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Ficus Sycomorus L (Moraceae): A review on its Phytopharmacology and toxicity profile



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ABSTRACT

Ficus Sycomorus (F. sycomorus), belonging to the family of moraceae, is an evergreen tree found in Nigeria and other parts of the world. It has several medicinal and culinary uses. This present review evaluated its traditional uses, phytochemical constituents,

pharmacological and toxicological effects. From this evaluation, bioactivity guided isolation and purification of its promising extracts is recommended to facilitate the discovery and development of its lead molecules as alternative therapies.

Key words: *Ficus sycomorus*, Ethnobotany, Phytochemistry, Pharmacological properties, Toxicity.

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INTRODUCTION

Ficus sycomorus (F. sycomorus), also known as fig-mulberry belonging to the family of moraceae is a semi-deciduous tree that grows up to 20 -21 m tall, not exceeding 46 m.¹⁻²

The name Ficus is the Latin word for fig, which originates from the Persian 'fica'. The species, sycomorus, originates from the Greek name sykamorea (i.e. sycamore). It connotes the fruit of the century (sykaomorom) in the Old Testament of the Bible, until Jesus cursed it to be barren, according to the gospel of Luke.³ It has about 40 genera and 1400 species.⁴

Its leaves resemble the shape of a heart. It has a dense round crown of spreading branches whose leaves are deep green.² Its flowering and fruiting occurs all the time, but mostly between July and December. Its fruits are between 2.5 to 5 cm in diameter. The color of its bark ranges from green, yellow to orange.¹ Within a year, it can produce several fruits.⁵ Its picture is depicted in [figure 1](#).

It is a widespread savannah tree which thrives in high water table areas, although it can also be found along rivers and streams.⁶ It is sacred in some localities such as Boran (Kenya), Luo (*South Sudan* and *Ethiopia*, *Northern Uganda* and *eastern Congo* (DRC), *Western Kenya*, and the *Mara Region of Tanzania*), Kikuyu (Kenya), Kamba (Uganda, Tanzania and South American country of Paraguay), Mbeere (Kenya), Tharaka (Kenya), and Meru (Kenya). Its wood is light and pale.⁷ [Figure 1](#) illustrates its physical features.

GENERAL DISTRIBUTION

Naturally, *F. sycomorus* originates from the Middle East west to Cape Verde Islands and to South Africa, Namibia and the Comoro Islands.⁸

It can be found in the following countries; Zambia and Zimbabwe, Syrian Arab Republic, Cote d'Ivoire, South Africa, Uganda, Swaziland, Djibouti, Egypt, Tanzania, Nigeria, Namibia, Angola, Sudan, Benin, Botswana, Burundi, Cameroon, Congo, Democratic Republic of Congo, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Israel, Kenya, Lesotho, Madagascar, Mozambique, Rwanda, Saudi Arabia, Senegal and Somalia.^{7,9}

It is very common in the Northern regions of Nigeria, Maiduguri, Sahel, Sudan, and Guinea savanna.¹⁰ It grows favorably in regions having well drained loamy, clay and sandy soils.⁵

Scientific classification

Taxonomically, *F. sycomorus* can be classified under the following categories; Kingdom (Plantae), subkingdom (Tracheobionata), superdivision (spermatophyta), division (magnoliophyta), class (magnoliopsida), subclass (hamamelididae), order (urticales), family (moraceae), genus (ficus), species (*Ficus sycomorus*).¹¹⁻¹²

Common/local names

Its common names in English include: Stranglerfig, Sycamore, sycamore fig, and bush fig. Locally, it is called Baure in Hausa, Tarmur in Kanuri.⁹

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Other local names include; Boran (Oda); Embu (Mukuyu), Swahili (mukuyu, mkuyu, chivuzi), Luhya (Omukhuyu), Luo (Olam), Nandi (Sebetuet), Pokot (Mangang), Teso (Eborborei, Eduro).⁷

Ethno-medicinal and Culinary uses

The ethno-medicinal uses of *F. sycomorus* are summarized in [table 1](#).

From folkloric claim, the white latex is applied topically on ulcers, burns, inflammation, and warts to prevent infections and promote healing among the Africans and South Americans. These inhabitants also use the boiled bark of *F. Sycomorus* in the treatment of sore throat, scrofula, respiratory and chest diseases and infections.¹⁴ The milky latex and its bark are useful against ringworm.³ The powdered stem bark is soaked in water for a period of 5 days and it is administered 3 times daily for treatment of pains, diarrhea, epilepsy, insomnia, and other mental disorders.^{8,13,15} It is one of the medicinal plants used in the treatment of animal diarrhea in Plateau State, Nigeria.²⁰

The leaves are used in the treatment of jaundice and as an antidote for snakebite. The root is also useful as laxative and antihelmintic.^{7-9,19} Its stem bark is used in Diabetes mellitus and other infectious diseases in the Northern Nigeria.⁴ In Kenya, its stem bark is used by herbalists to ameliorate diabetic complications.¹⁶ Its stem bark decoction is also useful in the treatment of infertility, low sperm count, and sterility in humans in various parts of Nigeria, including Borno State.

Eating the leaves and fruits of *F. sycomorus* stimulates lactation.¹⁷ Decoction of its leaf and stem bark aids in breast milk production in lactating mothers in Gurara Local Government area of Niger State.²¹ The bark decoction is used for the treatment of excessive menstrual flow.¹⁸ It is used in the treatment of cancer in the Northern part of Nigeria.²²

Its root had also been claimed to possess laxative properties. Eating the seed of *F. Sycomorus* helps in the prevention of microbial infections. The non-digestible nature of the seed helps to prevent constipation. It contains anti-nutritional constituents such as oxalate and phytates which prevent vitamins and mineral absorption. However, the anti-nutritional constituents can be minimized by cooking the seed.¹⁹ Its mature fruits can be cooked, eaten fresh or preserved for future use. The fruit is also useful for the preparation of alcoholic beverages. The cooked leaves can be mixed with groundnut cakes and eaten as food. The wood ash is used as an alternative to salt in Ghana.⁷ It is also useful as source of protein for ruminant animals and birds.⁵

PHYTOCHEMICAL CONSTITUENTS

Phytochemicals are responsible for the therapeutic and toxicological effects of several medicinal plants.²³ Studies on the phytochemical composition of various parts of *F. Sycomorus* had been documented.

According to Osama and coworkers, phytochemical screening of *F. Sycomorus* bark extract revealed the presence of phenols, tannins, flavonoids, coumarins, quinous, alkaloids, triterpenes, steroids, saponins, except diterpenes.²

Study by Al-matani and collaborators on the flavonoid contents of the leaf extracts of various solvent extracts, hexane, chloroform, ethyl acetate and butanol using aluminium chloride method revealed that chloroform extract had the highest total flavonoid content followed by hexane, butanol, ethyl acetate, and water extracts.³

Bello and coworkers had also reported the presence of flavonoids, glycosides, reducing sugars, resins, saponins and tannins in stem bark extract of *F. Sycomorus*.⁴

A study on the nutritional and phytochemical composition of *F. Sycomorus* seed revealed a moisture content of $9.65 \pm 0.10\%$ and crude fat value of 31.34% . Copper, sodium and zinc have the least value of mineral composition while phosphorus, magnesium and calcium contents were 380.24 ± 0.031 , 300.67 ± 0.021 and 390.77 ± 0.012 mg/100g respectively. Its tannin and alkaloid contents were $4.03 \pm 0.015\%$ and $5.65 \pm 0.021\%$ respectively.¹

Braide and collaborators also carried out a phytochemical study on the various parts, leaf, stem, root, seed and fruit of *F. Sycomorus*. Their results revealed the presence of tannin, hydrogen cyanide, flavonoids, saponins, alkaloids, oxalate and vitamin C in various proportions.²⁴

Phytochemical screening done on its aqueous leaves and fruit extracts revealed the presence of alkaloids, tannins, saponins, flavanoids and steroids.¹⁹

Its fruit and leaf extracts also revealed the presence of flavonoids, tannins, alkaloids and glycosides.¹³

Phytochemical screening of its methanolic stem bark extract showed the presence of tannins, saponins, terpenoids, flavonoids, phenols, steroids, except glycosides and proteins.²⁵

As part of antimicrobial studies on the etheric and acetonetic leaf and stem-bark of *F. sycomorus* extracts, phytochemical screening test carried out revealed the presence of more phenolic compounds in stem bark extract.²⁶

High resolution mass spectral (LC-MS) analyses on the hydromethanolic stem bark extract was also investigated as part of a study on the ability of *F. Sycomorus* to reverse behavioral impairment and brain oxidative stress in rats. The positive mode (ES+) of the high-resolution mass spectral LC-MS revealed a polar glycosidic flavonoid with a peak of retention (RT) at 3.45-3.46 min. It had a mass of 515 g with abundant absorption at $\lambda = 254, 280-310$ nm. Data base showed that the major compound was racemosic acid with formula C₂₂H₂₈O₁₄.²⁷

Proximate analyses of *Ficus asperifolia* and *F. sycomorus* leaves revealed higher protein content of 20.27 ± 0.17 and $17.24 \pm 0.71\%$ for *F. asperifolia* and *F. sycomorus* respectively when compared to those of some of Nigeria vegetables. Moisture, ash, lipid and carbohydrate contents were within the ranges expected in dry leafy vegetables. Oxalate, tannins, saponins, phytates, alkaloids and hydrogen cyanide (HCN) were some anti-nutrients present in both plants and they were below the established toxic levels.²⁸

PHARMACOLOGICAL PROPERTIES

Pharmacological studies on *F. sycomorus* is summarized in [table 2](#).

Antimicrobial properties

A study on the etheric and acetonic leaf and stem-bark extracts of *F. sycomorus* were evaluated for their antibacterial activity using disc-diffusion method against 10 clinical bacterial isolates, *Liseria monocytogeneses*, *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli* O:157, *Salmonella typhimurium*, *Brucella melitensis*, *Proteus mirabilis*, *Yersinia enterocolitica* O:9, *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. The study revealed that the etheric leaf and stem bark extracts showed no antibacterial activity against all isolates. However, the acetonic stem and leaf extracts inhibited the isolates, with *Salmonella typhimurium* being the most sensitive.²⁶

Anti-microbial activity of *F. Sycomorus* leaf extract against four bacterial strains (*E. coli*, *Proteus spp*, *S. aureus*, *H. infleunza*) using disc diffusion method revealed that the extract's zone of inhibition was in the range of 0-12 mm. The antimicrobial activity increased with increase in polarity.³

Assessment of the synergistic antibiotic effects of ethanol, methanol and aqueous stem bark extracts of *F. Sycomorus* against some bacteria isolates *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* revealed that the ethanolic extracts showed antibacterial and synergistic activity better than methanol and aqueous extracts.

S. aureus was more susceptible than *E. coli* and *P. aeruginosa* in the assay.¹¹

According to Wakil and colleagues, the aqueous stem bark extract of *F. Sycomorus* revealed anti-trypanocidal activity in *in-vitro* assay using *Trypanosome parasite*. Its activity was similar to the standard drug, Berenil. On the other hand, *in-vivo* studies of the extract in mice intraperitoneally inoculated with *Trypanosoma brucei* produced no anti-trypanocidal activity.⁹

In a related study, various solvent extracts of its unripe fruit and leaves were evaluated against clinical isolates of *Escharichia coli*, *Staphylococcus aureus*, *Pasteurella aeruginosa* and *Bacillus cereus*. The unripe fruit extract produced an inhibition zone of 3.5 mm – 14.7 mm while the stem-bark extract produced inhibition zone of 3.7 – 14.2 mm.¹³

Study by Dahiru and Thagriki revealed that the stem bark extract of *F. sycomorus* exhibited a strong antibacterial activity against pathogenic organisms, *E. coli*, *S. aureus*, *S. typhi*, *B. cereus* and *P. aeruginosa*.²⁵

Antibacterial investigation on various parts, leaf, stem, root, seed and fruit of *F. sycomorus* revealed that the fruit extract elicited bactericidal activity against some multi drug resistant bacteria, *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Proteus vulgaris*.²⁴

Antifungal activity of stem bark extracts of *F. sycomorus* chromatographic fractions was carried out against selected organisms, *Candida albicans*, *Trichophyton rubrum*, *Tricophyton mentagrophytes*, *Microsporium gypseum*, *Aspergillus niger* and *Aspergillus flavus*. Significant activity was recorded on hexane fraction against *Microsporium gypseum* at 0.31 – 5.63 mg/ml. The isolated fraction containing anthraquinone glycoside that was identified using preparative thin layer chromatography produced total inhibitory activity against all isolates.³¹

The methanol and aqueous stem bark, root bark, leaves and fruit extracts of *F. sycomorus* were tested against susceptible strain of *Mycobacterium tuberculosis* (M-Tb) using standard nitrate reductase assay techniques. From their findings, n-hexane fruit extract elicited activity against the strain. However, n-hexane leaves, root bark and stem bark extracts did not elicit activity against the susceptible M-Tb strain. Using thin layer chromatographic techniques, fraction "B" produced the lowest minimum inhibitory concentration against the tested M-Tb strain at 6.25 $\mu\text{g/mL}$.³⁰

Antimicrobial activity of methanol and acetone leaf extract of *F. sycomorus* leaf and stem-bark extracts were tested against multidrug resistant human pathogens, *Staphylococcus aureus* and

Acinetobacter baumannii pathogens using disc diffusion method. From the study, the acetone leaf and stem bark extracts produced the maximum antibacterial activity against *Acinetobacter baumannii* isolate with MIC values of 2.5, 4.9 mg/ml and MBC values of 3.8, 9.7 mg/ml respectively.³²

A study on the efficacy of *Caltropis procera* latex and F sycomorus leaf extracts in treating MRSA (methicillin-resistant *Staphylococcus aureus*) keratitis in rabbit was also investigated by Waiel and coworkers. Treatment of rabbits for 12 days with extracts inhibited MRSA and its symptoms.³³

Aqueous ethanol leaf and stem bark extracts of F. sycomorus and *Ficus platyphylla* both in the family of Moraceae were investigated for their antibacterial properties *in vitro*. F. sycomorus and *Ficus platyphylla* had zones of inhibition of 11.5 - 21.5 mm and 17.0 - 22.0 mm respectively. While the M.I.C and M.B.C values of F. sycomorus were 1.95, 31.3 and 3.91, 250 mg/ml respectively and those of *Ficus platyphylla* were 1.95 and 7.81 mg/ml and 3.91 to 62.5 mg/ml respectively.³⁴

Neuroprotective properties

Crude flavonoid fraction from F. sycomorus stem bark was investigated for its anticonvulsant activities in mice and chicks using sub-cutaneous Pentylenerazole and maximal electroshock models. The fraction exhibited 20% protection at 10 mg/kg against convulsed animals when compared to the standard, sodium valproate which exhibited 83% protection at 200 mg/kg.¹⁵

A study by Foyet and co-workers on behavioral impairment and brain oxidative stress induced by unpredictable chronic mild stress in rats revealed that the aqueous methanol stem bark of F. sycomorus reversed the harmful effects of unpredictable chronic mild stress on mood and behaviors of rats. Its anti-oxidative stress property was mediated through the antioxidant pathways.²⁷

Anti-diabetic properties

The stem bark extract of F. sycomorus was evaluated for its anti-diabetic properties in alloxan model in mice. Three doses of the extract, 50, 100 and 150 mg/kg significantly reduced blood glucose level when compared to the diabetic control. The extract caused steady reduction in blood glucose level at the first and second hours while a steep decrease was observed at the 3rd and 4th hours at all tested doses.¹⁶

Anti-diarrhea properties

The leaves extract of F. sycomorus and *Daniellia oliveri* were screened for anti-diarrheal properties. F. sycomorus at 50 and 100 mg/kg and *Daniellia*

oliveri at 200 mg/kg exhibited 60% and 80% protection respectively against castor oil induced diarrheal in mice. At a dose of 60 and 120 mg/kg, F. sycomorus butanol extract exhibited 100% protection. Butanol extract of F. sycomorus (0.16 - 2.56 mg/ml) and *Daniellia oliveri* (0.4 - 3.2 mg/ml) exhibited dose dependent relaxation on rabbit jejunum. In mice, the LD50 of butanol fraction of F. sycomorus and *Daniellia oliveri* were found to be 1141.4 and above 4000 mg/kg respectively.²⁹

Hepatoprotective properties

Histopathological studies on the hepatoprotective properties of wood, leaf, unripe fruit and root extract of F. sycomorus using N-nitrosodiethylamine and carbon tetrachloride induced hepatocarcinogenesis in rats revealed that the leaf and wood extracts produced remarkable hepatoprotective activities at 400 mg/kg while the stem bark and fruit extract produced moderate and no significant activities respectively.¹⁴

Hypotensive properties

Various parts including, leaves, stem and fresh unripe fruit of F. sycomorus were investigated for their blood pressure lowering effects in normotensive rabbits. Results revealed that intraperitoneal administration of the unripe fruit extract at 400 mg/kg produced more significant reduction in mean arterial blood pressure when compared to other doses of the extract. The unripe fruit extract was recommended to be used with caution because it produced remarkable arrhythmia.¹⁸

Antioxidant properties

A study by Dahiru and co-workers on the antioxidant properties of methanol stem bark extract of F. sycomorus at concentrations of 20, 40, 60, 80 and 100 mg/ml revealed that the extract exhibited DPPH (2, 2-diphenyl-2-picrylhydrazyl) and hydrogen peroxide (H₂O₂) scavenging activities as well as ferric reducing antioxidant properties (FRAP). The half maximum inhibitory concentration (IC₅₀) of the extract and L-Ascorbic acid in DPPH and FRAP assays were 24.02 mg/ml and 20.00 mg/ml as well as 28.0 mg/ml and 33.05 mg/ml, respectively. The IC₅₀ values for H₂O₂ scavenging assay were not specified.²⁵

Other studies

Hemagglutination inhibitory assay using various concentrations 20-100 mg/ml of F. sycomorus stem bark extract showed low, moderate and strong activities for blood groups A⁺, B⁺, AB⁺ and O⁺ while no activity was observed at lower concentrations, except for blood group B⁺ at 40 mg/ml. The extract

also caused a concentration (20 -100 mg/ml) dependent inhibition against hydrogen peroxide induced hemolysis in red blood cells.²⁵

Reports had also shown that supplementation of ruminant diets with processed leaf, fruit and combination of leaf and fruits of *F. sycomorus* promote growth and reproduction when compared with other feeds. The leaf had high protein content than the seed. The legume is unacceptable for food/feed due to the presence of quinolizidine alkaloids and some anti-nutritional agents which cause bitter taste.⁵

Using gas chromatography and mass spectroscopy, insecticidal and acaricidal activities of the bioactive phytochemicals from *F. sycomorus* leaves were determined. The study resulted in the identification of 22 main compounds in the leaf extract, which was more toxic in fumigant toxicity test than contact phase to insects. Concentrations of 0.1, 0.01 and 0.001% were found to be repellent to adult females of *Tetranychus utricae*, *Aphis craccivora* and *Sitophilus oryzae* respectively.³⁵

Toxicological effects

Toxicological studies on the stem bark root and fruit extracts of *Ficus. Sycomorus* are summarized in table 3.

A study was carried out on the effect of *F. sycomorus* stem bark extract on semen production in albino rats. The extract was administered at 200, 400 and 600 mg/kg and animals were euthanized on

days 10, 20 and 30th after treatment. Administration of the extract resulted to an increase in pH and sperm cell production.¹⁷

In a related study, similar doses of stem the bark extract above caused no significant change in mean live body weight, mean testicular size, scrotal diameter of treated rats when compared to control group. No histological lesions were observed in treated group.⁸

A study on single and combined intraperitoneal administration of stem bark extract of *F. Sycomorus* and *Nigella sativa* in rabbits for three weeks revealed no alteration in hematological and biochemical parameters.³⁶

Toxicological effect of the fruit extract of *F. sycomorus* at 400 mg/kg for 21 days and 800 mg/kg for 10 days in Wistar rats revealed no toxicity on liver, kidney and blood parameters. The extract showed immune boosting property.²⁴

Administration of aqueous root extract of *F. sycomorus* to Wistar rats for 2, 4 and 6 weeks at 320, 640 and 1280 mg/kg caused a significant reduction in body weight. There was no significant alteration in liver and kidney weights. However, there was toxicity in liver characterized by cytoplasmic vacuolation of hepatocytes, necrosis, dilatation of central vein and proliferation of bile ducts. The LD50 was estimated to be 3.20 ± 0.60 g/kg using Millar and Tainter method.¹⁰

Another study was conducted by Hassan and colleagues on the effects of anthraquinone glycosides and aqueous ethanol stem bark extracts of *F. sycomorus* on rat liver and kidney functions. Doses of 247.14, 617.86 and 988.57 mg/kg of anthraquinone glycosides and 307.14, 767.86 and 1228.57 mg/kg of aqueous ethanol stem bark extracts were administered for 28 days. Their results showed that 617.86, 988.57 mg/kg of anthraquinone glycosides as well as 767.80 and 1228.60 mg/kg of aqueous ethanol extract caused significant decrease in body weight as well as renal and hepatic indices. The authors concluded that the extract may be potentially toxic to the liver and kidney, hence the need to exercise caution during its usage.³⁷

In-vivo acute toxicity study on methanol stem bark extract of *F. sycomorus* using Lorke's method revealed that it produced toxicity at 1500 mg/kg.⁴

CONCLUSION

Currently, there is resurgence in the use of natural products, especially medicinal plants in prevention, treatment and management of several diseases. Natural products are perceived by the consuming public as safer alternatives to conventional therapies, especially in the face of known numerous

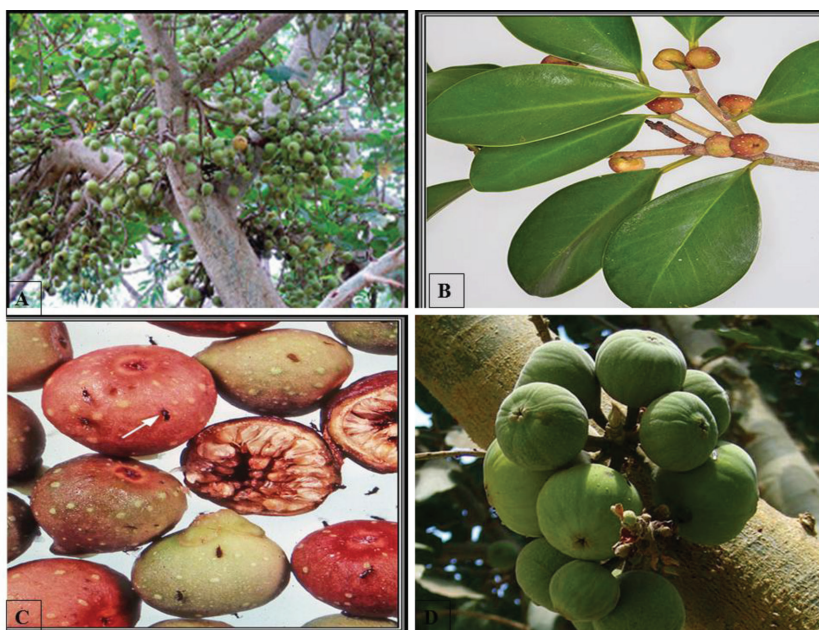


Figure 1 Picture of whole plant, leaves and fruits of *F. sycomorus*. Images were adopted from <https://www.google.com/search?q=ficus+sycomorus>. A (*F. sycomorus* tree), B (*F. sycomorus* leaves and fruits), C (*F. sycomorus* fruits), D (*F. sycomorus* tree and fruits)

Table 1 Reported folkloric uses of different parts of *F. sycomorus*.

Part used	Folkloric uses	References
White latex	Topically for ulcers, burns, inflammation, ringworm, and warts	3,13
Stem bark	Sore throat, scrofula, respiratory and chest diseases, epilepsy, diarrhea, insomnia, mental disorders, diabetes, infertility and low sperm count, excessive menstrual flow. It also used to increase breast milk production	4,8,14-18
Leaves	Jaundice, antidote to snake poison. Eaten to increase breast milk production. Used as a source of protein for ruminant animals and birds.	5,7-9,19
Root	Laxative and antihelminthic.	7-9
Fruit	Used to stimulate lactation, preparation of alcoholic beverages	7,17

Table 2 Summary of Pharmacological activities of *F. sycomorus*

Part used	Reported activity	Results	References
Stem bark.	Neuroprotective	Protection against convulsion, Reversed behavioral impairment	15,27
Stem bark.	Anti-diabetic	Reduction in blood glucose	16
Leaf extract.	Antidiarrheal	Protection against castor oil induced diarrhea, relaxation of rabbit jejunum.	29
Wood, leaf, unripe fruit and root.	Hepatoprotective	Protected NDEA and CCl ₄ induced hepatocarcinogenesis	14
Leaves, stem and fresh unripe.	Hypotensive	Reduction in mean arterial blood pressure	18
Stem bark	Antioxidant	DPPH, H ₂ O ₂ scavenging and FRAP activities	25
Various parts: Leaf, stem bark, fruit, seed, root	Antimicrobial properties	Antibacterial, antifungal,	3,9,11,13,24-26,30

H₂O₂ (hydrogen peroxide), FRAP (ferric reducing antioxidant power), DPPH (2, 2-diphenyl-2-picryl hydrazyl). CCl₄ (Carbon tetrachloride), NDEA (N-nitrosodiethylamine).

Table 3 Summary of toxicological effects of *F. sycomorus*

Part used	Biomarkers	Result	References
Stem bark	Reproductive toxicity	Increase in pH and sperm cell production	17
Stem bark	Reproductive toxicity	No alteration in body weight, mean testicular size, scrotal diameter and testes histology	8
Stem bark	Hematological and biochemical parameters	No toxicity observed	36
Fruit extract	Liver, kidney, blood parameters	No toxicity observed	24
Root extract	Liver, kidney, blood parameters	Toxicity in liver architecture	10
Stem bark	Renal and hepatic parameters	Liver and kidney toxicity	37

adverse effects associated with the latter.³⁸ It is on record that more than 80% of the world population depends on medicinal plants as alternative to conventional drugs in the healthcare sector.³⁹

Ficus sycomorus (*F. sycomorus*) is a plant with several medicinal and culinary relevancies. Some of its ethnomedicinal claims had been scientifically validated. This review evaluated its ethno-botany, phytochemistry, pharmacological properties and toxicological effects using electronic data bases. Its ethnomedicinal claims with validated

pharmacological properties include; anti-diabetic, anti-microbial, anti-oxidant, hepatoprotective, neuroprotective, antidiarrheal and hypotensive activities.

Most studies on *F. sycomorus* focused on antimicrobial properties. Majority of *in-vitro* and *in-vivo* studies were carried out using the stem bark. Phytoconstituents, phenols, tannins, flavonoids, alkaloids, steroids, saponins, glycosides, reducing sugars, resins, and terpenoids were found to be present in its various parts.

Out of 33 research article on reviewed *F. sycomorus*, researches done on 22 of them were conducted in Nigerian institutions, while 11 were conducted outside Nigeria institutions. From the 22 research articles, 19 were conducted in Northern Nigerian Institutions and 3 were in southern/eastern Nigerian Institutions.

RECOMMENDATION AND PROSPECTS

From this evaluation, we found out that, appreciable studies are yet to be done on purification, isolation and characterization of bioactive components of various parts of the extracts of *F. sycomorus* with promising outcomes. Thus, adequate standardization regarding the active compound should be carried out, as such would be relevant in drug development.

Furthermore, folkloric claims with respect to its wound healing, laxative, anthelmintic, anti-ulcer and anti-inflammatory properties still need to be scientifically validated. Also, research on its teratogenic profile still needs to be considered.

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