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Bioactive Phytoconstituents of *Cassia angustifolia*: A Qualitative Screening Approach

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ABSTRACT

There is a growing interest in using phytochemical substances to treat metabolic diseases, which are considered more effective than synthetic drugs. Cassia angustifolia, known as Senna, has emerged as a significant focus of scientific research due to its many beneficial effects. Various parts of Senna plants—such as roots, stems, leaves, and flowers—are abundant sources of diverse chemicals. Cassia angustifolia belongs to the Senna genus of the Fabaceae family and is one of around 350 species of trees and shrubs. Its global distribution across various habitats, climates, and landscapes highlights its adaptability and ecological importance. Ancient Ayurvedic texts document Senna's traditional medicinal uses, recognizing its widespread application as a laxative, antimalarial, relaxant, and anti-inflammatory agent. Phytochemical studies have identified more than 350 compounds in Senna, including pentacyclic triterpenes and piperidine alkaloids, which exhibit various health-promoting properties. Pharmacological studies have also revealed its effectiveness against infections, antioxidant properties, and activities against cryptococcal, tumor, mutagenic, plasmodial, inflammatory, carcinogenic, diabetic, healing, and parasitic conditions. Senna is distinguished by its compound capitate leaves and unique flowers. It thrives in tropical regions and is prevalent in America, Australia, and Africa. Evolutionarily adapted to arid environments, Senna displays morphological flexibility and strategic resilience. This research paper offers a comprehensive exploration of the phytochemical makeup of Cassia angustifolia, highlighting its diverse biochemical profile and therapeutic potential. These findings underscore the importance of Senna in traditional medicine and its promising role in medicinal research.

Keyword: synthetic drugs, Cassia angustifolia, phytochemical screening, medicinal plant, therapeutic potential.

INTRODUCTION

Using natural substances instead of synthetic drugs to combat metabolic diseases is gaining interest. Senna has emerged as a significant botanical subject extensively studied for its therapeutic effects. Its roots, stems, leaves, and flowers contain a rich array of chemical compounds. Senna belongs to the family Fabaceae, subfamily Caesalpinioideae, and tribe Cassieae [1,2]. The genus thrives across diverse habitats, climates, latitudes, and landscapes in the Americas, Africa, and Oceania, with sporadic occurrences in Asia and the Pacific Islands. Senna plants flourish in wet and dry forests, deserts, and rocky terrain. Some ornamental species are popular in landscape architecture due to their vibrant yellow flowers and adaptability to various soils and environmental conditions. Species native to desert climates are particularly studied for their potential to mitigate desertification in arid regions[2,3]. Historically, Cassia species have been used since ancient times as noted in Ayurvedic texts for their laxative, antimalarial, relaxing, and anti-inflammatory properties. Today, this genus is renowned for its bioactive compounds and medicinal benefits [1,4].

The use of phytochemical compounds to address metabolic diseases rather than synthetic drugs is gaining attention. Senna has emerged as a heavily researched plant known for its medicinal properties. Its roots, stems, leaves, and flowers are abundant sources of various chemical compounds. Senna belongs to the family Fabaceae, subfamily Caesalpinioideae, and tribe Cassieae [1,2,3,4]. It encompasses about 350 species of shrubs and small trees. Originally classified separately from Cassia s.l., Senna is divided into three genera: Senna, Cassia L. (s.s), and Chamaecrista Moench. This genus thrives across diverse habitats, climates, latitudes, and countries in the Americas, Africa, and Oceania, with sporadic occurrences in Asia and the Pacific Islands (big-a-kiwa). Senna plants are found in wet and dry forests, deserts, and rocky outcrops. Some ornamental species are popular in landscape design due to their bright yellow flowers and adaptability to various soils and environmental conditions [5,6,7]. Particularly, species from desert climates are being studied to combat desertification in arid areas. The use of Cassia species dates back to ancient Ayurvedic texts, highlighting its abundance within the Senna genus and its medicinal properties [8]. These benefits stem from a wide range of plant extracts found in leaves, stems, and seeds. Phytochemical studies have identified over 350 compounds in Senna, including 40 secondary metabolites from Senna spectabilis (DC.). These phytochemicals, mainly pentacyclic triterpenes and piperidine alkaloids, are renowned for their health-promoting properties [9,10]. Various parts of the senna plant, including leaves, bark, roots, and fruits, exhibit

medicinal benefits against a spectrum of conditions. Medicinal activities documented include anti-infective, antioxidant, anti-cryptococcal, anti-tumor, anti-mutagenic, anti-plasmodial, anti-inflammatory, anti-carcinogenic, anti-diabetic, healing, and anthelmintic properties. Some studies indicate senna's effectiveness in diabetes management due to its phenols and flavonoids [11]. These antidiabetic effects operate by mechanisms such as reducing adipokine expression levels and lowering glucose levels. Senna is historically recognized for its laxative, antimalarial, relaxing, and anti-inflammatory properties. Today, this genus is celebrated for its biologically active compounds and medicinal attributes [12,13]. The genus Senna comprises a variety of plants ranging from semi-shrubs to small trees reaching heights of 4 to 9 meters. It thrives in moist, loose soils and demonstrates adaptability to diverse environments. Due to the extensive diversity within the genus, generalizing its plant characteristics is challenging. Typically, Senna plants feature compound leaves arranged alternately along the stem, adorned with stipules. The flowers form bright yellow, densely clustered panicles, measuring 15-30 cm in length. Each fragrant flower is oval-shaped, surrounded by five sepals. The petals, unequal in size, are golden yellow and cup-shaped, with anthers opening via pores and containing seven fertile stamens and three smaller staminodes, ending in a curved, slender, hairless pistil. The smooth ovaries bear variously shaped stigmas. As the fruit ripens, it transitions from green to black or dark and assumes a rounded or columnar shape, terminating in short, indehiscent pods housing seeds about 5 mm in diameter, appearing flat and brown. Senna flowers exhibit intriguing structural adaptations, showcasing morphological diversity and symmetrical patterns. Describing Senna flower characteristics is complex due to their unique winged appendages. Most flowers bear ten stamens, with three being staminodes and the remainder fertile. These stamens are grouped into two sets: four intermediate stamens from which bees gather pollen via the horn, and two or three abaxial stamens through which pollen is delivered to the stigma [1]. Another floral feature is the variable-sized pollen grains of Senna, demonstrating characteristics such as eutropism, radial symmetry, and isopolarity, with colpi structures ranging from almost spherical to elongated triangular shapes. Floral symmetry in Senna is influenced by the corolla and androecium. Many Senna species exhibit extrafloral nectaries, termed "ancillary nectaries," found in about 76% of American species and numerous Australian and African species, yet absent in South Asian species. These nectaries secrete nectar, attracting insects like ants that consume the nectar and inadvertently defend the plant from herbivores. Senna fruits are elongated tubular or cylindrical, typically black with brown seeds and pleurotus. Senna plants are propagated through seeds, which remain viable for several years. Certain Senna varieties benefit from scarification to enhance germination rates. The plant displays numerous lateral roots and robust taproots aiding in anchorage and resource acquisition. The Senna Aphyllae (Benth.) of the H.S.Irwin & Barneby series represents a complex group of drought-resistant shrubs and small trees within the leguminous caesalpinioid Senna Mill, native to arid, semi-arid, and dry regions of southern South America. Among the Senna varieties, these seven types exhibit marked distinctions. Mature plants in this series feature leafless, green, succulent stems and deep, woody roots adapted to endure harsh environmental conditions. Phylogenetic studies confirm Senna as a monophyletic group within the Cassiinae family, alongside Cassia sensu stricto and Chamaecrista. Biological identification of this genus relies on characteristics of the androecium, flower structure, corolla, bracts, and fruits [16]. Contemporary taxonomy incorporates anatomical, cytological, serological, and molecular biology data to delineate relationships and classifications within the Senna genus. Senna plants are distributed across forests and thrive in diverse habitats including wastelands, riverbanks, and undisturbed wetlands. They also inhabit lowland coastal areas and can thrive at altitudes ranging from 1000 to 1400 meters above sea level. Senna's distribution is intricately linked to the arid habitats it occupies today, including deserts and semi-arid environments of South America encompassing southern Bolivia, southeastern Paraguay, and central and western Argentina. Studies on various climatic conditions have revealed variation among individuals withinSenna species, likely influenced by phenotypic plasticity and geographic distribution, contributing to adaptive strategies and ecological diversity [14,15].

Figure 1 Senna Plant (*Cassia Angustifolia*)

Table 1 Taxonomical classification of cassia angustifolia

Classification	
Kingdom	Plantae-Plantes, Planta, Vegetal, Plants
Subkingdom	Viridiplanae- green plant
Infrakingdom	Streptophyta- land plants
Superdivision	Embryophyta
Division	Tracheophyta- vascular plants
Subdivision	Spermatophytina- seed plants
Class	Magnoliopsida
Superorder	Rosanae

Table 2 Vernacular names of *Cassia Anugustifolia*

Language	**Names**
Arabic	Sana Makki
Assumes	Sona Mukhi
Bengali	Sanna Makki, Sonpat
English	Indian Senna, Tinnevelly Senna
Hindi	Sanaya, Hindi Sana
Kannada	Nelavarika
Marathi	Sona Makhi
Oriya	Shona Mukhi
Punjabi	Sarna patta, Sana patti
Persian	Sana Makki
Sanskrit	Swarnpatri, Bhumiari
Siddha	Nilaavaarai
Tamil	Nelavirai, Nilpponnai
Telugu	Nelaponna
Unani	Aalwai

Material and method

Material

Chemicals:

Dragendroff's Reagent, Mayers Reagent, Wagners Reagent, Million's Reagent, Ninhydrine, Acetone, Magnesium turning, Concentrated Hydrochloric acid, Sodium Hydroxide, Zinc Dust, Ferric Chloride Solution, Sodium Acid Phosphate, Phenazone Solution, Gelatin, Sodium chloride, Biuret Regent, Concentrated Sulphuric Acid, Trichloroacetic Acid, Acetic Anhydride, Alcoholic α- Napthol, Fehling's A & B, Benedict's Reagent, Dichloromethane, Chlorofrom, Ammonia, Glacial Acetic Acid, Picric Acid, Sodium Nitroprusside, Ethanol

Plant Collection

Dried Senna (*Cassia Angustifolia)* was procured from local vendors in Pune city and subsequently authenticated at the Department of Pharmacognosy at TMV's LTIPS Pune.

Method

Preparation of the Aqueous Extract of the dried senna leaves:

The dried leaves were cleaned by removing the damaged and unwanted particles and was crushed into powder with the help of a grinding machine. 50 gm of fine powder of the senna leaves were take in an 200ml Glass Beaker and 150 ml water was added to it. The powder was allowed to soak in the water for 18 hours and the it was filtered with the help of filter paper, The extract was the used of the phytochemical screening of the crude drug.

Phytochemical test

Initial analysis of the extracts was conducted to detect and identify the presence of various phytoconstituents within the crude drug extract.[9,10,11]

1. Test For Alkaloids

Alkaloids are naturally occurring organic compounds characterized by their basic nature and the presence of at least one nitrogen atom in their molecular structure. This class of compounds encompasses related substances that may exhibit neutral or weakly acidic properties. Synthetic compounds with similar structures can also be classified as alkaloids. Apart from carbon, hydrogen, and nitrogen, alkaloids may also incorporate elements such as oxygen or sulfur. In rarer cases, alkaloids may contain elements like phosphorus, chlorine, or bromine. [9,10,11,18,19]

A. Dragendorff's Test: Upon adding 1 mL of Dragendorff's reagent to 2 mL of the extract, a reddish-brown precipitate forms, indicating the presence of alkaloids.

B. Mayer's Test: Adding a few drops of Mayer's reagent to 1 mL of the extract results in the formation of a yellowish or white precipitate, indicating the presence of alkaloids.

C. Wagner's Test: Mixing two drops of Wagner's reagent with 2 mL of the extract results in the appearance of a reddish color, indicating the presence of alkaloids.

D. Hager's Test: Treating 2 mL of the extract with a few drops of Hager's reagent leads to the formation of a yellow precipitate, indicating the presence of alkaloids.

2. Test For Amino Acid:

Amino acids are organic compounds characterized by the presence of both amino and carboxylic acid functional groups. While nature boasts a vast array of over 500 different amino acids, the most crucial are the 22 α-amino acids essential for protein synthesis. Plant roots employ both inorganic nitrogen sources, primarily ammonium (NH4Present) and nitrate ($NO3^-$), as well as organic nitrogen compounds such as amino acids, peptides, and proteins. Under upland conditions, plants predominantly absorb nitrogen in the form of nitrate. [9,10,11,20]

A. Millon's Test: Adding about 2 mL of Millon's reagent to the extract results in the formation of a white precipitate, indicating the presence of amino acids.

B. Ninhydrin Test: Adding two drops of ninhydrin solution to 2 mL of the crude extract results in the appearance of a characteristic purple color, indicating the presence of amino acids.

3. Test For Flavanoid:

Flavonoids are natural compounds found in various plants, fruits, vegetables, and leaves, offering significant potential in medicinal applications. They exhibit diverse medicinal benefits such as anticancer, antioxidant, anti-inflammatory, and antiviral properties. Additionally, flavonoids are known for their neuroprotective and cardio-protective effects. The specific biological effects of flavonoids vary depending on their type, mode of action, and bioavailability in the body. [9,10,11,21]

A. Shinoda Test: Upon adding a few magnesium turnings and concentrated hydrochloric acid dropwise to the extract, a color change to pink, scarlet, red, or occasionally green to blue occurs after a few minutes, indicating the presence of flavonoids.

B. Alkaline Reagent Test: Adding a few drops of sodium hydroxide solution to the extract results in an intense yellow coloration. This color changes to colorless upon addition of a few drops of dilute acid, indicating the presence of flavonoids.

C. Zinc Hydrochloride Test: Mixing the extract with a mixture of zinc dust and concentrated hydrochloric acid results in a red coloration after a few minutes, indicative of the presence of flavonoids.

4. Test For Phenolic Compounds (Tannins)

Tannins are intricate phenolic compounds typically found in a variety of plant species, characterized by a molecular weight spanning from 500 to 3000 Da. They are present in fruits, berries, chocolates, and various dietary sources. Historically, tannins were often viewed as antinutrients due to their capacity to bind and precipitate proteins. [9,10,11,21,22]

A) Ferric Chloride Test: Treat the extract with ferric chloride solution, blue colour appears if hydrolysable tannins are present and green colour appears if condensed tannins are present.

B) Phenazone Test: Add about 0.5gm of sodium acid phosphate to 5ml of extract warm it and filter. To filtrate add 2% phenazone solution, bulky precipitate is formed, which is often coloured.

C) Gelatin Test:To the extract add 1% gelatin solution containing 10% sodium chloride, precipitate is formed.

5. Test For Proteins

Proteins are large, complex molecules that play many important roles in the body. They are critical to most of the work done by cells and are required for the structure, function and regulation of the body's tissues and organs. A protein is made up of one or more long, folded chains of amino acids (each called a polypeptide), whose sequences are determined by the DNA sequence of the protein-encoding gene. [9,10,11,23]

A) Biuret test. Two drops of 3% copper sulphate and few drops of 10% sodium hydroxide were added to 1 mL of extract, violet or red colour formation indicating that proteins are present.

B) Ninhydrin test. Two drops of 0.2% freshly prepared ninhydrin solution added to 1 mL of extract. Production of purple colour shows the presence of proteins.

6. Test For Steroids And Triterpenoids

Triterpenes are a substantial component of the lipid substances found in all plants, with over 4000 triterpenoids identified so far. These compounds serve as precursors to steroids in both plant and animal biology. Steroids play essential roles as membrane components in plants. Triterpenes and steroids can be found in free form, as glycosides, or in various other combined forms within plant structures. [9,10,11]

A. Libermann-Burchard Test: Treating the extract with a few drops of acetic anhydride, boiling, and cooling it. Then, adding concentrated sulfuric acid from the side of the test tube. A brown ring forms at the junction of the two layers, with the upper layer turning green indicating the presence of steroids. The formation of a deep red color indicates the presence of triterpenoids.

B. Salkowski Test: Treating the extract with a few drops of concentrated sulfuric acid. A red color appearing in the lower layer indicates the presence of steroids, while the formation of a yellow-colored layer indicates the presence of triterpenoids.

7. Test For Carbohydrates

Carbohydrates serve as a primary source of energy for both animals and plants. In plants, carbohydrates are synthesized using solar energy through photosynthesis, whereas animals acquire carbohydrates by consuming plants or other animals. Plants store carbohydrates in the form of starch, which consists of long chains of polysaccharides. Animals store carbohydrates in the form of glycogen. These complex polysaccharides contain numerous chemical bonds that store significant chemical energy. During metabolism, these bonds are broken down, releasing energy that cells utilize for various cellular processes. [9,10,11]

A. Molisch Test: Add a few drops of alcoholic α-Naphthol to the extract, followed by the careful addition of concentrated sulfuric acid down the side of the test tube. A purple to violet color ring appears at the junction if carbohydrates are present in the test solution.

B. Fehling's Test: Mix 1 mL each of Fehling's A and Fehling's B solutions. Boil the mixture for 1 minute and then add an equal volume of the test solution. Heat the mixture in a boiling water bath for 5 to 10 minutes. Initially, a yellow precipitate forms, which then turns into a brick-red precipitate.

C. Benedict's Test: Mix equal volumes of Benedict's reagent and the test solution in a test tube. Heat the mixture in a boiling water bath for 5 minutes. The solution's color changes to green, yellow, or red, depending on the amount of reducing sugars present in the test solution.

8. Test For Anthraquinone Glycosides

Anthraquinone glycosides are organic compounds present in plants such as Senna, where anthraquinone molecules are conjugated with sugar molecules. These glycosides are renowned for their laxative properties and exhibit diverse pharmacological effects, including anti-inflammatory and antioxidant activities. [9,10,11]

A. Brontrager's Test: Boil the test material with 1ml of sulphuric acid in a test tube for 5minutes. Filter while hot. Cool the filtrate and shake with equal volume of dichloromethane or chloroform. Separate the lower layer of dichloromethane or chloroform and shake it with half of its volume of dilute ammonia. A rose pink colour is produced in the ammonical layer.

B. Modified Brontrager's Test: Boil 200mg of the test material with 2ml of dilute sulphuric acid. Treat it with 2ml of 5% aqueous ferric chloride solution for 5minutes shake it with equal volume of chloroform and continue the test as above. As same plant contain anthracene aglycone in a reduced form, if ferric chloride is used during the extraction, oxidation to anthraquinone takes place, which shows response to brontrager's test.

9. Test For Saponins Glycosides

Saponin glycosides are naturally occurring compounds in plants, featuring a hydrophobic saponin core linked to sugar molecules (glycosides). Their name stems from their ability to generate foam when agitated in water, reminiscent of soap ("sapo" in Latin). These glycosides exhibit a wide range of biological effects, including antimicrobial, anti-inflammatory, antifungal, and anticancer properties. They are frequently utilized in traditional medicine and show promise for applications in pharmaceuticals, as well as the food and cosmetics industries. [9,10,11]

A. Froth Formation Test: Take a 2 ml solution of the drug in water in a test tube and shake vigorously. Observe the formation of stable froth.

10. Test For Cardiac Glycoside

Cardiac glycosides are natural compounds present in specific plants, notably Digitalis species such as foxglove. They exert a significant impact on cardiac function by enhancing the force and efficacy of heart contractions. These compounds find application in medical treatments aimed at managing diverse heart conditions, including congestive heart failure and atrial fibrillation. Nonetheless, their ingestion in excessive quantities can lead to toxicity. [9,10,11]

A. Keller-Killani Test: Extract the drug with chloroform and evaporate it to dryness. Add 0.4 of glacial acetic acid containing trace amount of ferric chloride. Transfer to a small test tube. Add carefully 0.5 of conc. Sulphuric acid by the side of the test tube. Acetic acid layer shows blue colour.

B. Legal Test: Treat the extract with pyridine and add alkaline sodium nitroprusside solution, blood red colour appears.

C. Baljet's Test: Treat the extract with picric acid or sodium picrate, orange colour is formed.

11. Test For Gums & Mucilage:

Gums and mucilage are botanical substances that, upon contact with water, create thick or gel-like solutions. Gums such as gum arabic and guar gum serve as additives in food and pharmaceuticals to enhance viscosity and stability. Mucilage, sourced from plants like flaxseed and marshmallow root, offers soothing effects, effectively alleviating irritation and inflammation within the body's mucous membranes. [9,10,11]

A. Test: The extract was dissolved in 10ml of distilled water and to this 25ml of absolute alcohol was added with constant stirring, white or cloudy precipitate indicates the presence of gums and mucilage.

12. Test For Fixed Oils & Fats:

Fixed oils, also referred to as triglycerides in scientific terms, are fatty substances obtained from plants, seeds, or nuts that are non-volatile in nature. Composed primarily of glycerol esters and fatty acids, they constitute a substantial portion of plant lipids. Fixed oils find extensive utilization in various industries such as food, cosmetics, pharmaceuticals, and industrial sectors due to their stability at ambient temperatures. These oils serve as crucial sources of energy and essential nutrients in the human diet.

A. Spot Test: A small quantity of extract was pressed between two filter papers. Oil stain on the paper indicates the presence of fixed oils.

13. Test For Coumarin Glycosides:

Coumarin glycosides are glycosides where the aglycone component is coumarin. Coumarins, classified as polyphenolic compounds, are naturally occurring substances found in numerous plants, bacteria, and fungi. They are widely utilized as fragrances in products such as soaps, detergents, lotions, and perfumes. Coumarins exhibit diverse biological activities, including anti-inflammatory, anticoagulant, antimicrobial, antidiabetic, antioxidant, and enzyme inhibitory properties.

Test Procedure: Place a small quantity of the sample in a test tube and cover the tube with a filter paper soaked in dilute sodium hydroxide solution. Heat the covered test tube on a water bath for several minutes. Remove the filter paper and examine it under ultraviolet (UV) light. A green fluorescence will be observed on the paper if the sample contains fluorescein compounds.

Result & Discussion

Phytochemical research on Cassia angustifolia (Senna) revealed its plant species, showing its potential as a valuable medicine. Critical analysis shows the presence of alkaloids, flavonoids, phenolic compounds (tannins), proteins, steroids, terpenoids, carbohydrates, anthraquinone glycosides, saponin glycosides, cardiac glycosides, gums, mucins and coumarin glycosides in the complex matrix. Henna removed. These phytochemicals, with their unique molecular structures and medicinal properties, offer healing potential. For example, alkaloids are known for a variety of biological activities, from analgesic and anti-inflammatory effects to acting as central nervous system stimulants. Flavonoids, on the other hand, show antioxidant, anti-inflammatory and anti-cancer properties, which are beneficial for overall health and well-being. Additionally, the traditional use of senna in herbal systems across cultures provides further evidence of its medicinal value. Historically, senna has been important for digestive health, stimulating and promoting bowel movements. In addition to gastrointestinal benefits, senna's medicinal capabilities extend to antioxidant, antibacterial, antidiabetic, and wound-healing activities, making it a growing partner in the world of natural medicine. These findings not only reveal the complex phytochemical composition of Senna but also demonstrate its potential as a source of new therapeutic agents. By uncovering the molecular complexity of Senna, this study paves the way for future research to elucidate Senna's mechanism of action and explore its application in therapeutic strategies.

Table 3 Phytochemical test, observation and inference of *Cassia Angustifolia*

Sr No.	Phytochemical Group	Sr No.	Test	Observation	Inference
1	Alkaloid	1	Dragendroff's Test	Reddish brown precipitate	Present
		2	Mayer's Test	No yellow or white precipitate	Absent
		3	Wagner's Test	Reddish colour precipitate	Present
		4	Hager's Test	Yellow colour Precipitate	Present
2	Amino Acid	1	Millon's Test	No white precipitate	Absent
		2	Ninhydrine Test	Purple colour present	Present
3	Flavanoid's	1	Shinoda Test	Greenish blue colour present	Present
		2	Alkaline Test	Yellow colour present	Present
		3	Zinc Hydrochloride Test	No red colour present	Absent
4	Phenolic Compound (Tannins)	1	Ferric Chloride test	Green colour present	Present
		2	Phenazone Test	Bulky precipitate present	Present

		3	Gelatin Test	Precipitate is formed	Present
5	Proteins	1	Biuret Test	Violet colour present	Present
		2	Hydrolysis test	No purple colour present	Absent
		3	Test with Trichloroacetic acid	No precipitated formed	Absent
6	Steroids and Terpenoids	1	Liberman-Burchard Test	Brownish layer is formed at the junction	Present
		2	Salkowski Test	yellowish colour is formed at the junction	Present
7	Carbohydrates	1	Molish's Test	Purple to Violet colour is formed at the junction	Present
		2	Fehling's Test	Brick red colour precipitate formed	Present
		3	Benedict's Test	Greenish colour is present	Present
8	Anthraquinone Glycoside	1	Brontragers Test	Reddish colour is present	Present
		2	Modified Brontrager's Test	Reddish colour is present	Present
9	Saponins Glycoside	1	Froth Formation Test	Formation Of Foam	Present
10	Cardiac Glycoside	1	Killer-Killani Test	Blue colour present	Present
		2	Legal's Test	Dark red colour is present	Present
		3	Baljet's Test	Reddish orange colour is present	Present
11	Gum & Mucilage	1	-	White precipitate is formed	Present
12	Fixed Oil's and Fats	1	Spot test	No oil stain	Absent
13	Coumarin Glycoside	1	-	Presence of Green Fluorescence	Present

Conclusion

A comprehensive phytochemical analysis conducted on Cassia angustifolia (Senna) revealed a large number of phytochemicals, indicating its medicinal value. Active tests found alkaloids, flavonoids, phenolic compounds (tannins), proteins, steroids, terpenoids, carbohydrates, anthraquinone glycosides, saponin glycosides, cardiac glycosides, gums, mucins, and coumarin glycosides in the plant extract. These varieties are known for their medicinal properties, contributing to Senna's popularity as a versatile medicinal plant. The presence of these botanical components is consistent with the ancient use of senna in various cultures and further scientific research into its medicinal properties. From laxative effects to antioxidant, anti-inflammatory, antibacterial, anti-diabetic and more, senna has a wide range of potential health benefits.

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Conflict of interest

No conflicts of interest to be disclosed.

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