Monographic on *Ficus sur* Forssk (Moraceae): A review on its Traditional uses, phytochemistry and pharmacology

ABSTRACT

Background:

Genus Ficus, belonging to the family Moraceae, comprises more than 1,000 species of woody trees, shrubs, and vines. *Ficus sur* is known as fig trees or figs and native throughout the tropics. *Ficus sur* is used in Ayurvedic medicine for many health conditions.

Aim:

This review aims to provide an overview of the major classes of phytoconstituents, pharmacology, toxicoly and the chemical. This review was searched in Google Scholar, PubMed, Elsevier, ScienceDirect, Sciencedomain and Scifinder to examine published scientific reports, ethnobotanical and ethnopharmacological books on its phytochemical constituents and pharmacological properties.

Results:

The plant contains various groups of biologically active compounds such as alkaloids, flavonoids, saponosides, glycosides which are responsible for the biologically activity. Its leaves and roots are used to cure leukoderma, leprosy, wounds, oedema, respiratory problems, diarrhoea, sexually transmitted illnesses, tuberculosis, anaemia, epilepsy, rickets, dysentery, male infertility, and gonorrhoea etc. It also has anti-inflammatory, anti-diabetic, lipid-lowering, antibacterial, anticonvulsant, antidiuretic, antifalcaemic, antiviral, antioxidant, muscle relaxant and gastroprotective properties.

Conclusion:

This study brought together important scientific data on *F. sur* which could be used to create innovative phytopharmaceutical products.

Keywords: Traditional uses, phytochemistry, pharmacology, *Ficus sur (Vahl)* .

1. INTRODUCTION

“For millennia, people have utilised plants to help them stay healthy and manage common diseases. Humans have recognosed the utility of numerous medical plants and incorporated them into modern pharmacology, despite the fact that the use of plants was based only on people's intuitive knowledge due to a lack of appropriate ways that showed the therapeutic potential of plants ” **[1].**

In Senegal, the genus Ficus is the 5th most important genus in its flora, behind the genera Indigofera and Cyperus (44 species), the genera Ipomoea (38 species) and Crotolaria (33 species). Senegal's particular geographical position gives it a relatively high level of plant biodiversity in relation to its status as a Sahelian country.

Ficus are found in all regions of Senegal and have a great ability to colonise quite diverse and sometimes surprising habitats, such as the roofs of buildings. They are trees, shrubs or lianas that can be hemi-epiphytic, terrestrial or strangling **[2].**

" Morphologically, it is a tree that can grow up to 25–30 m tall, with leafy twigs 2–5 mm thick, puberulous, hirtellous, tomentose or hirsute to glabrescent, with the periderm typically not flaking off when dry" **[3].**

" Ficus sur contains various groups of biologically active compounds such as alkaloids, flavonoids, saponosides, glycosides which are responsible for the biologically activity" **[4]**. "Its leaves and roots are used to cure leukoderma, leprosy, wounds, oedema, respiratory problems, diarrhoea, sexually transmitted illnesses, tuberculosis, anaemia, epilepsy, rickets, dysentery, male infertility, and gonorrhoea etc" [5]. It also has anti-inflammatory, anti-diabetic, lipid-lowering, antibacterial, anticonvulsant, antidiuretic, antifalcaemic, antiviral, antioxidant, muscle relaxant and gastroprotective properties **[6, 7, 8, 9, 10, 11, 12, 13, 14]**. Fresh pulverised leaves of *F. sur* combined with water were administered orally as a traditional remedy for urine retention, effectively relieving the disease by increasing urine production. There is also a traditional belief that the root of this plant may be utilized to treat bladder diseases **[15,16]**. "The crude leaf extracts enhanced urine excretion and urinary electrolyte concentrations in a dose-dependent manner" **[7].** "The results of another study indicated that an ethanol extract of *F. sur* has a substantial anticonvulsant effect, validating the traditional use of the plant in the treatment of epilepsies; processes may entail interaction with GABAergic, glycinergic, serotonergic, and glutaminergic system components" **[11].** "The aqueous stem bark extract yielded the highest phenolic content (115.51 ± 1.60 mg gallic acid equivalent/g extract), while the methanolic leaves extract possessed the highest flavonoid content (27.47 ± 0.28 mg Rutin equivalent/g extract). However, studies involving Gas Chromatography-Mass Spectrometry (GC-MS) and High Pressure Liquid Chromatography (HPLC) of the leaf of *Ficus sur* are scanty" **[17].**

"F. sur extracts were tested for anticancer properties and antiviral activity towards human herpes virus type 1 (HHV-1). Stem bark infusion and methanolic extract showed antineoplastic activity against cervical adenocarcinoma and colon cancer cell lines, whereas leaf methanolic extract exerted moderate antiviral activity towards HHV-1 "[**18].**

" Cytotoxicity evaluation revealed that the infusion and methanolic extract from ***Ficus sur*** leaves exerted low toxicity on normal kidney fibroblasts (VERO); the exact CC50 values could not be evaluated because they were above the tested concentration range " **[18].**

The aim of this review is to provide a thorough summary of this plant's traditional use; phytochemistry, pharmacological activity, and toxicity in light of the several recent findings about it.

2. Taxonomy, Morphology, Distribution of plant

2.1. Taxonomy [19]

- **Kingdom:** Plantae Haeckel
- **Subkingdom:** Pteridobiotina Britton & Brown
- **Class:** Angiosperms
    - **Order:** Rosales Bercht. & J. Presl
    - **Family:** Moraceae Gaudich.
    - **Genus:** Ficus L.
    - ***Species:*** *Ficus sur* Forssk.

2.1.1. Synonyms [20]

– *Ficus capensis* **Thunb ;** *Ficus mallotocarpa* **Warb** and *Ficus riparia* **Miq**

2.1.2. Commons names and local names [21, 22, 23]

English: Sycamore fig , bush fig ; **French:** Sycomore.

Bambara: seretoro, torodo, torogènyè; **Malinke:** nzetetoro, nintorogo; **Moore:** womséége; **Peul:** nigri bele ; **Wolof:** soto, aldiana; **Mandingue:** Bukungol, kidundal, soto, sirogn toro, toro and **Sérère:** babut, idun.

2.2. Morphology [19]

Large tree, up to 25 m high. Leaves ovate to ovate-elliptic, glabrous, margin entire or distantly and bluntly dentate. Figs in long clusters on main branches and trunk, stalked, up to 40 mm in diameter, yellow and rosy. Monoecious tree to 11 m, bark dark grey. Leaves elliptic to ovate, broadly toothed. Figs in panicles on trunk and main branches, 20-40 mm diam., red. Tree with rounded crown, up to 12(-25) m high. Leaves alternate, spiralled, thinly leathery, ovate to elliptic (55-200 x 20-130 mm), dark green, paler below, glabrous on both surfaces, base rounded to cordate, apex rounded to acute, margins widely and irregularly dentate; petioles 13-90 mm long. Syconia (figs) borne on much-branched leafless branches (trusses), main branches, trunk or roots (syconia borne just below soil level); figs round to pear-shaped, 28-40 mm in diam., usually hairless, green, spotted with minute cream-coloured spots, turning pink/red when ripe; stalk ± 10 mm long. Fig .1 shows images images of tree, leaves and fruits.

Tree **Leaves** **Fruit**

Fig.1. *Ficus sur* Images of Tree, Leaves and Fruit

2.3. Distribution of plant [24]

Ficus sur is widely distributed throughout tropical Africa, from Cape Verde to Somalia and as far south as Angola and South Africa. It is also present in Yemen and Syria. In Senegal, it is found in the regions of Fatick, Kaolack, Tambacounda, Ziguinchor and the Niayes area. It is found in areas with a Sudano-Guinean climate and sandy-clay to rocky soils, such as the woody savannahs along rivers, forest galleries, secondary forests and submountain forests.

3. Phytochemistry compounds

“ Phytochemical screening revealed the presence of alkaloids, flavonoids, saponosides, glycosides, anthocyanins, tannins, sterols and terpenoids in the different organs of *Ficus sur* ”**[4]**. According to Odiete *et al.,* 2023, same compounds have been identified except saponosides and glycosides. In a study of methanolic and aqueous extracts of *F. sur*, phenolic compounds such as polyphenols and flavonoids were quantified. In another study, the aqueous extract obtained from the stem bark yielded the highest amount of phenolics (115.51 ± 1.60 mg GAE/g), while the methanolic leaves extract had the highest flavonoid content (27.47 ± 0.28 mg RE/g) **[18].**

The GC-MS profiling of the *F. sur* methanolic extract revealed 66 compounds from the observed chromatogram of the analysis. Table 1 provides the molecular weight and molecular formular for each of the identified compounds **[17].**

Table 1. GC-MS analysis of the *F. sur* leaf extract.

S/N	WF	MF	Compounds
1	79.10	C_5H_5N	Pyridine
2	55.08	C_3H_5N	Propargylam
3	401.50	$C_{21}H_{23}NO_5S$	N-Deacetyl-N-formyl-10-thiocolchicine
4	145.16	$C_6H_{11}NO_3$	N-Methoxy-2-carbomethoxyazetidine
5	503.33	$C_{20}H_{13}N_2O_2F_{10}$	3-Methylpentan-2, 4-dione dioxime-O,O'-bis[(pentafluorophenyl)methyl]
6	268.898	$C_5H_3NO_2Br_2$	3,4-dibromo-N-methyl-1-H-Pyrrole-2,5- dione
7	376.26	$C_{17}H_{11}Cl_2N_3OS$	2-(6-Chloro-1,3-benzothiazol-2-yl)-6-(4-chlorophenyl)-4,5-dihydro-3(2H)-pyridazinone
8	470.65	$C_{28}H_{26}N_2OS_2$	Cis-2 3-Bis (2,4,5- trimethyl-3- thienyl)-2,3-dihydrofuro[2,3-f][4,7]phenanthrol
9	322.4	$C_{18}H_{26}O_5$	1,2-benzenedicarboxylic acid-4-(hexyloxy)-, diethyl ester
10	383.4	$C_{21}H_{21}NO_6$	8H-1, 3-Dioxolo[4,5-h] isoindolo[1,2-b][3]benzazepin-8-one, 5,6,12,13- tetrahydro-9,10,14-trimethoxy-
11	533.7	$C_{31}H_{42}F_3NO_3$	Acetamide,N-[4-[2-(3,4-dihydro-6- hydroxy-2-methyl-2-undecyl-2H-1-be nzopyran-7-yl)ethyl]phenyl]-2,2,2- trifluoro-
12	228.24	$C_{14}C_{12}O_3$	Methyl-3-phenoxybenzoate
13	535.6	$C_{28}H_{42}F_5NO_3$	Sarcosine, n-pentafluorobenzoyl-,octadecyl ester

14	239.27	$C_{15}H_{13}NO_2$	Propenamide, N-(3-dibenzofuryl)-
15	294.35	$C_{18}H_{18}N_2O_2$	2,4(1H,3H)-pyrimidinedione, 1,3-dimethyl-5,6-diphenyl-
16	312.37	$C_{17}H_{20}N_4O_2$	1H-Pyrazole-5-carboxamide,3-cyclo propyl-N-[4-[(dimethylamino)carbon
17	288.38	$C_{18}H_{24}O_3$	Estra-1,3,5(10)-triene-3,11,17-triol, (11.alpha.,17.beta
18	346.86	$C_{19}H_{23}ClN_2O_2$	Pyrrolidine-3-carboxamide, 1-(4-chlorophenyl)-N-[2-(1-cyclohexenyl)ethyl]- 5-ox
19	327.5	$C_{21}H_{29}NO_2$	19-Norethindrone,o-methyloxime
20	512.2	$C_{19}H_{30}I_2$	Androstane,17,18-diiodo-, (5.alpha.,17.beta.)-
21	367.46	$C_{25}H_{21}SN$	Benzo[5,6]cyclohepta[1,2-a]naphthalene,7-phenyl-5,6,7,13-tetrahydro-8
22	314.4	$C_{17}H_{18}N_2O_2S$	3-(2-Furylmethyl)-2-(mesitylimino) -1,3-thiazolan-4-one
23	248.28	$C_{13}H_{16}N_2O_3$	butanoic acid, 2-[2-(4- methylphen
24	209.24	$C_{14}H_{11}NO$	2-phenoxyphenylacetonitrile
25	361.28	$C_{14}H_{14}F_3N_3O_5$	Benzamide, 3,4-dimethoxy-N-(1-methyl-2,5-dioxo-4-trifluoromethyli
26	594.9	$C_{41}H_{58}N_2O$	2,20-Cycloaspidospermidine, 1-acetyl-6,7-didehydro-3-methyl-, (2.alpha.,3.beta.,5.alpha.,12.beta.,19.alpha.,20R)- Androstane
27	297.31	$C_{16}H_{13}N_2O_4$	4-[3-(3,4-Dimethoxyphenyl)-1,2,4- oxadiazol-5-yl]p
28	350.42	$C_{21}H_{22}N_2O_3$	Sarpagan-16-carboxylic acid, 17-oxo-, methyl ester, (16R)
29	408.7	$C_{27}H_{52}O_2$	2-Docosenoic acid, 2,4,21,21-tetramethyl-,methyl ester, (Z)
30	467.35	$C_{21}H_{17}F_8NO_2$	Benzamide, 3-trifluoromethyl-2-fluoro-N-(3-trifluoromethyl-2-fluorobenzoyl)-N-pentyl
31	232.19	$C_{11}H_8N_2O_4$	Pyrimidine-2,4(1H,3H)-dione, 6-benzoyl-5-hydroxy
32	197.14	$C_8H_7NO_5$	3-Methoxy-4-nitrobenzoic a
33	447.6	$C_{27}H_{45}NO_4$	2,6-Pyridinedicarboxylic acid, pentadecyl 2-pentyl este
34	414.47	$C_{15}H_7Br_2ClO_2$	2,3-Dibromo-6-chlorophenanthrene-9-carboxylic acid
35	267.08	$C_{10}H_7BrN_2O_2$	1H-pyrazole-3-carboxaldehyde, 1-(4-bromophenyl)-4,5-dih
36	360.45	$C_{23}H_{24}N_2O_2$	4-(3,5-Diacetyl-1-phenyl-1,4-dihydro-4-pyridyl)-N,N-dimethylaniline
37	406.9	$C_{13}H_6Cl_6O_2$	Hexachlorophene
38	341.41	$C_{22}H_{19}N_3O$	2-(4-Tolylamino)-3-(4-tolyl)-quinazoline-4(3H)-one
39	293.4	$C_{20}H_{23}NO$	Acetamide, N-tricyclo[10.2.2.2(5,8)]octadeca-5,7,12,14,15,17

40	400.43	$C_{24}H_{20}N_2O_4$	2-Oxazolidinone, 5,5'-(1,4-phenylene)bis[3-phenyl-
41	324.32	$C_{18}H_{14}O_5N$	Ethyl 4-(2-ethoxycarbonyl-7-methoxy-3-indolyl)butanoate
42	221.66	$C_7H_8ClNO_3S$	pyridine, 2-chloro-3-methoxy-5-(methylsulfonyl)-
43	516.45	$C_{30}H_{51}NO_4S$	3Alpha-methoxy-3beta-(methanesulfonamido)cholestane-5beta-carboxylic lact
44	332.4	$C_{23}H_{24}O_2$	Propenoic acid, 3-(4-diphenylmethylene-2-methylcyclopentyl)-, methyl
45	540.8	$C_{34}H_{52}O_5$	Olean-9(11)-en-12-one, 3.beta.,28-dihydroxy-, diaceta
46	444.6	$C_{28}H_{44}O_4$	Fumaric acid, 4-isopropylphenyl pentadecyl ester
47	362.41	$C_{21}H_{20}N_3O_3$	4-(3,4-Dimethoxyphenyl)-6-phenyl-2-pyrrolidino
48	406.34	$C_{16}H_{18}N_6O_5S$	pyridine, 3-nitro-2-[[1-[(3,4,5-trimethoxyphenyl)methyl]-1H-tetrazol-5- yl]thi
49	380.38	$C_{18}H_{20}O_9$	2-Methyl-7-acetoxy-2',4',5'-trimethoxy-isoflavone
50	61.08	C_2H_7NO	N-methoxy-Methanamine
51	379.5	$C_{16}H_{13}NO_4S_3$	Dimethyl 2-(1-methyl-2-thioxo-3-indolinylidene)-1,3-dithiole-4,5- dicarboxyl
52	115.16	$C_3H_5N_3S$	1,3,4-Thiadiazol-2-amine, 5-meth
53	223.24	$C_{11}H_{13}NO_4$	1(2H)-Isoquinolinone, 3,4-dihydro-7- hydroxy-6-methoxy-2-methyl
54	370.91	$C_7H_3I_2NO$	Loxynil
55	73.09	C_3H_7NO	Isoxazolidine
56	89.52	C_3H_4ClN	3-chloropropa
57	55.08	C_3H_5N	Propiolon
58	73.09	C_3H_7NO	N-Ethylform
59	73.14	$C4H_{11}N$	Isobutylam
60	207.27	$C_{15}H13N$	Indolizine, 2-(4-methylphenyl)-
61	281.38	$C_{16}H_{15}N_3S$	1H-1,2,4-Triazole, 1-benzyl-3-benzylthio-
62	207.27	$C_{12}H_{17}NO_2$	MDMA methylene homolog
63	207.23	$C_{11}H_{13}NO_3$	Cyclohexa-2,5-diene-1,4-dione, 2-methyl-5-(4-morpholinyl)-
64	162.27	$C_{12}H_{28}$	Cyclopropane, 1-(2-methylene-3-butenyl)-1-(1-methylenepropyl)-
65	313.44	$C_{20}H_{27}NO_2$	Preg-4-en-3-one, 17.alpha.-hydroxy-17.beta-cyano-
66	195.18	$C_9H_9NO_4$	Benzofuran-2-one, 2,3-dihydro-3,3- dimethyl-4-nitro-

The ethanolic extract of the fruits was used to isolate six pentacyclic triterpenoids: 11-oxo-β-amyrin acetate (1), olean-12-en-3-one (2) β- amyrin palmitate (3), β-amyrin (4), β-amyrin acetate (5), lupeol acetate (6) and four steroid derivatives: ergosterol

peroxide(7), (22R)-3β-stigmast-5-ene-3,22- diol (8), β-sitosterol (9) and β-sitosterol 3-O-β-D-glucopyranoside (10) **[10].**

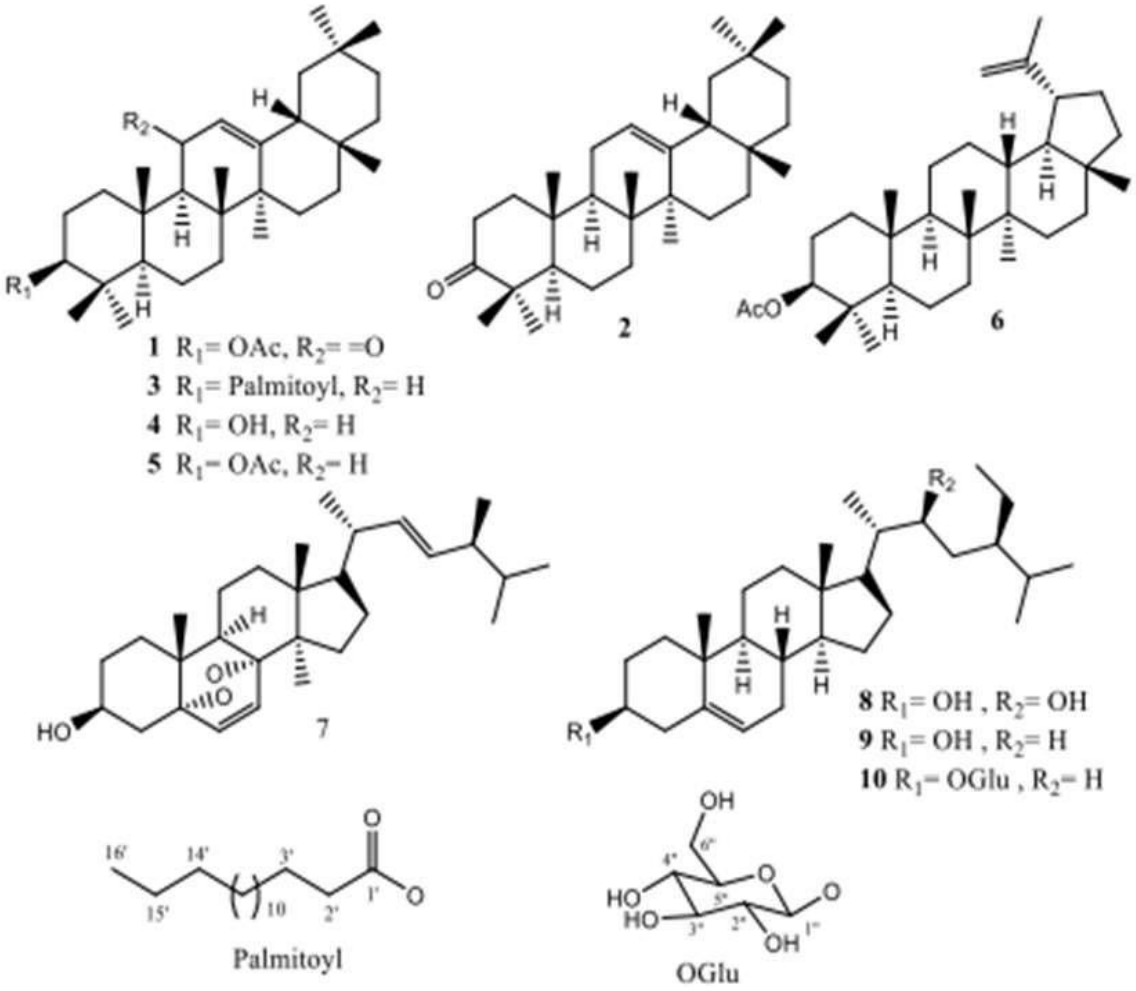

Fig. 2. Chemical structures of isolated compounds (1-10) from the fruits of *Ficus sur* Forssk

"The methanolic extract from leaves contained mainly phenolic acids and their derivatives, esters of phenolic acids and flavonoids, and flavonoid glycosides (esters of kaempferol and quercetin). Hydroxycoumarin and methyl gallate were present only in this extract. Hydroxycaffeoylquinic, glucogallic, 2-isopropylmalic, tartaric, coumaric, ferulic acids and their esters were characteristic for leaf infusion. The methanolic extract from the stem bark was abundant in tannins, represented by catechins and procyanidins. In the stem bark infusion, apigenin, luteolin, kaempferol, quercetin and their conjugates with one or more sugar moieties dominated" **[18].**

4. Ethnobotanical uses

In Sudan and Nigeria, *F. sur* leaves and roots are used to cure leukoderma, leprosy, wounds, oedema, respiratory problems, diarrhoea, sexually transmitted illnesses, tuberculosis, anaemia, epilepsy, rickets, dysentery, male infertility, and gonorrhoea **[5].** According to Esievo *et al.,* 2018 **[25]**, *F. sur* is also used to cure swellings. In

South Africa and other nations, *F. sur* has long been used for treating renal disorders and as a natural diuretic product **[15,26].**

In Ethiopia, pulverized fresh *F. sur* leaves combined with water were administered orally as a traditional medicine for urine retention, effectively alleviating the condition by boosting urine production. Traditionally, for treating bladder diseases the root of *F. sur* may be utilized **[10,11].** Another researchs, have confirmed the traditional usage of *F. sur* as a diuretic agent **[7]**. "The crude leaf extracts enhanced urine excretion and urinary electrolyte concentrations in a dose-dependent manner" **[7].** "In another study, the results indicated that an ethanol extract of *F. sur* has a substantial anticonvulsant effect, validating the traditional use of the plant in the treatment of epilepsies ; processes may entail interaction with GABAergic, glycinergic, serotonergic, and glutaminergic system components" **[11]. "**The figs are frequently cited in the treatment of diarrhea and oligogalactia, the leaves in the treatment of diarrhea, stomach complaintsas, antidote and diabetes, the latex in the treatment of intestinal worms and wounds, and the barks in the treatment of diarrhea" **[31].**

"Extracts from *F. sur* were tested for their antiviral and anticancer effects on the human herpes virus type 1 (HHV-1). While leaf methanolic extract shown moderate antiviral activity against HHV-1, stem bark infusion and methanolic extract demonstrated antineoplastic activity against cervical adenocarcinoma and colon cancer cell lines" **[18]**.

5. Pharmacological propreties

5.1. Antibacterial activity

"The crude ethanolic extract of *Ficus sur* fruits shows significant activity against *S. typhi* (MIC = 64 µg/mL) and moderate activity against *K. pneumoniae*, *E. coli* (MIC = 256 µg/mL).and *S. aureus* (MIC = 128 µg/mL). The wide range of antibacterial activity shown by this extract could be explained by the qualitative and/or quantitative variation in the different groups of potentially active secondary metabolites it contains. Indeed, at the molecular level, the different compounds (terpenoids and steroids) isolated from this plant could act synergistically and be partly responsible for the antibacterial activity" **[10].**

5.2. Antidiabetic, hypolidemic activity

A study was designed to assess the effects of ethanolic extract of *Ficus* leaves on the glycaemia and lipid profile of Alloxan-induced diabetic rats. Alloxan induces diabetes mellitus by selectively destroying pancreatic beta cells, which are involved in the synthesis, storage and release of insulin. The extract at a dose of 150 and 300 mg/kg significantly reduced ($P<0.05$) blood glucose levels in diabetic rats.

"The action of *Ficus sur* leaf extract on blood glucose in diabetic rats was similar to that of Glibenclamide (5mg/kg), a potent hypoglycaemic agent, and suggests that *Ficus sur* leaf extract contains active ingredients with a potent hypoglycaemic property. The extract may have achieved this property by increasing peripheral glucose utilisation, inhibiting endogenous glucose production or inhibiting intestinal glucose production. The extract may also have potentiated pancreatic insulin secretion from the existing residual islet beta cell" **[9].**

β-sitosterol promotes insulin sensitivity and reduces glucose and nitric oxide levels in diabetic rats followed by increased insulin levels. This makes β-sitosterol an excellent anti-diabetic agent. β-Sitosterol has also shown a protective effect on pancreatic tissue with the enhancement of pancreatic antioxidant **[27].** Control diabetic rats had elevated mean total cholesterol, triglycerides (TG), low-density lipoprotein cholesterol (LDL-C) and very low-density lipoprotein cholesterol (VLDL-C), while high-density lipoprotein cholesterol (HDL-C) was reduced.

The leaf extract significantly ($P<0.05$) reduced cholesterol, triglycerides, LDL-C and VLDL-C and significantly increased HDL-C levels in rats treated for diabetes. *Ficus sur* ethanol extract therefore showed a hypolipidaemic effect in diabetic rats **[9].** The n-hexane extract showed the highest significant ($p<0.05$) reduction of 77.7% in blood glucose which was comparable to Glibenclamide (78.3%). Further, fractionation yielded five fractions (F1-F5) in which fraction F4 and F5 were the most active with 54.7 and 55.9% reduction of blood glucose. The lipid profile of fraction F4 also exhibited decrease in TG, total cholesterol (TC), glycosylated heamoglobin (GH), Urea and increase in HDL **[28].**

5.3. Anticonvulsant activity

Anticonvulsant activity was studied using convulsion models induced by picrotoxin (PTX), strychnine (SCN), isoniazid (INZ), pentylenetetrazole (PTZ) and N-methyl-D-aspartic acid (NMDA). Oral administration of ethanolic extract of *Ficus* stem bark 1 h before intraperitoneal injection of chemical convulsants significantly delayed ($p<0.05$) and prolonged the duration of onset of convulsions in seizures induced by PTX, SCN, INZ, PTZ and NMDA **[11].**

5.4. Antidiuretic activity

Rats were randomly divided into eight groups of six rats each. The test groups received either 100 mg/kg, 200 mg/kg or 400 mg/kg of aqueous or 80% methanol leaf extract. The negative and positive control groups were treated with 2 ml/100 g distilled water and furosemide (10 mg/kg), respectively. The middle (200 mg/kg) and highest (400 mg/kg) doses of both extracts significantly increased diuresis at five hours ($p<0.001$) compared with the negative control, although the diuretic activity was less than that of the positive control. In terms of electrolyte excretion, all dose levels of both extracts showed significant natriuresis ($p<0.001$) and chloruresis ($p<0.01$) compared to the negative control. The aqueous extract showed a more significant diuretic effect than the 80% methanol extract **[7].**

"Crude extracts of *F. sur* leaves increased urinary excretion and urinary electrolyte concentration in a dose-dependent manner. Thus, the diuretic effect of this plant extract may be due to stimulation of regional blood flow, or by inhibiting tubular reabsorption of water and anions. In addition, a number of compounds including a flavone, 4,5,7- trihydroxyflavone-3-ol, have been identified from leaf extract of this plant and flavones are known to have a diuresis effect" **[29].** “Although it is almost impossible to identify the specific phytoconstituents that cause the observed diuretic activity of the plant with this study, it can be suggested that the compounds may act individually or synergistically ” **[7].**

5.5. Antioxidant activity

In a study by **[7],** stem bark extracts showed significantly higher antioxidant activities with DPPH, ABTS, CUPRAC, FRAP and phosphomolybdenum. The antioxidant capacity of the extracts was then assessed in terms of potency reduction using the CUPRAC and FRAP tests. From the results, it can be seen that the methanolic stem bark extract had the most potent Cu^{2+} reducing potential while the aqueous stem bark extract was the most potent Fe^{3+} reducing agent. The methanolic stem bark extract exhibited the most potent radical scavenging potential against 2,2-diphenyl-1 picrylhydrazyl and 2,20 -azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (475.79 ± 6.83 and 804.31 ± 4.52 mg Trolox equivalent/g extract, respectively) and the highest reducing Cu^{2+} capacity (937.86 ± 14.44 mg Trolox equivalent/g extract) [18]. ABTS can function with lipophilic and hydrophilic molecules, but DPPH can only be solubilized in organic environments **[18].**

5.6. Antiviral and Anticancer activities

F. sur extracts were tested for anticancer properties and antiviral activity towards human herpes virus type 1 (HHV-1). Stem bark infusion and methanolic extract showed antineoplastic activity against cervical adenocarcinoma and colon cancer cell lines, whereas leaf methanolic extract exerted moderate antiviral activity towards HHV-1. This investigation yielded important scientific data on *F. sur* which might be used to generate innovative phytopharmaceuticals **[18].**

5.7. Antifalcaemic activity

A further study [28] evaluated the antifalcaemic effect of anthocyanins extracted from the decoction of the leaves of this plant: at a concentration of 0.4 µg/ml, anthocyanins inhibited sickle cell red blood cell formation by 89%. In a study by **[14]**, the hydroethanolic extract of *Ficus sur* leaves had antifalcaemic activity in vitro in both subjects with sickle cell trait AS and in subjects with sickle cell trait SS, with a significant decrease in the sickle cell count observed in the presence of the extract. This decrease in sickle cell count induced by the extract is dose-dependent as the activity of the extract is greater at 2.5 mg/ml than at 1.25 mg/ml**.**

5.8. Acute toxicity evaluation

“A total of 18 albino rats of either sex weighing 150-180 g were used in the determination of the acute toxicity of the leaf extract of *Ficus sur*. The rats were randomly divided into six groups of three (3) rats each and the first group was given 10 mg/kg, the second group 100 mg/kg and the third group 1000mg/kg of the plant extract respectively via the oral route. The rats were observed for signs of toxicity, adverse effects or death. After 24 hours, the second three groups of rats were given 1600, 2900 and 5000 mg/kg of the plant extract respectively and observations were noted as previously described. The result revealed that calculated lethal dose (LD_{50}) of *Ficus sur* leaves is 2154 mg/kg body weight of rat” **[30].**

6. CONCLUSION

The aim of the current study was for Examining available scientific reports on the pharmacological, phytochemical composition and toxicology effects of *F. sur. Several studies proved pharmacological effects showed for the plant's pure constituents and extracts.* The methanolic extract from the stem bark was abundant in tannins, represented by catechins and procyanidins. In the stem bark infusion, apigenin, luteolin, kaempferol, quercetin and their conjugates with one or more sugar moieties dominated. However, we have to use the plant species for the discovery of new medicine to treat different diseases. For the development/formulation of novel drugs and future clinical applications, it is a promising candidate in pharmaceutical biology.

Disclaimer (Artificial intelligence)

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Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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Details of the AI usage are given below:

1.

2.

3.

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