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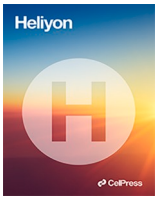

Review article

The genus *Commelina*: Focus on distribution, morphology, traditional medicinal uses, phytochemistry, and Ethno-pharmacological activities: An updated literature review

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ABSTRACT

Natural plant-based medicines have gained in popularity, replacing artificial models and chemicals as a result of new pharmacological discoveries. The increased popularity and acceptability of herbal medications such as *Commelina* arose from the assumption that all-natural products are safe, readily available, and inexpensive. The genus *Commelina* (Commelinaceae), which has over 200 species, has long been utilized as a treatment for a variety of ailments and conditions around the world. However, to the authors' knowledge, there are no Comprehensive scientific reports of many medicinally important species of the genus *Commelina* under one roof. The current narrative review aims to present an updated overview of the various species of *Commelina* focusing on its morphology; geographical distribution; traditional medicinal use (species type, parts of the plant used, the mode of action, ailments treated, and countries practicing); phytochemical constituents; and pharmacological properties. The data search approach was carried out utilizing English-language electronic databases such as PubMed, Web of Science, Scopus, Science Direct, Research Gates, Ethnobotany Research and Applications, and Google Scholar. Using key terms such as "medicinal plant," "genus *Commelina*," "traditional medicinal usage of *Commelina* species," "photochemistry of *Commelina* species," and "pharmacological (biologic) activities of *Commelina* species" numerous searches and in-depth discussions are conducted. It was found that many *Commelina* species contain bioactive-phytochemicals (secondary metabolites) with a variety of structural kinds, including alkaloids, phenolics, flavonoids, glycosides, tannins, saponins, sterols, anthocyanins, and others which are presumed for their pharmacological activities. According to the invitro and preclinical reports, the *Commelina* species have shown anti-diabetic, antioxidant, anti-microbial, analgesic, anti-inflammatory, anti-cancer, hepato-protective, diuretic, fertility-inducing, anti-diarrheal, and anthelmintic activity, sedative, and anxiolytic activities. Although standardized extracts and phytochemicals derived from numerous *Commelina* species are presumed to provide safer alternatives for treating a variety of human ailments, the phytochemistry and pharmacology of the genus' plants have yet to be thoroughly investigated, both in preclinical studies with various animal models and in large-scale clinical trials. The authors also advocate for future collaboration among scientists, pharmaceutical firm owners, and other interested parties to develop novel *commelina* drugs.

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1. Introduction

1.1. Background

The World Health Organization (WHO) defines a medicinal plant as one that has parts in its organ that can be utilized therapeutically or as a basis for the production of potent medications [1]. Therapeutically effective medicinal plants are utilized as raw materials to create pharmaceuticals and herbal remedies. They contribute significantly to a country's natural resources and are crucial as primary healthcare resources for rural residents [2].

Throughout the world, herbal medicines are increasingly being used to treat a variety of health problems in healthcare practices [3]. According to WHO, herbal medicine is estimated to be the primary source of health care for 80 %–90 % of Ethiopians [4], mostly because they are less expensive and more accessible than modern medicines and because traditional medicines are more acceptable from a cultural and spiritual standpoint [5].

Natural plant-based remedies have grown in popularity, replacing artificial models and chemicals as a result of new pharmacological findings. According to current scientific thought, it would be preferable to look for therapeutic leads or hit molecules in plants and other natural sources that have not yet received substantial research. The growing popularity and acceptability of herbal medicines like *Commelina* stemmed from the belief that all-natural goods are safe, inexpensive, and freely accessible.

1.2. Rational of the study

Research efforts in both rich and developing countries have expanded, but healthcare demands have yet to be addressed. there are serious concerns concerning the pharmacognosy and standardization of herbal medicine when compared to conventional medications. Although the genus *Commelina* has a wide range of healthcare uses around the world, to the best of the authors' knowledge, there is no comprehensive, updated assessment of all species under one roof. Previous literary attempts on the *Commelina* species did not focus on phytochemistry (secondary metabolites) and the pharmacological or biological properties discovered in their members. This thorough and updated literature review evaluates the thorough discussion of the genus *Commelina's* morphological description, traditional medicinal uses, phytochemistry, and pharmacological (biological) aspects found in the current review to close this knowledge gap and give readers the most recent information on the genus. Additionally, it is expected that this comprehensive study would stimulate collaboration between scientists and pharmaceutical companies to invest in the *Commelina* species to uncover a possible source for the development of novel medications from different parts of the *Commelina* species.

2. Methodology

2.1. Literature searching strategy

The data search approach was carried out utilizing English-language electronic databases such as PubMed, Web of Science, Scopus, Science Direct, Research Gates, Ethnobotany Research and Applications, and Google Scholar. Using key terms such as "medicinal plant," "genus *Commelina*," "traditional medicinal usage of *Commelina* species," "photochemistry of *Commelina* species," and "pharmacological (biologic) activities of *Commelina* species".

2.2. Inclusion criteria

The morphology, distribution, phytochemistry, traditional medicinal usage, and pharmacological activity of Commelina species were among the subjects covered by English-language papers published between 1992 and 2023, as long as the full text and abstract were accessible.

2.3. Exclusion criteria

Research outputs published in non-English languages**;** Publications that prejudice incomplete discussions, Research publications that are not publicly available when searching the literature; articles that are not listed completely (abstract only)**;** articles that do not focus and discuss on, distribution, phytochemistry, traditional medicinal usage, and pharmacological activity of *Commelina* species.

3. The geographical distribution and morphological description of the genus *commelina*

There are 200 species in the family Commelinaceae, which includes the genus *Commelina*. Due to the thread-like secretion that emerges when the stem is cut and the brief flowering time, the genus is also known as dayflowers and spiderwort. In Africa and Asia, the genus is widely dispersed in warm-temperate, subtropical, and tropical regions. Furthermore, it is naturalized throughout North and South America [6]. Kanda Loa is the local name for the annual herb *Commelina appendiculate*. Eastern India, Sri Lanka, and Bangladesh are the regions where it is sold [7]**.** *Commelina paludosa* Blume is found in parts of Bangladesh, southern China, Burma, Bhutan, and Burma [8].

The common names "trapoeraba" and "erva-de-santa-luzia" refer to the herbaceous blooming plant *Commelina erecta* L. It was created in the tropics at first, but it has subsequently become accustomed to subtropical and temperate climates. It is regarded as an

invasive plant since it reproduces by cuttings and seeds [9].

The roots of the species of Commelina are primarily fibrous, except for *Commelina maculate* and *Commelina suffruticosa*, which have tuberous roots. The stem is elongated, rounded, and solid, and the nodes are swollen or brittle in almost all genera and species of

Table 1
Traditional uses of various *Commelina* species' components for medical purposes.

Species	Plant Part used	Mode Of use	Ailments	The country's Traditionally used *Commelina* species	Reference (s)
Commelina benghalensis L	NA	NA	Jaundice, headache, constipation, leprosy, fever, snakebite, mouth thrush, insanity, epilepsy, mental illness, emollient	Indian	[14]
Commelina benghalensis L	NA	NA	Diuretic, febrifuge, antiepilepsy, antifungal for mouth thrush, antipyretic and anti-inflammatory	China	[15]
Commelina benghalensis L.	NA	NA	Leprosy, laxative, and inflammation	Pakistan	[16]
Commelina benghalensis L.	Stem	NA	Wound healing	Cameroon,	[17]
Commelina benghalensis L.	NA	NA	Infertility in women	Lesotho	[17]
Commelina benghalensis L.	NA	NA	Sore feet, sore throat, burns, eye complaints, and leprosy	Ghana	[18]
Commelina benghalensis L.	Flower	In the form of juice	Eye problem	Zanzibar	[17]
Commelina benghalensis L.	Plant sap	NA	Ophthalmia, sore throat, and burns	East Africa	[17]
Commelina benghalensis L.	Whole plant	Crushed and packed into the skin or over a wound	Wound ecbolic	Uganda	[19]
Commelina benghalensis	stem	NA	to perform abortions	Uganda	[20]
Commelina communis L.	Leaves	NA	Diabetes mellitus	Korea	[21]
Commelina communis L.	NA	NA	Wind-heat type common cold, sore throat, fever, dropsy, diuretic, acute tonsillitis, urinary infections, dysentery, acute intestinal enteritis, and obesity	China	[7,21]
Commelina diffusa Burm.f.	Leaves, Stem	NA	Abscess, boils, malaria, insect, snake, and bug bites, edema, laryngitis, sore throats, acute tonsillitis, otitis media	In Asia, Africa, and America	[22]
Commelina diffusa	Leaves	Crushed and applied topically	Abscesses, wounds, and painful joints along with dermatitis, burns, snake bites, or insect stings in, Urinary tract infections, swellings, inflammation, diarrhea	China	[23,24]
Commelina diffusa	stem	Stem juice	laryngitis and sore throats acute tonsillitis, pharyngitis, otitis media, and nose bleeding	China	[24]
Commelina diffusa	NA	NA	Hemorrhoids, an irritated uterus, laryngitis, leprosy, malaria, mumps, otitis media, painful menses, pharyngitis, rheumatoid arthritis, sore throats, snake bites, tonsillitis, and tumors	Nepal	[24]
Commelina diffusa	NA	NA	as a refrigerant and tonic to heal stomach and groin ailments	Egypt	[24]
Commelina diffusa	Leaves	Crushed and applied topically	Urinary tract infections, respiratory tract infections, diarrhea, enteritis, and hemorrhoids	In Africa, America, and some parts of Asia	[23]
Commelina nudiflora L.	Leaves	NA	Swelling of the groin, for dressing wounds after circumcision	Sirraleon	[25]
Commelina coelestis Willd.	NA	NA	Diarrhea	Mexico	[26]
Commelina appendiculata C.B.Clarke	Whole plant	NA	Cats and dogs bite	Bangladesh	[27,28]
Commelina erecta L	stems and leaves	NA	sore throat, eye infections and inflammations, wound healing, and dermatological problems, but also in women's infertility, diabetes, rheumatism, hypertension, and diarrhea	tropical America and Brazil,	[29]
C. latifolia	fresh leave	The fresh leaves of *C. latifolia* crushed and the wound area is covered with crushed leave	prevent wound-induced pain and inflammation	Ethiopia	[6]
Commelina africana	leaves	the macerate of the leaves	dermatitis, itchy skin rashes, burns, skin aging, stings	DR Congo,	[29]

Note: NA=Not specified.

Table 2
The structures of the compounds isolated from *Commelina* species.

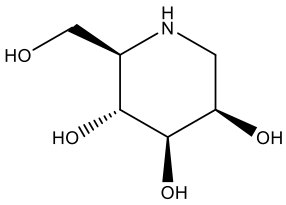
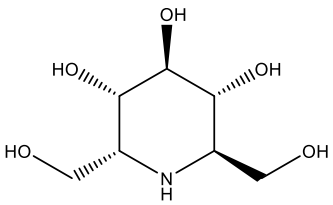
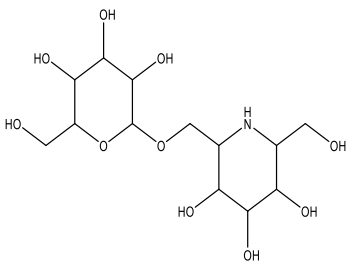
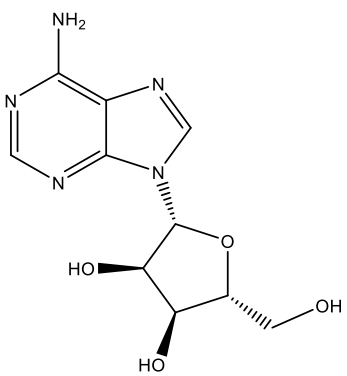
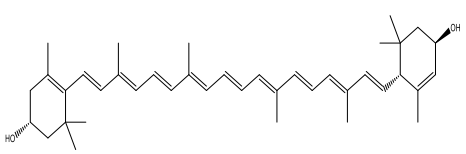
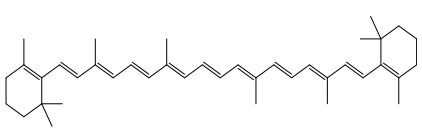
Compound isolated	Chemical structure	Species	Reference
Alkaloids			
1-deoxymannojirimycin		*Commelina communis*	[32]
α-homonojirimycin		*Commelina communis*	[32,33]
7-*O*-β-D glucopyranosyl-α-homonojirimycin		*Commelina communis*	[32,33]
Adenosine		*Commelina communis*	[33]
Terpenoids			
Lutein		*Commelina benghalensis*	[31]
β-carotene		*Commelina benghalensis*	[31]

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Table 2 (*continued*)

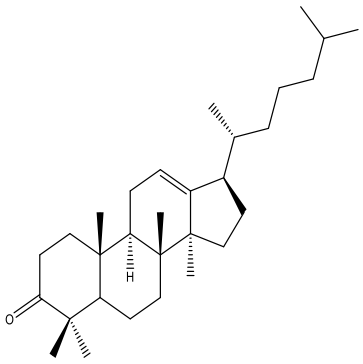
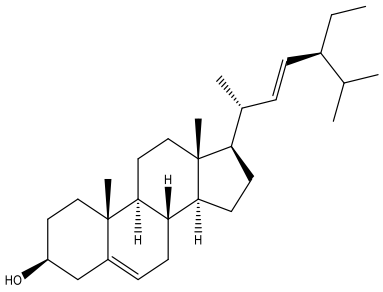
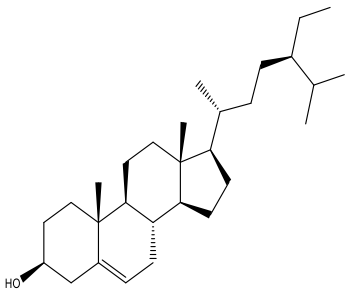
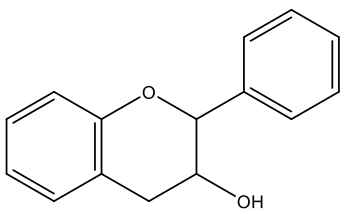
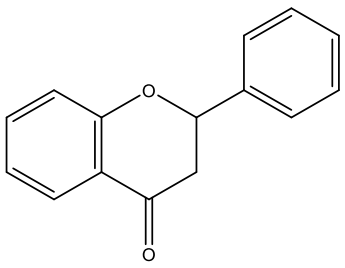
Compound isolated	Chemical structure	Species	Reference
Dammara- 12-en -3-one		*Commelina benghalensis* L.	[34]
Stigmasterol		*Commelina benghalensis and Commelina diffusa*	[18,22, 34]
β- sitosterol		*Commelina benghalensis* L.	[18]
Flavonoids			
Flavan-3-ol		*Commelina erecta and Commelina diffusa*	[35]
Flavanone			

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Table 2 (*continued*)

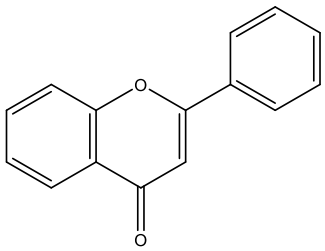
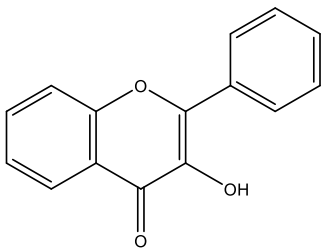
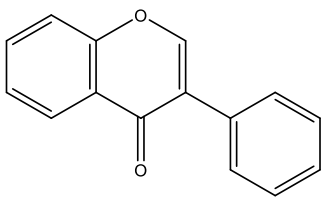
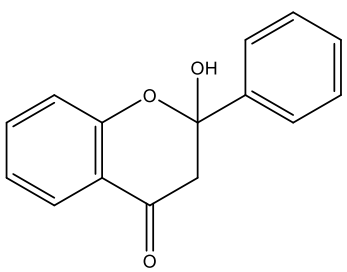
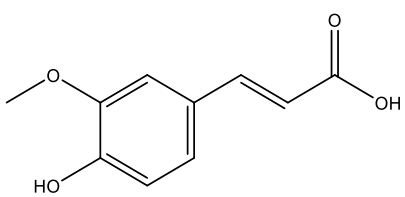
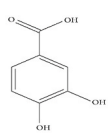
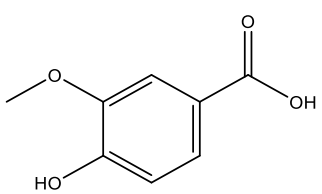
Compound isolated	Chemical structure	Species	Reference
Flavone			
Flavonol			
Isoflavone			
Flavanonol			
Phenolic acidsr			
Ferulic acid		*Commelina communis* Linn.	[33]
Protocatechuic Acid (PCA)			
Vanillic acid			

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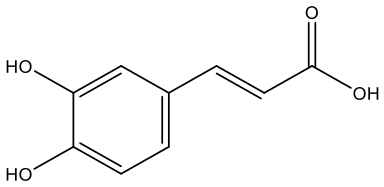
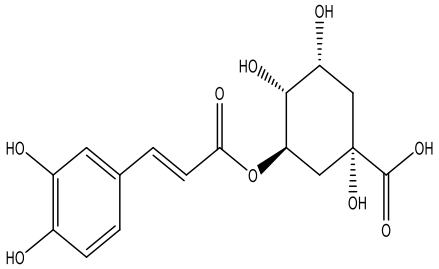
Table 2 (*continued*)

Compound isolated	Chemical structure	Species	Reference
Caffeic acid			
Chlorogenic acid			

Commelina. The leaves are simple, cauline, spiral, petiolate, sheathed at the base, and sheaths (the summit of the sheath of *Commelina benghalensis* L, *Commelina maculata* Edgew. and *Commelina paludosa* Blume bear reddish brown hairs) are closed. The flowers are bisexual, actinomorphic, or zygomorphic and staminate [10]. Typically, the fruit is a dry, dehiscent capsule with few seeds. seed with a linear hilum and mealy endosperm. Epigeal germination is present in the seedling; the hypocotyl is absent; the first cotyledon is sheath-like, glabrous, and transparent; the first leaf has a closed sheath, parallel veins, and a rounded apex [11].

4. Traditional medicinal uses of the genus *commelina* species

Many sections of the genus *Commelina* are utilized extensively in a variety of traditional medical ethnobotanical treatments worldwide, as summarized in Table 1. The entire plant from this genus is used to treat female infertility, and newborn urine retention, as a child tonic, and as a charm for luck [12]. It is documented that the Amhara, Shinasha, Agew-Awi, and other peoples of Northern Ethiopia utilize the root and leaf of the genus *Commelina* topically to cure foot wounds [13].

5. The phytochemistry of the genus *commelina*

Phytochemical analysis of the genus has revealed the presence of several different classes of compounds, including alkaloids, coumarins, steroids anthocyanins, terpenoids, iridoids, flavonoids, carbohydrates, tannins, and glycosides, as well as some other molecules like aliphatic alcohols, polyols, and phenolic acids [28]. The major phytochemicals and their respective structures isolated from *Commelina* species are summarized by Table 2. *Commelina Africana* contains secondary metabolites including flavonoids, terpenoids, saponins, and tannins [30]. The phytochemical examination of *Commelina communis* indicated the presence of lignans, alkaloids, aliphatic alcohols, phenolic acids polyols, tannins, flavonoids, and glycosides [31].

The crude fractions of *Commelina paludosa* were proven to include flavonoids, glycosides, saponins, and gums using n-hexane extraction, chloroform, and ethanol. *Commelina paludosa* contains tannins when exposed to chloroform and ethanol but not when exposed to n-hexane [8]. Alkaloids, flavonoids, lignans, terpenoids, and sterols are the main secondary metabolites found in the genus *Commelina* [36].

6. Pharmacological (biological) activities of the genus *commelina*

The bioactive elements discovered in the genus *Commelina* include alkaloids, lignins, phenolic acids, and glycosylated flavonoids. Because α-glucosidase is inhibited, these compounds have antibacterial, antioxidant, antiviral, and anti-hyperglycemic effects. The β-carbolines alkaloids taken from *Commelina communis* have anti-carcinogenic effects [37].

6.1. Anti-microbial activity

Gram-positive and gram-negative bacteria, as well as fungi, are all susceptible to the moderate to potent antibacterial effects of *Commelina diffusa* leaf extract [38]. Contrarily, *Commelina diffusa* leaf aqueous methanolic crude extract is more effective against *Staphylococcus aureus* [39]. *Commelina cyanea*'s alkaloids and saponins have been used as antibacterial agents by complexing extracellular proteins and rupturing microbial membranes, which causes cell death in bacteria [40].

Staphylococcus aureus, Escherichia coli, Enterococcus faecalis, and *Pseudomonas aeruginosa* are all susceptible to the effects of

Commelina erecta, *Commelina africana*, and *Commelina benghalensis* [9,30,41]. The antibacterial activity of *Commelina benghalensis* may be due to the presence of plant sterols [18], tannins, flavonoids, thymol oil [17], octadecadienoic acid, and hexadecanoic acid [42]. Effective antibacterial components were present in the ethyl acetate extract of *C.communis* Linn, with MICs of 10 mg/mL against *Salmonella typhi*, *Escherichia coli*, *Staphylococcus aureus*, and *Staphylococcus albus* [43].

According to published research, *Commelina erecta* and *Commelina benghalensis* are effective against a variety of bacteria, including *Pseudomonas aeruginosa*, *Salmonella typhi*, *Escherichia coli, Staphylococcus aureus, Staphylococcus pyogenes,* and *Staphylococcus saprophyticus* [9,41].

The fresh plant material of *Commelina benghalensis'* ethanol extract contains coumarins, which are highly effective against *Candida albicans* [19]. Another study revealed the anti-fungal activity of the crude methanolic extract from *Commelina diffusa* plant leaves. As a result, a variety of skin conditions are treated with it [31]. *Commelina diffusa* aqueous methanolic leave extract showed better antibacterial activity than the standard drug against *Staphylococcus aureus* with a zone of inhibition of 13 mm [24]. Aqueous and methanolic extracts of freshly harvested *Commelina cyanea* leaves and stems have antifungal action against *Epidermophyton floccosum*, which may be attributed to tannins, terpenoids, alkaloids, flavonoids, and saponins [40].

6.2. Anti-oxidant activity

The antioxidant activity of the methanolic extract of leaves from *Commelina diffusa* is demonstrated using reference standards such as ascorbic acid and tert-butyl-1-hydroxytoluene. The outcomes demonstrated its mild antioxidant activity, which reduces oxidative stress [38]. This plant has antioxidant properties due to the presence of secondary metabolites such as alkaloids, reducing sugar, phytosterols, flavonoids, and triterpenoids. Glucoluteolin, orientin, and isoorienin may all contribute to the antioxidant activity of *Commelina communis* L., but the first one has a superior antioxidant activity to the latter two [18].

The antioxidant properties of the flavonoids in *Commelina nudiflora* preparations in acetone, chloroform, and ethanol have been established [25]. Using the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) technique, *Commelina paludosa* fractions in ethanol, chloroform, and n-hexane all showed antioxidant activity; however, the n-hexane fraction showed stronger activity than the first and second fractions [8]. The leaves of *Commelina erecta* contain caffeic acid, which has antioxidant capabilities against the oxidized state brought on by the free radical nitric oxide, according to a study conducted by Santos et al. (2020). Santos et al.'s study (2020) found that *Commelina erecta* leaves contain caffeic acid, which has antioxidant capabilities against the oxidized state brought on by the free radical nitric oxide.

Commelina benghalensis includes dietary and medicinal antioxidants that prevent oxidative damage, slow down aging, and lower the risk of cancer and other cardiovascular and neurological conditions. Conversely, it has been demonstrated through experimentation that *Commelina benghalensis* contains phenolic groups. This group is effective in the pharmaceutical sector because it possesses antioxidant action that prevents the formation of free radicals. *Commelina benghalensis* fresh aerial parts extracted in acetone and methanol have anti-oxidant properties that prevent free radicals [31]. Flavonoids, apigenin, vanillic acid, protocatechuic acid, ferulic acid, and kaempferol are present in this plant, which gives it substantial anti-oxidant properties [41].

6.3. Sedative and anxiolytic activity

Aerial *Commelina benghalensis* components were examined in mice behavioral models using chloroform, pet ether, n-butanol, and hydromethanol fractions. The results showed how effective these fractions' sedative and anxiolytic effects were. Numerous flavonoids are GABA (gamma-aminobutyric acid) receptor ligands in the central nervous system. As a result, plants that contain alkaloids and flavonoids have these effects [16,44].

A study on CNS depressive effects found that the chemical components of *Commelina diffusa* Burm can cause depression. Nevertheless, it is unclear precisely which phytoconstituents have this effect [39]. *Commelina appendiculata* also has depressant characteristics. These substances include sugars, tannins, alkaloids, and flavonoids [2].

6.4. Nephro-protective activity

Albino rats were administered dosages of crude medicine, ethanol-extracted from *Commelina diffusa* leaves, at 200 and 400 mg/kg/day for 20 days. The anticancer drug doxorubicin was also administered at the same time as the *Commelina diffusa* extract. This crude extract created a normal kidney stroma with Bowman's capsule, glomeruli, and renal tubules in Albino rats [24,31].

6.5. Hepato-protective activity

Alcohol use is one of the many factors that might induce hepatic problems. Despite alcohol decoctions being more effective, *Commelina benghalensis* alcohol and water decoctions are both efficacious against the hepatic tissue damage produced by paracetamol [41]. The root of *Commelina benghalensis* has a hepato-protective effect since it contains flavocommelin, beta-carotene, and n-octacosanol, claim Sambrekar et al. (2009). *Commelina diffusa* provides defense for the liver. Cell integrity is enhanced following the administration of 200 and 400 mg/kg of crude drug extract to albino rats. Doxorubicin, however, caused patchy inflammation and neutrophil infiltration in these rats [24,31].

6.6. Anti-cancer activity

C. benghalensis methanol extract had antiproliferative effects on leukemic Jurkat-T cells. Similarly, sub-fractions of n-hexane and dichloromethane from *C. benghalensis* acetone extracts at 40 and 120 μg/mL showed antiproliferation properties against Jurkat-T cells. Extract of *C. benghalensis* root in ethanol, benzene, n-hexane, methanol, and chloroform showed varying antiproliferation activity on cells of breast and prostate cancer [20].

Commelina benghalensis methanol extract inhibits albino mouse tumor growth by significantly reducing its anticancer efficacy. Moreover, it increased the mice's hemoglobin level and lengthened their life span [31]. It may also exhibit this behavior as a result of the presence of sterols such β-sitosterol and stigmasterol [18]. Like the methanolic decoctions of *Commelina benghalensis*, the hydro-alcoholic decoctions of the leaves did not cause any dangerous reactions or fatalities, even at large dosages of 2000 mg/kg of body weight [41]. The cytotoxic action of *Commelina appendiculata* is influenced by alkaloids, phenolics, flavonoids, and tannins steroids [2].

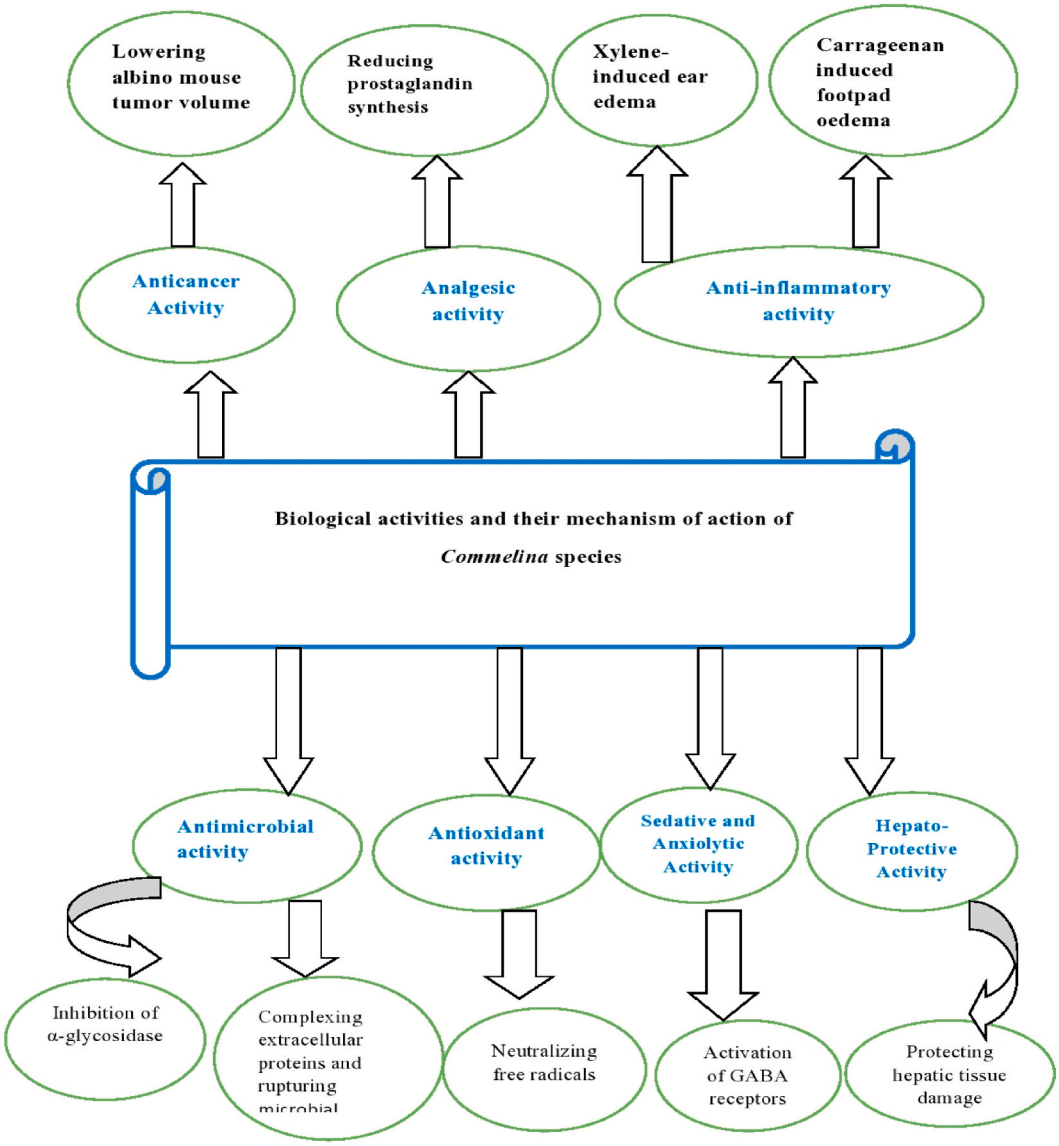


Fig. 1. a diagram displaying a variety of phytochemical components identified in Commelina, as well as the compounds' expected pharmacological mechanisms of action.

6.7. Analgesic and anti-inflammatory

In contrast to *Commelina benghalensis'* methanolic decoctions, even at high dosages of 2000 mg/kg of body weight, the hydro-alcoholic decoctions of the leaves did not result in any adverse effects or fatalities [41]. Alkaloids, flavonoids, steroids, phenolics, and tannins all affect *Commelina appendiculata's* ability to cause cell death [2]. Hasan et al., 2010 demonstrated that *Commelina benghalensis* is utilized as an analgesic by reducing prostaglandin synthesis [45]. In animal models, C. *latifolia* shown encouraging anti-inflammatory and antinociceptive properties [6]. *Commelina oblique* Vahl showed anti-inflammatory activity due to the presence of 3, 5, 7, 3′, 4′-pentahydroxy flavone 7-*O*-β- L-ribopyranosyl-3′-*O*-β-Dgalactopyranosyl [46].

Commelina benghalensis contains alkaloids, sterols, caffeine, anthocyanins, carotenoids, and flavonoids, all of which contribute to the analgesic effects of the plant [16,45]. *Commelina benghalensis* is used to cure inflammation due to the presence of flavonoids, tannins, and saponins in the hydroalcoholic extracts of the leaves. *Commelina benghalensis* extract significantly decreased xylene-induced ear edema at doses of 200 mg/kg and 400 mg/kg. This indicates the anti-phlogistic and substance P inhibition properties of *Commelina* extracts [47].

The investigation of the *Commelina appendiculata* ethanol extract revealed cytotoxic and analgesic effects for the first time [7], and it was utilized to treat heart conditions [17]. Resins and balsams from this plant imply that it is used as an emollient and demulcent in addition to healing burns, wounds, rheumatism, and sore throats [17]. *Commelina diffusa* leaves contain anti-inflammatory compounds that stop the acute edema that carrageenan causes in the chick footpad. These compounds include alkaloids, flavonoids tannins, phytosterols, and triterpenoids [48]. Fig. 1 summarizes the pharmacological (biological) activities of the genus *Commelina*.

6.8. Diuretic, fertility-inducing, anti-diarrheal and anthelmintic activity

Commelina diffusa showed diuretic activity by reducing sodium ion reabsorption in the kidneys and its potassium-sparing effect [24]. The methanol decoctions of *Commelina benghalensis* are used as a prophylaxis of diarrhea by suffocating the propulsive movement of charcoal through the gastrointestinal tract, Similarly, this plant has anthelmintic activity through paralyzing then killing the parasites. Male and female infertilities are also treated with *Commelina* species [41].

6.9. Anti-diabetic activity

Ethyl acetate fraction of *Commelina diffusa* has a hypoglycemic effect due to 4-hydroxybenzoic acid, methyl gallate, lyratol F, *N-trans*-feruloyltyramine, *N-trans-p*-coumaroyl-3′,4′-dihydroxyphenylethylamine, and 1,2-dihydro-6,8-dimethoxy-7-hydroxy-1-(3,5-dimethoxy-4-hydroxyphenyl)-N^1, N^2-bis-[2-(4-hydroxyphenyl)ethyl]-2,3-naphthalene dicarboxamide using α-glucosidase and α-amylase inhibitory assays [24]. Methanol decoction of the whole *Commelina benghalensis showed* anti-diabetic activity in animals [41].

7. Conclusions and future perspectives

Herbal remedies blend traditional medicine and medical knowledge passed down through generations. It includes critical information on the selection, processing, and administration of herbal remedies for the prevention, control, and treatment of a variety of disorders. Plant-based therapies are effective in treating a range of disorders around the world. The genus *Commelina* is one of the herbal treatments discretely documented in several kinds of literature. The current Narrative review summarizes and updates its morphology, geographical distribution, phytochemistry, ethnobotanical/traditional uses, and Pharmacological or biological properties of different *Commelina* species. It was reported that the species of *Commelina* produce secondary metabolites with a wide range of Phytochemical/structural kinds, such as flavonoids, anthocyanins, alkaloids, phenolics, saponins, tannins, sterols, glycosides, and others. Standardized extracts and phytochemicals obtained from several species of *Commelina* reported to offer safer alternative medical therapies for a range of human illnesses. According to in vitro and preclinical reports from various scholars, several species of *Commelina* show strong anti-microbial activity which is attributed to the presence of alkaloids sterol, and saponins; anti-oxidant activity alkaloids, reducing sugar, phytosterols, flavonoids, and triterpenoids. Glucoluteolin, orientin, and isoorienin may all contribute to the antioxidant; sedative, and anxiolytic activity attributed to the presence of sugars, tannins, alkaloids, and flavonoids; hepatoprotective activity due to the presence of flavocommelin, beta-carotene, and n-octacosanol; *anti*-cancer activity influenced by alkaloids, phenolics, flavonoids, and tannins steroids; analgesic and anti-inflammatory due to alkaloids, sterols, caffeine, anthocyanins, carotenoids, and flavonoids and due to the presence of 3, 5, 7, 3′, 4′-pentahydroxy flavone 7-*O*-β- L-ribopyranosyl-3′-*O*-β-Dgalactopyranosyl, respectively; diuretic activity, fertility-inducing activity, anti-diarrheal and anthelmintic Activity antidiabetic activities 4-hydroxybenzoic acid, methyl gallate, lyratol F, *N-trans*-feruloyl tyramine, *N-trans-p*-coumaroyl-3′,4′-dihydroxyphenylethylamine, and 1,2-dihydro-6,8-dimethoxy-7-hydroxy-1-(3,5-dimethoxy-4-hydroxyphenyl)-N^1, N^2-bis-[2-(4-hydroxyphenyl)ethyl]-2,3-naphthalene dicarboxamide. This means that the current comprehensive study may provide an avenue to discover a unique therapeutic agent that outperforms conventional medicine in terms of cost, effectiveness, and minimal side effects. Therefore, it will be imperative that the pharmaceutical business, scientists, and other stakeholders make significant investments in this endeavor to achieve a unique medicinal alternative from those *Commelina* species showing promising pharmacological or biological activities. Yet, in terms of phytochemistry and pharmacology, the medicinal potential of the majority of the genus' plants has not been fully investigated; instead, complementary methods without trustworthy, experimentally verified data have been used. Hence, subsequent studies ought to focus on the numerous phytochemicals found in this genus, and pharmacological evaluations ought to be supplemented with the elucidation

of the mechanisms of action and the recognition of the associations between the structural characteristics and the activities.

Ethical approval and consent to participate

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Data availability statement

Data will be made available on request.

CRediT authorship contribution statement

Abebe Dagne: Writing – original draft, Validation, Supervision, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation. **Wubetu Yihunie:** Writing – review & editing, Visualization, Validation, Software, Methodology. **Getinet Nibret:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software. **Bantayehu Addis Tegegne:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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