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Supplementary Data

Phytochemical Diversity and Pharmacological Perspectives of *Vitex leucoxylon* L.f.: A Comprehensive Review

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Table S1. Phytochemical profile of *Vitex leucoxylon* L.f. with compounds and activities.

Class/ Sub-Sub-class	Compound	Plant Part	Molecular formula	Melting point 0^C	Molecular weight g/mol	Solvent	Quantification	Biological activity	References
Sugar compound									
Anhydrosugar	1,6-Anhydro-β-D-glucopyranose (levoglucosan)	Leaves	$C_6H_{10}O_5$	170–172	162.14	Ethanol	GC-MS	Preservative	[28]
Monosaccharide (aldoses)	d-Mannose	Leaves	$C_6H_{12}O_6$	133-140	180.15	Ethanol	GC-MS	Anticancer, Antiviral	[43]
Disaccharide	D-Glucose, 6-O-D-galactopyranosyl	Leaves	$C_{12}H_{22}O_{11}$	182	342.3	Ethanol	GC-MS	Preservative	[28]
Oligosaccharide	Maltotriose hydrate	Leaves	$C_{18}H_{32}O_{16}$	132-135	504.43	Methanol	FTIR	Precursor for prebiotics	[44]
Oligosaccharide	Maltopentose hydrate	Leaves	$C_{30}H_{54}O_7$	168	526.74	Methanol	FTIR	Precursor for prebiotics , Inhibition of interleukin-2	[46]
Cyclic oligosaccharide	Gamma-cyclodextrin hydrate	Leaves	$C_{48}H_{80}O_{40}$	267	1344.08	Methanol	FTIR	Enhancement of drug solubility and bioavailability	[46]
Disaccharide	(+)-β-D Lactose β	Leaves	$C_{12}H_{22}O_{11}$	224	342.3	Methanol	FTIR	_	14
Oligosaccharide	Dextrin	Leaves	$C_{18}H_{32}O_{16}$	53-54	504.4	Methanol	FTIR	_	14
Aromatic alcohol glycoside	Benzyl α-D-glucoside	Leaves	$C_{13}H_{18}O_6$	95–103	270.28	Ethanol	GC-MS	_	[28]
Fatty Acids									
Saturated fatty acid	n-Hexadecanoic acid	Leaves	$C_{16}H_{32}O_2$	61–63	256.43	Ethanol	GC-MS	Antioxidant, Anti-inflammatory	[28]
Saturated fatty acid	Octanoic Acid	Leaves	$C_8H_{16}O_2$	239	144.21	Ethanol	GC-MS	Anti-Inflammatory, Perfumery pesticide	[28,47,48]
Polyunsaturated fatty acid	9,12,15-Octadecatrienoic acid	Leaves	$C_{18}H_{32}O_2$	_	292.46	Ethanol	GC-MS	Antihistaminic, Anticancer, Anti-inflammatory, Hepatoprotective	[28]
Saturated fatty acid	Tetradecanoic acid	Bark	$C_{14}H_{28}O_2$	52-58	228.37	Ethanol	GC-MS	Anti-viral, Antibacterial, Antioxidant	[28]
Polyunsaturated fatty acid	9,12-octadecadienoic acid	Bark	$C_{18}H_{32}O_2$	−5 °C	280.45	Ethanol	GC-MS	Anti-inflammatory, Antioxidant	[28]
Monounsaturated fatty acid	Oleic acid	Bark	$C_{18}H_{34}O_2$	13.4	282.46	Ethanol	GC-MS	Antifungal	[28]

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Saturated fatty acid	Octadecanoic acid	Bark	$C_{18}H_{36}O_2$	69.4	284.48	Ethanol	GC-MS	Antioxidant, Antiviral, Antimicrobial	[28]
Saturated fatty acid	n-Decanoic acid	Bark	$C_{10}H_{20}O_2$	31.6	172.26	Dichloromethane	GC-MS	Antibacterial, Anticancer	[28]
Saturated fatty acid	Dodecanoic acid	Bark	$C_{12}H_{24}O_2$	44-46	200.32	Dichloromethane	GC-MS	Antibacterial, Antioxidant	[28]
Saturated fatty acid	Propionic acid	Leaves	$C_3H_6O_2$	-20.5	74.08	Methanol	FTIR	Antioxidant , Anticancer, Antidiabetic	[14]
Unsaturated fatty acid	Hexadecenoic acid	Bark	$C_{16}H_{32}O_2$	60-62	256.43	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Hepatoprotective	[27]
Saturated fatty acid	Tetracosanoic acid	Bark	$C_{24}H_{48}O_2$	75-80	368.64	Chloroform + Methanol	NMR Spectroscopy	Antimicrobial, Hepatoprotective	[27]
Esters									
Aromatic ester	Benzoic acid, 3-hydroxy-, 1-methylethyl ester	Leaves	$C_{10}H_{12}O_3$	28–30	180.2	Ethanol	GC-MS	Antimicrobial, Anti-Inflammatory	[28]
Dimethyl ester	Dimethyl terephthalate	Leaves	$C_{10}H_{10}O_4$	142	194.18	Methanol	GC-MS	Production of plastics, Polyester fibres	[35]
Fatty acid ester	Hexadecanoic acid, methyl ester	Leaves	$C_{17}H_{34}O_2$	29–35	270.45	Ethanol	GC-MS	Antioxidant, Hypocholesterolaemia, Nematicide	[28]
Ethyl esters of fatty acids	Hexanoic acid, ethyl ester	Leaves	$C_8H_{16}O_2$	-67	144.21	Ethanol	GC-MS	Antimicrobial	[28]
Nitro fatty acid ester	4,9-Decadienoic acid, 2-nitro-, ethyl ester	Leaves	$C_{12}H_{19}NO_4$	_	168.24	Ethanol	GC-MS	Antimicrobial	[28]
Acetylenic fatty acid ester	10, 13-Octadecadiynoic acid, methyl ester	Leaves	$C_{19}H_{30}O_2$	_	290.45	Ethanol	GC-MS	Antimicrobial	[28]
Acetylenic fatty acid ester	4-Decynoic acid, methyl ester	Leaves	$C_{11}H_{20}O_2$	Below 25	184.27	Ethanol	GC-MS	Insecticidal, Antimicrobial	[28]
Polyunsaturated fatty acid	6,9,12,15-Docosatetraenoic acid, methyl ester tetramethyltetradeca-4,8-dienoic acid, methyl ester	Leaves	$C_{23}H_{38}O_2$	_	346.56	Ethanol	GC-MS	Anti-cholesterol	[28]
Methyl branched-chain fatty acid ester	Heptanoic acid, 2-methyl-, methyl ester	Seeds	$C_9H_{18}O_2$	15	158	Ethanol	GC-MS	_	[28]
Sorbitan fatty acid ester	Sorbitan monolaurate	Leaves	$C_{18}H_{34}O_6$	54-98	346.46	Methanol	FTIR	_	[14]
_	Methylparaben	Leaves	$C_8H_8O_3$	125–126	152.15	Ethanol	GC-MS	Preservative	[28]
Terpenes									
Sesquiterpene	Caryophyllene	Leaves	$C_{15}H_{24}$	Below 25	204.35	Ethanol	GC-MS	Anticancer, Analgesic, Sedative, Fungicide	[28,50]
Sesquiterpene	Azulene, 1,4-dimethyl-7-(1-methylethyl)	Leaves	$C_{15}H_8$	29-30	198.3	Ethanol	GC-MS	Antiallergic, Antidiabetic	[28]
Triterpene	Squalene	Seeds	$C_{30}H_{50}$	-75	410.73	Ethanol	GC-MS	Anti-Inflammatory, Immune-Enhancing Properties, Detoxifier	[28,51,52]
Terpenoids									
Phytosterol	β-sitosterol	Leaves	$C_{29}H_{50}O$	136-142	414.71	Methanol	GC-MS	Anticancer, Antidiabetic	[53,54,55]
Pentacyclic triterpenoid	Betulinic acid	Leaves	$C_{38}H_{40}O_3$	294-296	456.7	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Hepatoprotective	[27]
Triterpenoid	Corosolic acid	Leaves	$C_{30}H_{48}O_4$	148-150	472.71	Ethanol	IR spectroscopy	Antidiabetic, Anti-inflammatory	[28,56]
Triterpenoid	3β-hydroxy-olean-5, 12-dien-28- oic acid	Bark	$C_{30}H_{46}O_3$	198	454.69	Petroleum ether + ethanol + dichloromethane	1H NMR	_	[28]
Triterpenoid	3β-acetoxyolean-12-en-27- oic acid	Bark	$C_{32}H_{50}O_4$	197	498.74	Petroleum ether + ethanol + dichloromethane	1H NMR	_	[28]
Diterpene alcohol	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	Leaves	$C_{20}H_{40}O$	38–39	296.53	Ethanol	GC-MS	Antimicrobial, Anti-Inflammatory	[28]
Sesquiterpene lactone	2(3H)-Benzofuranone, hexahydro-4,4,7α-trimethyl-	Leaves	$C_{11}H_{18}O_2$	78-80	282.26	Ethanol	GC-MS	Antimicrobial, Hepatoprotective	[28,57]
Acyclic diterpene alcohol	Phytol	Leaves	$C_{20}H_{40}O$	25	296.53	Ethanol	GC-MS	Anti-Inflammatory, Diuretic, Cytotoxic, Antioxidant	[28,58]
Monoterpene epoxide	Ascaridole epoxide	Leaves	$C_{10}H_{16}O_2$	_	168.24	Ethanol	GC-MS	Antimicrobial, Antioxidant, Anthelmintic	[28]
Sesquiterpene	Ledol	Leaves	$C_5H_{10}O_3$	104-105	118.13	Ethanol	GC-MS	Antifungal, Expectorant properties	[28]
Diterpene	7α-Isopropenyl-4,5-dimethyloctahydroinden-4-yl)methanol	Leaves	$C_{15}H_{26}O$	_	222.37	Ethanol	GC-MS	Anti-Inflammatory, Asthma	[28]
Sesquiterpene	Aromadendrene oxide	Leaves	$C_{15}H_{24}O$	_	220.35	Ethanol	GC-MS	Anticancer, Sedative	[28]
Monoterpene	2-Methyl-4-(2,6,6-trimethylcyclohex-1-enyl)but-2-en-1-ol	Leaves	$C_{13}H_{20}O$	_	192.3	Ethanol	GC-MS	Antifungal	[28]
Tocopherol	Vitamin E	Leaves	$C_{29}H_{50}O_2$	2.5- 3.5	430.7	Ethanol	GC-MS	Antiaging, Antidiabetic Anti-inflammatory	[28]
Iridoids									
Iridoid glycoside	Agnuside	Leaves	$C_{22}H_{26}O_{11}$	146	466.43	Methanol	GC-MS	Antioxidant, Cardioprotective, Anticancer	[57,59,60]
Iridoid glycoside	Aucubin	Leaves	$C_{15}H_{22}O_9$	181	346.33	Methanol	GC-MS	Antioxidant, Anti-Aging, Anti-Fibrosis, Anticancer, Hepatoprotection, Neuroprotection	[57,61,62]
Monoterpene	Iridiod A	Leaves	_	_	_	Methanol	GC-MS	Anticancer	[31, 57]
Monoterpene	Iridiod B	Leaves	_	_	_	Methanol	GC-MS	Anticancer	[31, 57]

Flavone									
Flavone	5,6,7,4' -tetrahydroxy flavone	Bark	$C_{15}H_{10}O_5$	218-221	270.24	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
O-methylated flavone	5-hydroxy-7, 4' dimethoxy flavone	Leaves	$C_{171}H_4O_5$	168-172	298.08	Petroleum ether + ethanol + dichloromethane	NMR Spectroscopy	-	[28]
Flavone	5- hydroxy-3,6,7,3',4' pentamethoxyflavone	Leaves	$C_{20}H_{20}O_8$	120-121	388.37	Petroleum ether + ethanol + dichloromethane	1H NMR	-	[28]
Flavonoids									
Flavone C-glucoside	2'-O-caffeoylorieutin	Leaves	$C_{30}H_{26}O_{14}$	250-251	523.14	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
Flavonoid glycoside	Vitexin	Bark	$C_{21}H_{20}O_{10}$	264-265	432.38	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
Trihydroxyflavone	Kaemferol 3-O- β-D glucopyranoside	Leaves	$C_{20}H_{18}O_{11}$	178-180	434.35	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
Flavone C-glycoside	Isovitexin	Bark	$C_{21}H_{20}O_{10}$	246-247	432.38	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
O-methylated flavone	5,7 dihydroxy- 6,4' dimethoxy flavanone	Leaves	$C_{17}H_{16}O_6$	179	314.29	Petroleum ether + ethanol + dichloromethane	1H NMR	-	[28]
O-methylated flavanone	5,3'-dihydroxy—7,8,4'-trimethoxy flavanone	Leaves	$C_{18}H_{18}O_7$	_	346.33	Petroleum ether + ethanol + dichloromethane	1H NMR	-	[28]
O-methylated flavanone	7,8 dimethyl herbacetin 3-rhamnoside	Leaves	$C_{23}H_{24}O_{11}$	189	476.43	Petroleum ether + ethanol + dichloromethane	1H NMR	Antioxidant	[28]
Phenolics									
Aromatic aldehyde	Cinnamaldehyde	Leaves	C_9H_8O	7-8	132	Ethanol	GC-MS	Anticancer, Hypoglycemic	[28]
_	Benzenepropanoic acid, α-(hydroxyamino)	Leaves	$C_9H_9NO_3$	_	179	Ethanol	GC-MS	Antimicrobial	[28]
Di-phenol	Hydroquinone	Leaves	$C_6H_6O_2$	172–174	110.11	Ethanol	GC-MS	Antimicrobial	[28]
Hydroxybenzoic acid	Benzoic acid, 4-hydroxy-	Leaves	$C_7H_6O_3$	216–217	138	Ethanol	GC-MS	Antimicrobial, Anticancer, Hypoglycemic	[28]
Phenolic glycoside	6-O-caffeoylarbutin	Leaves	$C_{21}H_{22}O_{10}$	224-225	434.4	Ethanol	IR spectroscopy	Antidiabetic, Anti-inflammatory , Antioxidant	[71]
Hydroxybenzoic acid	3-hydroxy-Benzoic acid	Leaves	$C_5H_{10}O_3$	200	118.13	Ethanol	GC-MS	Antialgal, Antimutagenic, Antiestrogenic, Anti-platelet aggregating, Nematocidal, Antiviral, Antioxidant	[28,63]
Benzopyrone	Coumarin	Leaves	$C_9H_6O_2$	68-73	146.14	Methanol	FTIR	Antimicrobial, Anticoagulant, Anticancer, Anti-ulcers	[14,64,65]
Volatile organic compounds									
Unsaturated aliphatic alcohol	2,4-Pentadien-1-ol, 3-propyl-, (2Z)	Leaves	$C_{11}H_{12}O$	_	160.22	Ethanol	GC-MS	Antioxidant , Anti-inflammatory	[28]
Unsaturated aliphatic alcohol	10-Undecen-1-ol	Seeds	$C_{11}H_{22}O$	-3	170.29	Ethanol	GC-MS	Antimicrobial	[28]
Unsaturated aliphatic alcohol	3-Buten-2-ol	Seeds	C_4H_8O	-100	72	Ethanol	GC-MS	Antimicrobial	[28]
Aliphatic aldehyde	Tridecanal	Leaves	$C_{13}H_{26}O$	14	198.35	Methanol	FTIR	Antimicrobial, Antifungal, Cytotoxicity	[14]
Aliphatic aldehyde	Dodecyl aldehyde	Leaves	$C_{12}H_{24}O$	12	184.32	Methanol	FTIR	_	[14,48]
Aliphatic aldehyde	Nonyl Aldehyde	Leaves	$C_9H_{18}O$	-18	142.24	Methanol	FTIR	Antidiarrheal, Antifungal	[14,48,68,69]
Acyclic diene	1,5-Heptadiene, 2,6-dimethyl	Leaves	C_9H_{16}	–70 °	124.22	Ethanol	GC-MS	Antimicrobial, Antioxidant	[28,92]
Aliphatic ketone	3- nonanone	Leaves	$C_9H_{18}O$	-8	142.24	Methanol	GC-MS	_	[14]
Others									
Polyol	Glycerin	Leaves	$C_3H_8O_3$	17.8	92	Ethanol	GC-MS	Preservative, Antimicrobial	[28]
Aliphatic diol	1,14-Tetradecanediol	Seeds	$C_{14}H_{30}O_2$	85-90	230.39	Ethanol	GC-MS	Antimicrobial	[28]
Furanoid aldehyde	2-Furancarboxaldehyde, 5-(hydroxymethyl)-	Leaves	$C_6H_6O_3$	28-34	126	Ethanol	GC-MS	Preservative, Antimicrobial	[28]
Aliphatic amide	Butyramide	Leaves	C_4H_9NO	114-116	87.12	Methanol	FTIR	_	[14, 48]
Aromatic ether	Benzene, (ethenyloxy)-	Leaves	C_8H_8O	-50	120	Ethanol	GC-MS	_	[28]
Long-chain aliphatic ether	Ethanol, 2-(9,12-octadecadienyloxy)-, (Z,Z)-	Leaves	$C_{20}H_{40}O_2$	_	312.53	Ethanol	GC-MS	Antimicrobial	[28]
Alkyl glyceryl ether	2-(9-octadecenyloxy)ethanol (Z)	Leaves	$C_{20}H_{40}O_2$	_	312.53	Ethanol	GC-MS	Luciferase, Antioxidant	[28]
_	4H-pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	Leaves	$C_6H_8O_4$	75-78	144	Ethanol	GC-MS	Antimicrobial	[28]
Acetal	Butane, 1,1-diethoxy-3-methyl	Leaves	$C_9H_{20}O_2$	167-168	160.25	Ethanol	GC-MS	Antidiabetic Antidermatitic, Antileukemic, Anticancer	[28]
Furan derivative	Furan, 2-propyl	Leaves	$C_7H_{10}O$	–55 °C	110.16	Ethanol	GC-MS	_	[28]
Cardiac glycoside	Lanatoside A	Leaves	$C_{49}H_{76}O_{19}$	245-248	1017.1	Methanol	FTIR	_	[14]
Imidazole	2-Methyl-5,5-diphenyl-4-(methylthio)imidazole	Seeds	$C_{17}H_{16}N_2S$	_	280.39	Ethanol	GC-MS	Antimicrobial	[28]

Alkane	Tetradecane	Bark	$C_{14}H_{30}$	5.9	198.39	Dichloromethane	GC-MS	Antibacterial, Antifungal	[28]
Aromatic hydrocarbon	Benzene, 1-(1,5-dimethylhexyl)-4-methyl	Bark	$C_{15}H_{24}$	_	204.36	Dichloromethane	GC-MS	_	[28]
Alkane	Hexadecane	Bark	$C_{16}H_{34}$	18.18	226.44	Dichloromethane	GC-MS	Antimicrobial, Antioxidant	[28]
Alkane	Nonadecane	Bark	$C_{19}H_{40}$	32	280.54	Dichloromethane	GC-MS	Antimicrobial, Antioxidant	[28]
Alkane	Heptacosane	Bark	$C_{27}H_{56}$	59	380.74	Dichloromethane	GC-MS	Overcoming P-Glycoprotein (P-Gp)-Mediated Drug Resistance,	[28,70]
Alkane	Octacosane	Bark	$C_{28}H_{58}$	60-64	394.77	Dichloromethane	GC-MS	Antimicrobial, Antifungal	[28]
Aromatic hydrocarbon	1,2,4-Trimethylbenzene	Bark	C_9H_{12}	-43.78	120.19	Petroleum ether	GC-MS	Antagonist Inhibition Of Daf-12 Receptor	[28]
Alkane	Heneicosane	Bark	$C_{21}H_{44}$	40.5	296.58	Petroleum ether	GC-MS	Antimicrobial, Pesticidal	[28]
Alkane	Tricontane	Leaves	$C_{30}H_{62}$	63-67	422.83	Methanol	FTIR	Anticancer	[31]
Alkyl hydroxylamine	Hydroxylamine, O-decyl	Bark	$C_{10}H_{23}NO$	34	173.3	Dichloromethane	GC-MS	_	[28]
Fatty alcohol	Heptadecanol	Bark	$C_{17}H_{36}O$	55-57	256.47	Chloroform + Methanol	NMR Spectroscopy	Anti-inflammatory, Antimicrobial, Hepatoprotective	[27]
Monoacylglycerol	1-Monolinoleoylglycerol trimethylsilyl ether	Leaves	$C_{27}H_{54}O_4Si_2$	_	498.89	Ethanol	GC-MS	_	[28]
Aliphatic nitriles	Hexanenitrile	Seeds	$C_6H_{11}N$	-80	97.16	Ethanol	GC-MS	Antimicrobial	[28]
Pyrimidine nucleobase	Thymine	Leaves	$C_5H_6N_2O_2$	316-317	126	Ethanol	GC-MS	_	[28]
Isothiocyanate	Neopentyl isothiocyanate	Leaves	$C_6H_{11}NS$	_	129.226	Ethanol	GC-MS	Antimicrobial	[28]
Sulfone	2,3-Dihydrothiophene 1,1-dioxide	Leaves	$C_4H_6O_2S$	48.5	118.15	Ethanol	GC-MS	Antiviral	[28]
Sulfone	Phenyl sulfone	Leaves	$C_{12}H_{10}O_{25}$	123-129	218.27	Methanol	FTIR	Anti-HIV,	[14, 48]
Sulfinic acid	Benzenesulfinic acid	Leaves	$C_6H_6O_2S$	83-84	142.18	Methanol	FTIR	_	[14, 48]
_	Propane, 1-(ethenylthio)-	Leaves	$C_5H_{10}S$	–113 °C	102	Ethanol	GC-MS	Antimicrobial	[28]
Dialkyl phthalate	Di-n-octylphthalate	Bark	$C_{24}H_{38}O_4$	-25	390.56	Petroleum ether	GC-MS	Anticancer	[28]
Dialkyl phthalate	Dibutyl phthalate	Seeds	$C_{16}H_{22}O_4$	_	278.34	Ethanol	GC-MS	Antimicrobial, Antifouling	[28]
Dialkyl phthalate	Didodecyl phthalate	Seeds	$C_{32}H_{54}O_4$	21-23	502.78	Ethanol	GC-MS	Antimicrobial, Antifouling	[28]
Dialkyl phthalate	1,2-Benzenedicarboxylic acid, diisooctyl ester	Leaves	$C_{24}H_{38}O_4$	_	390.56	Ethanol	GC-MS	Antimicrobial, Antifouling	[28]
Dialkyl phthalate	1,2-Benzenedicarboxylic acid, butyl8-methylnonyl ester	Bark	$C_8H_{16}O_2$	_	144.21	Ethanol	GC-MS	_	[28]
Bile acid derivative	Ethyl iso-allocholate	Leaves	$C_{26}H_{44}O_5$	160	436.63	Ethanol	GC-MS	Antidiabetic, Antioxidant	[28,71]
Monoterpene	Cyclohexene, 3-methyl-6-(1-methylethylidene)-	Seeds	$C_{10}H_{16}$	_	136.24	Ethanol	GC-MS	_	[28]

Table S2. Pharmacological activities of *Vitex leucoxylon L.f.*

Plant Part	Pharmacological activity	Extract	Dose route of administration	Standard Used	Control/Assay	Method	Induced chemical	Model/Microbial strain	Result	Reference
Leaves	Antiosteoporotic	90 % Ethanol	500 mg/kg	Calcium & Vitamin D_3	-	*in vivo*	Chronic alcohol abuse (20 % ethanol/saline)	Wistar albino rats (Female)	Serum Ca^{2+}, phosphorus ↑; ALP, urinary Ca^{2+}, phosphorus, creatinine ↓.	[8]
Leaves	Hepatoprotective	Alcoholic extract	500 mg/kg	-	-	*in vivo*	CCl_4	BALB/C mice	At 500 mg/kg, alcoholic extract improved ALP, bilirubin, SGOT, and SGPT, showing hepatoprotective effect.	[12]
Bark	Anti-inflammatory	Ethanol	500 mg/kg	-	-	*in vivo*	Carrageenan (1% w/v, 0.1 ml)	Wistar albino rats	43.82% inhibition	[15]
Bark	Anti-inflammatory	Aqueous	500 mg/kg	-	-	*in vivo*	Carrageenan (1% w/v, 0.1 ml)	Wistar albino rats	46.06% inhibition	
Bark	Anti-inflammatory	-	-	Indomethacin, 10 mg/kg	-	*in vivo*	Carrageenan (1% w/v, 0.1 ml)	Wistar albino rats	50.60% inhibition	
Leaves	Analgesic	-	-	-	Distilled water	*in vivo*	Phenylbutazone (100 mg/kg)	Wistar albino rats	21.08 ± 3.96 writhes that reduced writhing	[16]
Leaves	Analgesic	Cold aqueous Infusion	100 mg/kg	-	-	*in vivo*	-	Wistar albino rats	22.00 ± 5.31 writhes	
Leaves	Analgesic	-	200 mg/kg	-	-	*in vivo*	-	Wistar albino rats	19.60 ± 4.30 writhes	
Leaves	Analgesic	Ethanol	200 mg/kg	-	-	*in vivo*	-	Wistar albino rats	24.00 ± 6.91 writhes	
Leaves	Analgesic	-	400 mg/kg	-	-	*in vivo*	-	Wistar albino rats	36.40 ± 4.57 writhes	
Leaves	Anti-inflammatory	Ethanol	100–400 mg/kg	Phenylbutazone, 100 mg/kg	-	*in vivo*	Carrageenan paw edema (acute inflammation)	Wistar albino rats	0.42 ± 0.08 ml (Significant)	
Leaves	Anti-inflammatory	Ethanol	100–400 mg/kg	Phenylbutazone, 100 mg/kg	-	*in vivo*	Cotton pellet granuloma (chronic inflammation)	Swiss albino rats	47.32 ± 4.17 mg/100 g (non-significant)	
Bark	Anti-inflammatory	Methanol	100 mg/kg	-	Vehicle (0.5% CMC)	*in vivo*	50 µL FCA injected in left hind paw on day 14.	Swiss albino rats	VL-89/185A at 100 mg/kg produced **36.92% inhibition of paw edema**.	[18]

Bark	Anti-inflammatory	Methanol	250 mg/kg	-	Vehicle (0.5% CMC)	*in vivo*	50 µL FCA injected in left hind paw on day 14.	Swiss albino rats	VL-89/185A at 250 mg/kg showed **46.41% inhibition of paw edema**.	[18]
Bark	Anti-inflammatory	-	10 mg/kg	Prednisolone	Vehicle (0.5% CMC)	*in vivo*	50 µL FCA injected in left hind paw on day 14.	Swiss albino rats	Prednisolone at 10 mg/kg achieved **59.74% inhibition of paw edema**.	
Leaves (AgNP synthesis)	Antibacterial	Aqueous	5 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 6mm, *Escherichia coli* 10mm, *Pseudomonas aeruginosa* 8mm, *Klebsiella pneumoniae* 5mm and *Salmonella typhi* 10mm	[21]
-	-	-	10 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 8, *Escherichia coli* 14, *Pseudomonas aeruginosa* 10, *Klebsiella pneumoniae* 8, *Salmonella typhi*16	
-	-	-	15 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 10mm, *Escherichia coli* 20mm, *Pseudomonas aeruginosa* 16mm, *Klebsiella pneumoniae* 12mm and *Salmonella typhi* 20mm	
Leaves (CuNPs synthesis)	Antibacterial	Aqueous	5 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 10mm, *Escherichia coli* 12mm, *Pseudomonas aeruginosa* 10mm, *Klebsiella pneumoniae* 8mm and *Salmonella typhi* 12mm	
-	-	-	10 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 12mm, *Escherichia coli* 18mm, *Pseudomonas aeruginosa* 18mm, *Klebsiella pneumoniae* 12mm and *Salmonella typhi* 18mm	
-	-	-	15 µg/ml	Ofloxin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Staphylococcus aureus* 18mm, *Escherichia coli* 22mm, *Pseudomonas aeruginosa* 20mm, *Klebsiella pneumoniae* 18mm and *Salmonella typhi* 22mm	
Leaves (AgNP synthesis)	Antifungal	Aqueous	5 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 8mm, *Candida tropicalis* 6mm and *Aspergillus niger* 6mm	
-	-	-	10 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 12mm, *Candida tropicalis* 8mm and *Aspergillus niger* 10mm	
-	-	-	15 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 16mm, *Candida tropicalis* 10mm, *Aspergillus fumigatus* 4mm and *Aspergillus niger* 14mm	
Leaves (CuNPs synthesis)	Antifungal	Aqueous	5 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 8mm, *Candida tropicalis* 6mm and *Aspergillus niger* 6mm	
-	-	-	10 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 12mm, *Candida tropicalis* 8mm and *Aspergillus niger* 10mm	
-	-	-	15 µg/ml	Ketokonazole (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Candida albicans* 16mm, *Candida tropicalis* 10mm, *Aspergillus fumigatus* 4mm and *Aspergillus niger* 14mm	
Leaves	Antioxidant	Ethanol	10 µg/ml	-	DPPH radical scavenging	*in vitro*	-	-	IC_{50} - 0.084	
Bark	Antioxidant	Ethanol	10 µg/ml	-	DPPH radical scavenging	*in vitro*	-	-	IC_{50} - 0.171.	
Seed	Antioxidant	Ethanol	10 µg/ml	-	DPPH radical scavenging	*in vitro*	-	-	IC_{50} - 0.758.	
Leaves	Antioxidant	Ethanol	10 µg/ml	-	Superoxide Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.317.	
Bark	Antioxidant	Ethanol	10 µg/ml	-	Superoxide Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.480	
Seed	Antioxidant	Ethanol	10 µg/ml	-	Superoxide Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.591	
Leaves	Antioxidant	Ethanol	10 µg/ml	-	Hydroxyl Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.130	
Bark	Antioxidant	Ethanol	10 µg/ml	-	Hydroxyl Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.166	
Seed	Antioxidant	Ethanol	10 µg/ml	-	Hydroxyl Radical Scavenging Activity	*in vitro*	-	-	IC_{50} - 0.268	
Leaves	Antioxidant	Ethanol	10 µg/ml	-	Lipid Peroxidation Assay	*in vitro*	-	-	IC_{50} - 0.209.	
Bark	Antioxidant	Ethanol	10 µg/ml	-	Lipid Peroxidation Assay	*in vitro*	-	-	IC_{50} - 0.200	
Seed	Antioxidant	Ethanol	10 µg/ml	-	Lipid Peroxidation Assay	*in vitro*	-	-	IC_{50} - 0.213	

Leaves	Hepatoprotective	Chloroform & Methanolic	50 mg/kg to 200 mg/kg	Silymarin	-	*in vivo*	CCl_4	Wistar albino rats (Male)	Liver function (GOT, GPT, ALP, bilirubin) showed hepatoprotection in all extracts except bark methanol.	
Leaves	Antibacterial	Chloroform	250 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 10 mm, *Bacillus cereus* 10 mm, *Bacillus pumilis* 10 mm, *Escherichia coli* 10 mm and *Proteus vulgaris* 9 mm	
	Antibacterial	-	500 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 12 mm, *Bacillus cereus* 13 mm, *Bacillus pumilis* 11 mm, *Streptococcus aureus* 9 mm, *Escherichia coli* 13 mm, *Proteus vulgaris* 12 mm and *Pseudomonas aeruginosa* 9 mm	
	Antibacterial	Methanol	250 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 11 mm, *Bacillus cereus* 25 mm, *Bacillus pumilis* 19 mm, *Streptococcus aureus* 16 mm, *Escherichia coli* 22 mm, *Proteus vulgaris* 20 mm, *Pseudomonas aeruginosa* 19 mm and*Streptomyces marienensis* 22 mm	
	Antibacterial	-	500 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 12 mm, *Bacillus cereus* 28 mm, *Bacillus pumilis* 22 mm, *Streptococcus aureus* 18 mm, *Escherichia coli*25 mm, *Proteus vulgaris* 27 mm, *Pseudomonas aeruginosa* 23 mm and *Streptomyces marienensis* 26 mm	[27]
Stem bark	Antibacterial	Chloroform	250 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 10 mm, *Streptococcus aureus* 10 mm, *Escherichia coli* 9 mm, *Proteus vulgaris* 11 mm, *Pseudomonas aeruginosa* 10 mm and *Streptomyces marienensis* 10 mm	
	Antibacterial	-	500 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 12 mm, *Bacillus cereus* 10 mm, *Bacillus pumilis* 10 mm, *Streptococcus aureus* 13 mm, *Escherichia coli*12 mm, *Proteus vulgaris* 14 mm, *Pseudomonas aeruginosa* 12 mm and *Streptomyces marienensis* 12 mm	
	Antibacterial	Methanol	250 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 16 mm, *Bacillus cereus* 23 mm, *Bacillus pumilis* 14 mm, *Streptococcus aureus* 14 mm, *Escherichia coli*22 mm, *Proteus vulgaris* 18 mm, *Pseudomonas aeruginosa* 14 mm and *Streptomyces marienensis* 18 mm	
	Antibacterial	-	500 µg/disc	Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Bacillus subtilis* 19 mm, *Bacillus cereus* 28 mm, *Bacillus pumilis* 22 mm, *Streptococcus aureus* 18 mm. *Escherichia coli*24 mm. *Proteus vulgaris* 20 mm, *Pseudomonas aeruginosa* 18 mm and*Streptomyces marienensis* 20 mm	
Leaves	Antifungal	Chloroform	250 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 18 mm, *Rhizopus oryzae* 12 mm and*Saccharomyces cerevisiae* 30 mm	
	Antifungal	-	500 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 18 mm, *Rhizopus oryzae* 14 mm and *Saccharomyces cerevisiae* 35 mm	
	Antifungal	Methanol	250 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 22 mm, *Rhizopus oryzae* 19 mm and *Saccharomyces cerevisiae* 20 mm	
	Antifungal	-	500 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 22 mm, *Rhizopus oryzae* 22 mm and *Saccharomyces cerevisiae* 20 mm	
Stem bark	Antifungal	Chloroform	250 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 14 mm, *Rhizopus oryzae* 10 mm and *Saccharomyces cerevisiae* 22 mm	
	Antifungal	-	500 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Aspergillus niger* 20 mm, *Rhizopus oryzae* 12 mm and*Saccharomyces cerevisiae* 27 mm	
	Antifungal	Methanol	250 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Rhizopus oryzae* 10 mm and *Saccharomyces cerevisiae* 18 mm	
	Antifungal	-	500 µg/disc	Nystatin Chloramphenicol (30 µg/cup)	-	*in vitro*	-	Cylinder plate assay	*Rhizopus oryzae* 16 mm and *Saccharomyces cerevisiae* 20 mm	
Leaves	Antibacterial	Ethanol	2000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*Escherichia coli* 14.5 mm, *Klebsiella pneumoniae* 11mm, *Enterobacter aerogenes* 15mm, *Vibrio cholerae* 18mm, *Salmonella paratyphi* 16mm, *Staphylococcus aureus* 11.5 and *Streptococcus faecalis* 12	
-	-	-	1000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 9mm, *K. pneumoniae* 8mm, *E. aerogenes* 10mm, *V. cholerae* 14mm, *S. paratyphi* 10mm, *S. aureus* 10mm and *S. faecalis* 9mm	[28]
-	-	-	500 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*V. cholerae* 11mm and *S. paratyphi* 8mm	
-	-	-	250 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	No activity	
-	-	Methanol	2000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 11mm, *K. pneumoniae* 9mm, *E. aerogenes* 12mm, *V. cholerae* 15mm, *S. paratyphi* 13mm, *S. aureus* 12mm and *S. faecalis* 11mm	
-	-	-	1000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 9mm, *E. aerogenes* 10mm, *V. cholerae* 12mm, *S. paratyphi* 10mm, *S. aureus* 10mm and *S. faecalis* 9mm	
-	-	-	500 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*V. cholerae* 10mm and *S. paratyphi* 9mm	
-	-	-	250 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	No activity	
-	-	Petroleum ether	2000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 10mm, *K. pneumoniae* 12mm, *E. aerogenes* 10mm, *V. cholerae* 11mm, *S. paratyphi* 12mm, *S. aureus* 11mm and *S. faecalis* 10mm	

-	-	Dichloromethane	2000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 9mm, *K. pneumoniae* 11mm, *E. aerogenes* 10mm, *V. cholerae* 12mm, *S. paratyphi* 11mm, *S. aureus* 10mm and *S. faecalis* 9mm	[28]
-	-	Aqueous	2000 µg/disc	Gentamycin (10 µg/disc)/Kanamycin (10 µg/disc)	-	*in vitro*	-	Disc diffusion method	*E. coli* 10mm, *K. pneumoniae* 12mm, *E. aerogenes* 10mm, *V. cholerae* 13mm, *S. paratyphi* 12mm, *S. aureus* 11mm and *S. faecalis* 10mm	
Bark	Antioxidant	Ethyl acetate	100 µg/ml	-	DPPH radical scavenging	*in vitro*	-	-	The ethyl acetate bark extract of *Vitex leucoxylon* L.f. showed 88.52% DPPH scavenging at 100 µg/ml, close to BHT (91.45%).	[30]
Bark	Antioxidant	Ethyl acetate	100 µg/ml	-	Nitric oxide scavenging	*in vitro*	-	-	The ethyl acetate bark extract of *Vitex leucoxylon* L.f. showed 74.00% nitric oxide scavenging at 100 µg/ml, compared to BHT (82.24%).	
Bark	Antioxidant	Ethyl acetate	100 µg/ml	-	Superoxide Radical Scavenging Activity	*in vitro*	-	-	The ethyl acetate extract of *Vitex leucoxylon* L.f. bark demonstrated 74.22% superoxide scavenging activity at 100 µg/ml, against BHT (81.76%).	
Bark	Antioxidant	Ethyl acetate	100 µg/ml	-	Hydroxyl radical scavenging	*in vitro*	-	-	The ethyl acetate bark extract of *Vitex leucoxylon* L.f. showed 79.04% hydroxyl scavenging at 100 µg/ml, above BHT (73.03%).	
Leaves	Hepatoprotective	Ethanol	500 mg/kg	5-Fluorouracil (20mg/kg/day)	Normal saline (0.9 %)	*in vivo*	Diethylnitrosamine 200mg/kg	Wistar albino rats	Hepatoprotective	[31]
Leaves	Anti-inflammatory	Hydroalcoholic	50 µg/ml	-	-	*In vitro*	0.36% NaOH-induced hypotonic haemolysis.	Human red blood cell membrane stabilization	96.63 % inhibition	[34]
Leaves	Anti-inflammatory	Hydroalcoholic	100 µg/ml	-	-	*in vitro*	-	Human red blood cell membrane stabilization	90.97 % inhibition	
Leaves	Anti-inflammatory	Hydroalcoholic	1000 µg/ml	-	-	*In vitro*	-	Human red blood cell membrane stabilization	84.16 % inhibition	
Leaves	Anti-inflammatory	Ethanol	50 µg/ml	-	-	*in vitro*	-	Human red blood cell membrane stabilization	99.03 % inhibition	
Leaves	Anti-inflammatory	Ethanol	100 µg/ml	-	-	*in vitro*	-	Human red blood cell membrane stabilization	90.02 % inhibition	
Leaves	Anti-inflammatory	Ethanol	1000 µg/ml	-	-	*in vitro*	-	Human red blood cell membrane stabilization	84.43 % inhibition	
Leaves	Anti-inflammatory	-	-	Prednisolone - 50 µg/mL	-	*in vitro*	-	Human red blood cell membrane stabilization	99.03 % inhibition	
Leaves	Anti-inflammatory	-	-	Prednisolone- 100 µg/mL	-	*in vitro*	-	Human red blood cell membrane stabilization	97.23 % inhibition	
Leaves	Anti-inflammatory	-	-	Prednisolone-500 µg/mL	-	*in vitro*	-	Human red blood cell membrane stabilization	98.85 % inhibition	
Bark	Antipyretic	Ethyl acetate extract	500 mg/kg	Aspirin (300 mg/kg)	-	*in vivo*	Brewer's yeast (20% suspension)	Wistar albino rats	Ethyl acetate extract (500 mg/kg) lowered rectal temperature in pyretic rats at 2–4 h.	[35]
Leaves	Anticancer	Ethanol	250 mg/kg	5-Fluorouracil (20 mg/kg)	DAL untreated mice	*in vivo*	-	Mice	Ethanol extract showed stronger antitumor activity.	
Aerial parts	Anticancer	Aqueous	-	-	-	*in vitro*	-	Mice	A549 lung cancer cells, IC_{50} was 315.57 µg/mL and Against NCI-H460 cells, IC_{50} was 560.48 µg/mL.	
Leaves	Anthelmintic	Chloroform, Ethyl acetate, Methanol, Ethanol and Aqueous	50 to 250 mg/20 ml	Piperazine citrate (100 µg/ml)	-	*in vivo*	-	*Pheretima posthuma*	Methanol extract showed well result at 250 mg/20 ml.	[38]
Leaves	CNS Depressant	Ethanol	50mg/1 ml & 100 mg/1 ml	Chlorpromazine (25 mg)	5 % gum acacia 1ml/kg	*in vivo*	Hypothermia	Wistar albino rats	At 250 and 500 mg/kg, it significantly reduced locomotor activity, peaking at 1 h, though less than the standard drug.	[39]
Leaves	Insecticidal	Powder itself	0.5gm/100 gm to 2.5 gm/100 gm	-	-	*in vivo*	-	*Corcyra cephalonica*	At 0.5 g/100 g, fecundity was 210.57 with 86.56% survival, dropping to 178.38 and 70.54% at 2.5 g/100 g.	[40]