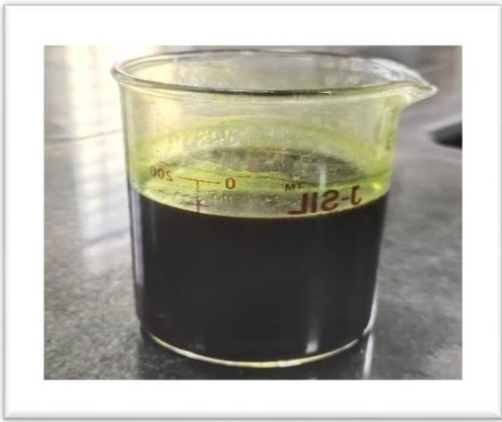
Preparation of Extract

Plant parts of Cassia fistula were collected from local medicinal garden areas of Kolhapur. The leaves of Cassia fistula were chopped into small pieces, dried, milled and powdered by using pestle and mortar. The ethanol extracts were prepared by using 50g of dried powder of C. fistula leaves in 250 ml of solvent separately. Each solvent extract was fractionated to get different serial fractions in different solvent. The extract was dried; residue was weighed and dissolved in known quantity of fresh solvent. In the preparation of aqueous extract, 50 mg the powdered material was dissolved in 250 ml of distilled water and kept for solubilization overnight at room temperature. For quantization plant extracts were evaporated and re- dissolved in known volume of each solvent separately.

Extraction process

With distilled water – Take C. Fistula leaves and dry it. After drying it grind with mechanical grinder and make into fine powder. Then take 10 gm. of prepare C.Fistula powder and 100 ml of distilled water into the round bottom flask. Then round bottom flask connects with condenser and start to produce heat. This process conducts minimum 4 to 5 hr. Finally, extract is filtered with the help of filter paper. Finally Distilled water extract is ready.

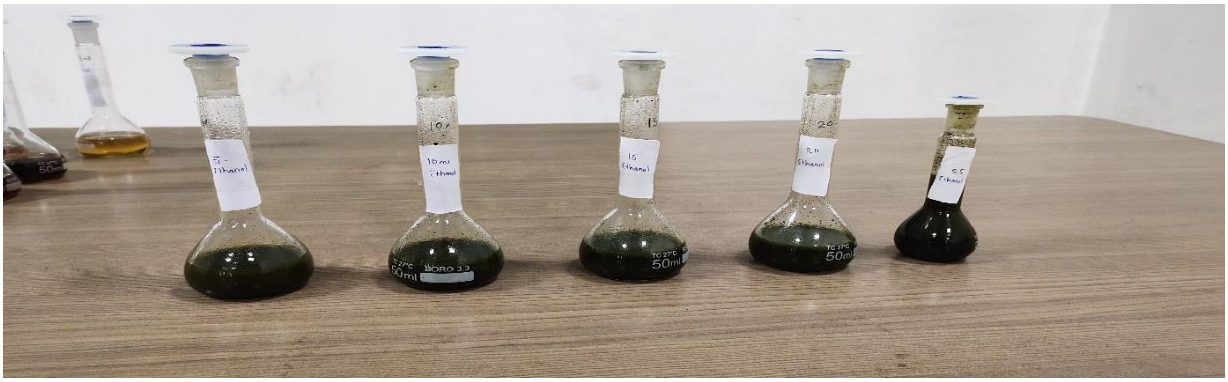
With ethanol – C. fistula powder are soluble in ethanol. This extraction process conduct with use of Soxhlet apparatus. Take 10 gm. of prepared C.Fistula powder in to the filter paper and this filter paper are placed into the Soxhlet apparatus and start the heat produce. This process conduct 4 to 5 hr. Finally gives the proper ethanolic extract.
(Fig:1) Ethanol extract



DILUTIONS
For Standard Solution Ciprofloxacin tablet was dissolved in 75 ml of distilled water. Take individually 5,10,15,20 and 25 ml standard solution and make up volume in 25 ml volumetric flask.

(Fig:2) standard solution's (Ciprofloxacin)

For Ethanolic Extraction solutions in that also same procedure of standard solution.also volume make up in volumetric flask.



(Fig:3) Ethanolic solutions

For distilled water extraction in that also procedure refer to standard solution.

(Fig:4) Distilled water solutions

Antibacterial Assay:
The antibacterial potential of the extracts was first assessed with the help of agar streak plate method. The extracts which were found to inhibit bacteria were further subjected to micro dilution method to find the minimum inhibitory concentration. The solutions of minimum inhibitory concentration were further subjected to agar cup plate assay to determine the potency of the extracts.

Prepare culture media using a Petri dish:
Materials Needed:
Ingredients for the media: Agar, peptone, beef extract, yeast extract, etc.
Equipment: Petri dishes, a source of heat (like a Bunsen burner or microwave), an autoclave or pressure cooker for sterilization, and sterile pipettes or spreaders.

PROCEDURE:
Prepare the Culture Medium:
Mix the ingredients (like agar, peptone, beef extract) with water following the specific recipe for the desired medium.
Heat and dissolve the mixture until it's uniform. If using agar, ensure complete dissolution by boiling.

Sterilize the Culture Medium:
Autoclave the medium in its container to kill any existing microorganisms. The autoclaving conditions are typically 121°C at 15 psi for about 15-20 minutes.
Allow the medium to cool to a temperature where it's still liquid but won't solidify immediately.

Prepare Petri Dishes:
Sterilize the Petri dishes in an autoclave or by using a microwave, heating them for a short period to eliminate any microorganisms.

Pouring the Culture Medium:
In a sterile environment (like a laminar flow hood), pour the sterilized, cooled culture medium into the Petri dishes.
Swirl or tilt the dishes gently to ensure an even distribution of the medium and cover the bottom evenly.

Allow the Medium to Solidify:
Let the poured medium solidify by leaving the Petri dishes undisturbed in a sterile area, typically in a vertical position to prevent uneven spreading.

Inoculate the Petri Dishes:
Once the medium solidifies, use sterile techniques (flame-sterilized tools or sterile pipettes) to inoculate the surface with the desired microorganisms.
Apply the microorganisms evenly across the surface or streak in patterns suitable for observation and analysis.

INCUBATION:
Incubate the inoculated Petri dishes at the appropriate temperature and conditions required for the growth of the specific microorganisms being studied.

Fig: Prepare microbe's petri dish

Antibacterial activity of standard drugs against bacterial test organism
Various strains of micro-organisms were used for antimicrobial study of the plant extract. There are some microbial strains shows good resistance to the extract and some of the microbes does not show any zone of inhibition.
The antibacterial activity study of the Nayan R. Bhalodia, V. J. Shukla used two Gram-positive—Staphylococcus aureus, Streptococcus pyogenes; two Gram-negative—Escherichia coli, Pseudomonas aeruginosa human pathogenic bacteria; From this study they concluded that the both the strains of micro-organisms were susceptible to C. Fistula plant extract at con. (5, 25, 50, 100, 250 µg /ml) range. The results showed that the remarkable inhibition of the bacterial growth was shown against the tested organisms. The phytochemical analyses of the plants were carried out.
One another antibacterial study reported by the Seyyed Mansour Seyyednejad: The microbial inhibitory effect of methanolic and ethanolic extracts of C. fistula was tested on 3 Gram positive: Bacillus cereus, Staphylococcus aureus and S. epidermidis and 5 Gram negative: Salmonella Typhi, Klebsiella pneumoniae, Escherichia coli, Pseudomonas aeruginosa, and Proteus mirabilis bacterial species using disc diffusion method at various concentrations. The minimum inhibitory and bactericidal concentrations (MIC and MBC) were measured by the tube dilution assay. From these study they reported that Both extracts showed significant activity against five of the tested strains. Interestingly, among sensitive strains, the Gram-negative bacteria were more sensitive than Gram positive ones. From this finding it can be concluded that the possible target site of these extracts is the structures except the cell wall. It may be affecting the outer membrane of Gram-negative bacteria or protein synthesis mechanisms.
The antimicrobial activity depends on the contents of phenolic components of the plant extracts. High amounts of phenolic group in the aerial parts of C. fistula implied that these components may be the active compounds, which may

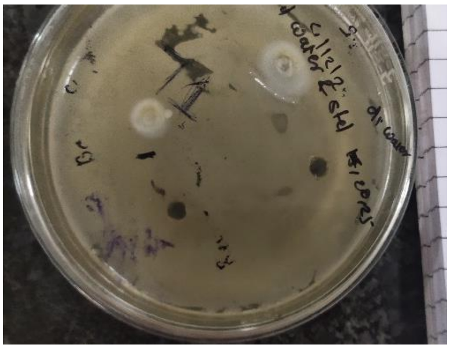
be responsible for the antibacterial activity [27]. Rizvi et al. observed that Cassia species had a significant activity against Gram positive micro-organisms. They claimed that this is the result of some substances like flavonoids and polysaccharides [26]. Abo et al. also found that leaves extracts of C. fistula have considerable antimicrobial activity [28]. Vasudevan et al. reported that methanolic extracts inhibited Gram-positive bacteria more than Gram negative species [27]. The result of this study suggests that C. fistula extracts can be useful to treat infectious diseases and must be considered as a new source of antibacterial agents. The microbial activity of the Cassia fistula was due to the presence of various secondary metabolites. Hence, these plants can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals research activities.[25]

RESULT AND DISCUSSION

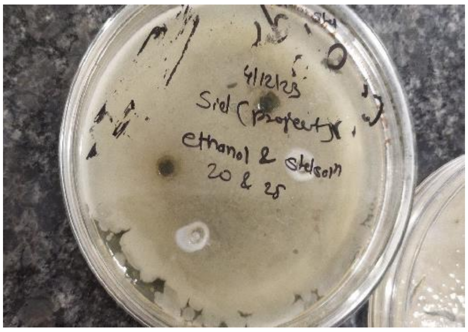
Medicinal plant species are important sources of biomedicine because they are rich in untouched chemical resources with significant therapeutic potential. Ayurveda and Chinese traditional medicine are most popular traditional medical systems that use Cassia fistula L as a significant medicinal herb. The tree, which is popularly known as "Yellow Shower," is a medium- sized deciduous tree with elongated, rod- shaped fruits that are filled with pulp and vibrant yellow blooms. Its botanical description and pharmacological characteristics, which include antibacterial, anti- inflammatory, antidiabetic, anticancer, and hepatoprotective effects, have been revised and presented in this study. Reviews of pharmacological properties of medicinal plants will provide useful information; hence, Cassia fistula L may yield significant bioactive natural product discoveries that may assist in the development of novel medications.

Results:

Standard Solution of Ciprofloxacin, ethanol and Distilled water are used as solvent for Extraction and Dilutions are prepared. These samples are used to check MIC Of every sample on Microbial plates.

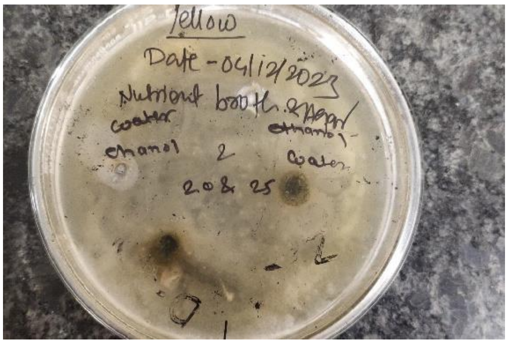


Distilled water and std sol inhibition zone



ethanol and std solution inhibition zone

Ethanol and std solution inhibition zone



ethanol and distilled water inhibition zone

Sample concentration	Aqueous extract	Ethanolic extract	Standard Solution of ciprofloxacin
(Zone of inhibition)in mm			
5 ml	0	0.50	0.50

10 ml	**0**	**1.0**	**0.75**
15 ml	**0.1**	**1.30**	**1.30**
20 ml	**0.2**	**1.75**	**1.50**
25 ml	**0.4**	**2.0**	**1.75**

Summary

This study was carried out with an objective to investigate the antibacterial potentials of leaves of Cassia fistula Linn. The aim of the study is to assess the antimicrobial activity and to determine the zone of inhibition of extracts on some bacterial and yellow strains. In the present study, the microbial activity of distilled water and ethanol extracts of leaves of Cassia fistula Linn. (an ethnomedicinal plant) was evaluated for potential antimicrobial activity against medically important bacterial strains. The antimicrobial activity was determined in the extracts using agar disc diffusion method. The antibacterial activities of extracts (5, 10, 15, 20,25 µg/ml) of Cassia fistula were tested against Gram-negative— Escherichia coli bacteria. Zone of inhibition of extracts were compared with that of different standards like ciprofloxacin for antibacterial activity . The results showed that the remarkable inhibition of the bacterial growth was shown against the tested organisms. The phytochemical analyses of the plants were carried out. The microbial activity of the Cassia fistula was due to the presence of various secondary metabolites. Hence, these plants can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals research activities

CONCLUSION

Prior to the invention of modern medications, herbal treatments were the only means of managing and treating a wide range of illnesses. It is estimated that 80% of people use the planet who live in vast rural areas of developing and impoverished countries still primarily rely on medicinal plant species and their metabolites. The medicinal plant cassia fistula has long been utilized, mostly in India and other countries. It is incredibly strong in treating wounds and possesses antibacterial, antioxidant and hepatoprotective qualities. Numerous research has revealed that the plant species, which is widely used in medical systems worldwide, has anti- inflammatory, hepatoprotective, antitussive, antibacterial, and antifungal qualities. It is also used to treat wounds.

It is well known as an excellent source of glycosides, tannins, and flavonoids, which might be medically and nutritionally valuable. From above- described literature, it is understood that C. fistula possess different medicinal properties which can be manipulated particularly in the treatment of gastrointestinal illnesses. Many research confirm that C. fistula is a valuable herbal plant for managing hepatic conditions and demonstrates other medical properties. From various studies, extracts of C. fistula have therapeutic and medicinal active ingredients. However, more research should be carried out to sufficiently assess the potential efficacy of the different extracts derived from C. fistula. The information in this article provides a basis upon which selection of specific plant species to investigate the prospective discovery of novel natural bioactive compounds.

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