ETHNOBOTANY OF SOME MEMBERS OF THE GENUS CASSIA (SENNA)

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Abstract: The Genus Cassia, also known as Senna, is a large group of leguminous plants belonging to the family of Fabacea. They have a wide range of ethnobotanical uses, including medicinal, ornamental, and industrial applications. In traditional medicine, the Genus has been used in the treatment of various diseases all over the world. Various pytochemicals with diverse bioactivities have been isolated from the Cassia species. However, this has not been done exhaustively in all the species. This review relates the ethnobotanical uses of various Cassia species and emphasizes the importance of doing scientific research on these secondary metabolites for the benefit of the general public.

Keywords: ailments, allopathic medicine, Cassia, ethnopharmacology, folklore, Senna.

1. INTRODUCTION

Medicinal plants are critical to developing novel medications [1-3] 70-90% of the population in Asia, Africa, Latin America, and the Middle East rely on traditional medicine for primary healthcare. Most pharmaceutical has and continues to revolve around this point [2]. The global acceptability of popular and efficient traditional species from Europe, North America, Africa, and Asia is expanding due to increased demand for medicinal plants in many countries [3]. The percentage of individuals using herbal plants has increased: to 40–50% in Germany, 42% in the USA, 48% in Australia, and 49% in France [3, 5]

The Tropics and Sub Tropics, which run from South America to Australia, have a rich floral diversity, and this richness corresponds to the diversified folklore management of the flora. Ethnobotany has played and will continue to play a significant role in drug discovery [6, 7]. In addition, traditional medical practices involving plant or plant parts are embedded in virtually all community cultures [7]. So folklore information on certain plant species from these areas have harnessed and wholly employed to develop drugs that have become the major lines of disease management [9, 10]. Such species include: Cartharanthus roseus in the management of leukemia [10] and Cinchona [11] have been incorporated into allopathic medicine with fewer modifications or alternative substantive substitutes.

During the literature review of Chamaecrista nigricans syn. Cassia nigricans, it became clear that there was significant documentation; however, there was still room to add more knowledge to this already exciting Genus Senna (Cassia). Cassia genus belongs to the family Fabaceae and comprises about 600 species of herbs, shrubs, and trees distributed in tropical and subtropical countries, mainly Africa, Asia, and South America [13, 14]. The species have been used, anciently in vogue, to treat various ailments that include: skin diseases (such as scabies, eczema, and ringworm), helmintiasis, impetigo, ulcers, pesticide, laxatives, rheumatic diseases, headache, and fever. This article attempts to give an overview of the
ethnopharmacology and bioactivity of the phytochemical compounds isolated from various species of the Genus Cassia. It is expected to emphasize the importance and traditional utilization of the Genus for novel drug discovery. This effort will incentivize more research to isolate bioactive constituents and develop drugs from the already bioactive compounds from the Genus. Virtually all the members of this Genus are of economic importance as fodder for foraging bees and nitrogen fixers, thus increasing soil fertility in essential nutrients [14].

The relevant information on the botanical description and ethnopharmacological have been generated from various search engines, including Google Scholar, Google, Springer, Elsevier, PubMed, Science Direct, and Research Gate. Cassia or Senna and its associated plant names were employed as keywords to find the pertinent information.

**Cassia auriculata Linn**

Synonyms: Sena auriculata and C densistipulata (L.) Roxb. It is a fast-growing shrub to a small tree used in green manuring, ornamental, soil reclamation, and tannin. The plant possesses some cardiac glycosides [15]. It is commonly found in Asia [16].

The whole plant treats liver ailments [17]. The leaves have been used for ulcers, skin diseases, anthelmintics, and leprosy [18]. The bark is an astringent [19], while the roots have been used to treat skin conditions such as leprosy, tumours, urethroe, and asthma [20]. The roots are also used in managing ailments in the urogenital system, fever, constipation, and diabetes [22, 23]. The flowers cure nocturnal emissions, urinary discharges, throat irritation, and diabetes [23]. Flowers are also used as a body coolant, treating yellow fever and in blood and liver purification [24]. The seeds are used in chylous urine, diabetes, ophthalmic, and aphrodisiac complaints [25]. The leaves have also been used as hair cleaner and to cure common cold, whereas roots also cure diarrhea, abdominal pains, and vomiting [26]. The plant is also used generally for intestinal problems, female infertility, worms, leprosy, conjunctivitis, rheumatism, and diarrhea [27]. Its seed, hydro-alcoholic extracts, is used in Ayurvedic and has been reported to possess antidiabetic activity [28].

**Cassia glauca (Lam)**

Synonym Senna sulphurea (Collad.) H.S. Irwin & Barneby. A shrub usually with yellow flowers and is used as an ornamental. It is found in Tropical Asia, India, Australia, South America, Malaysia, Pakistan, and China [30, 31]. The leaves have been used to manage blennorrhagia [32, 33]. The seeds treat skin diseases and leukoderma, whereas the bark and leaves treat gonorrhoea and diabetes [29]. The plant has been used for common cold as an antimalarial, central depressant, purgative, and diuretic [33].

**Cassia angustifolia Vahl**

Synonyms are Senna alexandrina Mill, C.acutifolia Delile, C. lanceolata Forssk., C.senna L., Senna acutifolia (Delile Batka) and Sangustifolia (Saheed SA & Iloho HC). The plant is also referred to as Indian Senna. It is found in India, Saudi Arabia, Pakistan, Egypt, Somalia, Arabia, and Yemen [35, 36]. The leaves have been used to manage hepatomegaly, anaemia, constipation, malaria, loss of appetite, indigestion, jaundice, ringworm, splenomegaly, and to increase peristaltic movement of the colon [13, 35]. The leaves and pods are used for splenic enlargements, cholera, antipyretic in typhoid, anthelmintic, and laxative [35]. Dry tubers have been used as an aphrodisiac, general debility tonic, and rheumatism [36].

**Cassia fistula L.**

Synonyms are: C Bactyrilobium fistula (L.) Wild; C.bonplandiana D.C; C. excels Kunth; C.fistuloides Collad; C.Rhombifolia Roxb; Cathartocarpus excelsus G. Don; Cathartocarpus fistula (L.) Pers; Cathartocarpus fistuloides (Collad) G. Don; and Cathartocarpus hombifolius (Roxb) G. Don. The medicinal use of the species date from ancient times and has been the main factor in its spread. It is called “Aragyadha,” a word that can be translated as “elimination of diseases” in Sanskrit. The plant must have originated from the Indian Subcontinent. It is widespread in East Africa and several of the Indian Ocean Islands [37]. The roots, bark, leaves, flowers, and seeds are all used for therapeutic purposes; the leaves have been used as a purgative against ringworms [38]. The whole plant treats anorexia, skin diseases, rheumatism, jaundice, and inflammatory diseases [39]. The roots also cure heart diseases, dysentery, joint pain, retained excretions, chest pain, fever, and migraine [40]. Ayurvedic medicines recognize the use of the plant for skin diseases, tubercular glands, adenopathies, burning sensations, syphilis, and leprosy [41]. The fruit, seeds, flowers, and pulp are all used for skin diseases; the pulp is also used to treat gout and rheumatism, while the leaves have been used as a laxative [42]. In addition, flowers,
leaves, bark, root, and pulp have been used in wound healing, liver protection, and as an antifungal [43]. The whole plant also treats ulcers, purgative, impetigo, and helminthiasis, although the leaves and the seeds act as a liver tonic, cardiotonic, laxative, ophthalmic, antiperiodic expectorant as well as in treating constipation and bronchitis [44]. The species' seeds have been used in treating swollen throats, oral sores, jaundice, and biliousness [45]. The plant is also used as a hair cleanser and in the treatment of venereal diseases, diarrhea, toothache, muscle pain, cold, inflammation, reduces body heat, vomiting as well as diabetes [27, 38].

_Cassia alata_ L.

Synonyms: _Senna alata_ L and _Herpetica alata_. It is distributed in Africa, South and North America, and India [47, 48]. The plant leaves treat ulcers, scabies, ringworm, and skin diseases such as eczema, itching, and pruritus [46]. The leaves and stem bark are used to treat burns, diarrhea, jaundice, gastroenteritis, and hepatitis, whereas the immature leaves are effective against food poisoning and constipation [48]. This plant is good against insect bites, worms, goitre, fever, blemishes, sexually transmitted diseases, and fungal skin infections [50, 51, 52]. The leaves also cure asthma and bronchitis [51]. The roots are used for uterus disorder [53, 54].

_Cassia tora_ L.

Synonyms: _Senna obtusifolia_ (L.) H.S.Irwin & Barneby, _Cassia numilis_ Collad, _C. obtusifolia_ (L.), _C. toroides_ Raf., _Diallobus uniflorus_ Raf, _Senna toroides_ Roxb. It is found in Africa, Fiji, Southeast Asia, Northern Australia, and Latin America [55, 56]. The species has been used in Folklore medicine in that the leaves of the plant are used for the treatment of jaundice, eczema, ringworm, intestinal impetigo, helminthiasis; and the decoction of leaves and flowers against asthma and bronchitis; and the seeds are used to treat leprosy, psoriasis, earache, itching, eye diseases, liver problems while pods are used against dysentery and in eye diseases [56]. Its fermented leaves have purgative properties [57]. Traditionally, the plant has been widely employed in managing hemorrhoids, vitiated tridosha, hepatitis, skin diseases, dandruff, cough constipation, and fever [55]. The leaves and seeds possess cardiotonic, ophthalmic, antimicrobial, and liver tonic properties [58].

_Cassia abbreviata_ Oliv

Synonyms: _Cassia afrofistula_ Brenan, _Cassia beareana_ Holmes and _Cassia kassneri_ Bak. It is a medium-sized tree widely distributed in the tropics of Asia and other tropical Worlds [59] and used as medicine. The roots treat malaria, fever, impotence, abdominal pain, wounds, dysentery, syphilis, snake bite, body weakness, and hernia [61, 62, 63]. The plant is used to treat cancer [63]. Its root bark manages vaginal candidiasis [64]. The leaves, roots, and bark have been used to treat cough, epilepsy, diarrhea, fever, convulsion, vomiting, abortion, infertility, earache bilharzia, syphilis, hemorrhoids, gonorrhea, jaundice hernia, and stomach ache [65]. The bark and the roots cure dysentery, bloody vomiting, and menstrual cycle problems [66]. Fruits are used against eye infections and malaria [59]. The bark is also used in treating toothache and sexually transmitted diseases [67]. The roots are also used as an aphrodisiac [68].

_Cassia nigricans_ Vahl

Synonym: _Chamaecrista nigricans_ Vahl. The roots and leaves are vermifuge and antiperiodic [69]. The leaves also treat rheumatoid pains, gastrointestinal disorders, and family planning[71, 72]. The leaves also manage fever and sore throat [72]. The plant treats skin diseases, ulcers, diarrhea, and gastrointestinal disorders [74, 75].

_Cassia sieberiana_: D.C.

This species is a medium-sized tree widely distributed in Sub-Saharan Africa, from Senegal to East Africa [75]. The root bark and rootlets treat toothache, abdominal pains, skin diseases, hemorrhoids, helminths, and leprosy [76]. The roots also treat hemorrhoids and skin irritation and manage indigestion, stomach pains, and gastric ulcer [77, 78]. The seeds have been used in weight reduction, clearing of acne, detoxification, and driving out internal heat [79].

_Cassia absus_ L.

Synonym: _Chamaecrista absus_ H.S.Irwin & Barneby. It is a small hairy herb, a native of Africa; however a common monsoon weed in South East Asia [80]. In folklore medicine, the seeds have been used to treat syphilitic ulcers, skin infections, leukoderma, ophthalmia, and as a cathartic [81]. The leaves are used for nasal diseases, cough, and as an astringent to the bowel [82]. The leaves are used in curing tumours, while the roots are used against constipation [83].
Senna septemtrionalis  H.S.Irwin & Barneby.

Synonyms: Cassia aurata Roxb., C. elegans Kunth, C. Floribunda Kunth C. laevigata Wild var., floribunda sensu Ghesq., C. quadrangularis, C. septemtrionalis Viv and C. vernicosa Clos. A shrub to a sub-shrub native to America now spreads in the tropic and subtropics up to India and South Africa [84]. The roots treat malaria, gonorrhea, syphilis, intestinal worms, and blood cleansing [67, 84]. The leaves are used as a vermifuge [85, 86]. It is also used in treating stomach aches, wounds, fever, gastroenteritis, snakebites, burns, epilepsy, hemorrhoids, anxiety, and as a laxative, fungicide agent, and expectorant as antidiuretic [87]. This plant has also been used as a medication for rabies, cold, alopecia, earache, bile diseases, pain, inflammation, and cholera [88, 89].

Senna petersiana (Bolle) Lock

Synonym: Cassia petersiana (Bolle) Lock. This small tree is generally found in Tropical and sub-Tropical Africa and can grow to 12 m [90]. The root extracts treat infertility, malaria, and deworming and are used as inhalers [91] [92, 93]. The leaves cure skin diseases, backaches, stomach aches, and febrifuge[90, 93]. The plant is used to treat arthritis and management of diabetes [94]. The roots also treat a loss of appetite [95]. The plant also cures cholera, cold, and fever [96]. The plant's roots, leaves, and stems have been used for convulsion and healing pain in the bones [97]. Various parts of the plant have been used in traditional medicine in different parts of the world [98]. The leaves and bark have been used to treat skin cancer [99]. The stem, bark, leaves, and roots treat sprain, stomach pain, and tooth infection [100]. The leaves cure hepatitis, vomiting, and loss of appetite, and the stem bark prevents stillbirth [101]. The roots treat epilepsy and agitation [102]. The flowers are used as an anti-inflammatory, anti-ulcer, and antispasmodic agent and in treating respiratory tract infections, malaria, and typhoid [103]. The root bark is also used for abdominal pain, bilharziosis, mental disorder, women's infertility, constipation, convulsion, painful uterus, swollen breast, fever, menstruation, gonorrhea, anti-emetie, hernia, and in managing snakebites [104, 105].

Senna didymobotrya (Fresen.) H.S.Irwin and Barneby

Synonyms: Cassia didymobotrya Fresen, C. nairobiensis H. Bailey, C. verdickii De Wild and Chamaesenna didymobotrya Sunarno. It is an invasive shrub that forms a dense growth that hinders the development of other plant species in a given area [106]. It is distributed in North, West, East, Southern Africa, and Madagascar [107]. This plant's leaves, stem, and roots have been used in treating sickle cell anaemia, backache, fibroids, inflammation of fallopian tubes, and hemorrhoids [108]. The bark is an antihaemorrhagic [109]. The plant has been used in treating skin disease, jaundice, purgative, malaria, sexually transmitted diseases, intestinal worms, and as an appetizer and antibiotic [107, 110, 111]. The leaves are used in curing dysentery, diarrhea and as an emetic and diuretic, while the root is used to treat ringworm, malaria, intestinal worm, fever, and jaundice [110].

Senna bicapsularis (L.) Roxb

Synonyms: Cassia bicapsularis L., C.emarginata L., C.berterii Colla, Adipera bicapsularis (L.), Adipera spiciflora Pittier, Cathartocarpus bicapsularis (L.) Ham Isandrina emarginata (L.) Britt. & Rose ext Britt. & Wilson, Chamaefistula inflate G.Don and Isandrina arborescens Raf. It is distributed in South America and tropical countries [112]. The species is cultivated in many parts of the world; however, it has escaped being naturalized and has an unpleasant odour [113]. Roots and leaves are used for stomach aches [114]. The leaves have been used in treating skin ailments [115]. The flowers have been used as an abortifacient and contraception agent for both males and females [116]. The plant has been used to treat pain as well as a muscle relaxant and purgative [117].

Cassia spectabilis (D.C.) H.S. Irwin & Barneby

Synonyms: Cathartocarpus humboldtianus Loudon; Cathartocarpus speciosus (DC.) G.Don; Cathartocarpus trinitatis (D.C.) G.Don; Cassia trinitatis Rchb.exDC. Cassia carnaval Speg, Pseudocassia spectabilis (DC.) Britton & Rose, Sena speciosa Roxb. Senna surattensis (Burm. f.) Irwin & Barneby. Cassia amazonica Ducke and Senna spectabilis (D.C.) Irwin & Barneby. The species is a native of South America, Brazil, and coastal Ecuador and has migrated throughout Central America, the West Indies, the tropics, and sub-tropic parts of the world [118, 119, 120]. The leaves are used for throat inflammation and diarrhea [118]. The plant is used to cure headaches, malaria, and dysentery, while the leaves treat anxiety, epilepsy, insomnia, constipation, and anxiety [121]. The species has also been used in treating ringworm, skin disease, flu, cold, whooping cough, menstrual cramps, and diabetes [119, 122, 123].
Cassia siamea Lam

Synonyms: Senna siamea Lam.; Senna sumatrana Roxb, Cassia florida Vahl, Cassia arayatensis Naves, Cassia sumatrana Roxb, Cassia arborea Macfad, Cassia gigantea DC., and Sciacassia siamea Lam. It is widely spread in South Africa, East Africa, Brazil, Mexico, China, West Indies, and Asia [124]. The fruits prevent convulsion and expel intestinal worms [125, 126]. The plant treats asthma and microbial infections [124]. Leaves treat stomach pains, malaria, constipation, sleeplessness, liver disorder, hypertension, cough, and toothache; the roots are used for diabetes mellitus, malaria, and snake bite; flowers and seeds are used to cure convulsion, typhoid fever, snake and scorpion bites while the stem is used against herpes, scabies, rhinitis, urogenital diseases, diabetes and as a laxative [127] [128]. The plant is also used to reduce blood sugar levels and to treat abdominal pain, fever, typhoid, menstrual pain, and jaundice [129].

Cassia mimosoides

Synonyms: Chamaecrista mimosoides L., Chamaecrista nictitans (L.) Moench, Cassia aeshynomene D.C, Cassia aspera Muhl. ex Ell., Cassia multipinnata Pollard, Cassia procumbens Stickman, Cassia Chamaecrista lauricoma Kuntze, and Cassia nictitans Sickmann. It is native to China but has spread to different countries [130]. The leaves cure swelling of the legs during pregnancy; [131], facilitate urination, and act as an anti-inflammatory agent [130]. Roots treat colic pain, stomach spasms, and diarrhea [132]. The plant also cures chronic hepatitis and other liver diseases, including liver cirrhosis and liver fibrosis [133].

Cassia occidentalis L

Synonyms: Senna occidentalis (L.) Roxb, Cassia caroliniana Walter, C. obliquifolia Schrank, C ciliata Raf, Cassia planisiliqua L., C. falcate L. Cassia macrodendria, Cassia torosa Cav, and Ditrimexa occidentalis (L.) Britt & Rose. It is distributed in Asia, South America, Australia, and Africa [134]. The plant treats diarrhea and dysentery [135]. The leaves are used for throat infections, itching, and bone fractures. It also manages fever, anaemia, leprosy, tuberculosis, menstrual, and liver problems [136]. Moreover, the leaves and seeds are used for skin disorders such as eczemas and mycoses [137]. Additionally, the plant is used to treat cancer, eye inflammation, and venereal diseases [138]. The roots cure diabetes, elephantiasis, epilepsy, and convulsion [139, 140].

Cassia Italica Mill.

Synonyms Senna italica Mill Cassia obovata Collad, Cassia aschrek Fors., Its origin is in the equatorial region and surrounding areas [141]. The plant treats venereal diseases [142]. The roots are used for dysmenorrhoea, nausea, and liver problems, whereas the pods and the leaves are used for burns, skin diseases, and ulcers [143]. Leaves are used as hair conditioners, while roots are used to cure diarrhea [144]. The whole plant is used as a urinary tract purifier and laxative, while its leaves, seeds, and pods treat elephantiasis and eye diseases and as a purgative [145].

Cassia afrofistula Brena

Synonyms: Cassia beareana Holmes and Cassia kassneri Bak. F. It is distributed in Madagascar, Mozambique, Tanzania, and Kenya [146]. The roots treat hernia and body weaknesses, while the stem is used for kidney diseases and liver pains [60]. The bark is used as an aphrodisiac and laxative. The bark also cures pneumonia, fever, stomachaches, backache, and blood pressure [147]. It is also used to manage uterine complaints, fever, malaria, syphilis, gonorrhea, pneumonia, and snakebites [147]. Bioactive compounds have not been isolated from this plant.

Cassia falcinella Oliv

Synonym: Chamaecrista falcinella Oliv. It is found in Kenya, Tanzania, Uganda, Rwanda, Namibia, Zambia, Zimbabwe, Mozambique, Botswana, and DR Congo [146]. The roots are used as an aphrodisiac and in treating gonorrhea [148]. Its leaves are used to cure broken bones and rheumatism, while the roots are also used to treat diarrhea [146]. Bioactive compounds have not been isolated from this plant.

Cassia kirkii Oliv

Synonym: Chamaecrista kirkii Oliv. It is widely spread in tropical and subtropical Africa [149]. Leaves are used for upsetting pains [150]. The plant is used for skin diseases and fertility [151]. Bioactive compounds have not been isolated from this species.
Cassia leptocarpa Benth

Synonyms: Senna hirsuta L., Cassia caracassana Jacq., Cassia hirsuta L., Cassia tomentosa L., Cassia longisiliqua Blanco, Cassia venenifer Rodsch. Ex G.Mey, Cassia neglect Vogel var. acuminata Benth, Cassia pubescens Jacq and Cassia gooddingii A. Nelson. It is distributed in North, Central, South America, and tropical regions [152] [153]. It is used to treat liver diseases, malaria, high blood pressure, diarrhea, typhoid fever, and skin rashes and to reduce cholesterol levels [154].

2. CONCLUSION

The Genus Cassia has been widely used in Chinese, Ayurveda, African, and South American folklore medicine systems to manage various ailments. Various studies have been done on their crude extracts and phytochemicals from different plant parts of the individual species of this Genus. It has been established that several species have a wide range of bioactivities: antimalarial, larvicidal, antimicrobial, wound healing, laxative, antiasthmatic, hepatoprotective, antidiabetic, antiparasitic, antioxidant, analgesic, anti-inflammatory and anticancer.

Regularization, documentation, and the development of the pharmacopeias based on the folklore are still not well articulated in some of these systems, such as in Africa and, largely, the Amazonia and the farthest East Asia. These shortfalls have been the loopholes that the allopathic drug developers have exploited to the disadvantage of the indigenous drug regions. Several products, like Cinchona officinalis L, Artemisia annua L. and, lately, Adansonia digitata L., are currently plundered by the Wet pharmaceutical without any meaningful returns to the raw material producers. This Genus is being subjected to the same fate.

Overall, the ethnobotany of Cassia species is quite diverse, and these plants continue to play an important role in traditional practices and customs worldwide. However, it is important to note that all species of Cassia have not been thoroughly researched, and in some cases, the safety and efficacy of traditional uses have not been scientifically proven.

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