Chemical compositions from the leaf extracts of*Funtumiaafricana*(Benth.) stapf with its antioxidant and anti-inflammatory activity.

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ABSTRACT

Antioxidant and anti-inflammatory activity of the extracts of Funtunmiaafricana(Benth.) stapfleaves were investigated in this study. The leaf part of Funtunmiaafricanawere dried, weighed, and exhaustively extracted with n-hexane and chloroform. GC-MS analysis of the extracts was carried out to know the number of compounds present in the extract as well as their molecular formula. These extracts of the plant were evaluated for antioxidant and anti-inflammatory activity using peroxide scavenging, lipoxidase and membrane stabilization. Hexane extract showed antioxidant activity with IC_{50} of 194.09 µg/mL. Hexane and chloroform extracts also showed pronounced anti-inflammatory activity. The GC-MS analysis of the plant extracts showed the presence of twenty-eight compounds in chloroform extract, with terpenoids, fatty acids and unsaturated hydrocarbons as its principal components, while seven compounds were revealed in hexane extract of the plant, and its most abundant compound is 1,2-Benzenedicarboxylic acid, bis(2-methylpropyl)ester.

Keywords: Antioxidant activity, anti-inflammatory activity, α-bisabolol, 13-methyl pentadecanoic acid, GC-MS.

INTRODUCTION

Medicinal plants include various types of plants used in herbalism and some of these plants have medicinal exertions. Medicinal plants are the "backbone" of traditional medicine, which means more than 3.3 billion people in the less developed countries utilize medicinal plants on a regular basis[1]. *Funtumiaafricana*(Benth.) stapf is a tropical tree up to 30 m tall (usually shorter) with a straight, cylindrical trunk and a narrow tree crown. Bark brown to dark in color, thin and slightly fissured becoming granular on old trees. Slash orange exuding latex copiously[2]. Leaves elliptic or ovate, base round orcuneate, apex acuminate 20 x 9 cm, with approximately 8-14 main lateral veins on each side, leaf margins wavy. Axils on the main lateral veins not pitted.Flowers yellow-white, fragrant in dense cymes.Corolla tube 6-10 mm, lobes 5-7 mm.Fruit

grey-brown, fusiform, with an acute or acuminate apex, up to 30 cm long, with hairy wind-borne seeds.The generic epithet is derived from 'funtum', a local Ghanaian (Akan dialect) name of the plant. The specific epithet means 'of Africa[3]. In Africa this species is used to treat urinary incontinence and burns. The leaf and bark are used as enema. The principle alkaloids of *F. africana* are hypotensive[4].*F. Africana* is used to treat and manage diverse ailments including fever, inflammation, malaria, cancer and urinary incontinence in Africa.

MATERIALS AND METHODS

F. africana plant was collected at Ajashe-Ipo, Kwara state, November 2017. The plant was firstly identified using its vernacular name by an area hunter,Mr. Sumanu and later identified and authenticated by Mr. AjayiBolu of the Department of Plant Biology, University of Ilorin, Ilorin, Nigeria. A voucher specimen [UILH/004/337] was deposited into the herbarium section of the department. Leaf part of the plant were washed with water, air dried for more than a week, crushed and grounded into a powdery form. The weight after grinding was 1,660g.The plant samples were weighed and extracted using cold extraction method with two solvents n-hexane and chloroform.

Antioxidant Activity

Hydrogen peroxide scavenging activity

The ability of the samples to scavenge peroxide radicals was assessed following the procedure[5]. A solution of H_2O_2 (43 mM) was prepared in phosphate buffer (0.1 M, pH 7.4). The extracts at different concentrations in 3.4 ml phosphate buffer was added to 0.6 mL of H_2O_2 solution (0.6 mL, 43 mM). The absorbance value of the reaction mixture was recorded at 230 nm. H_2O_2 scavenging activity (%) = $(A_0 - A_1) / A_0 \times 100$ Where A_0 is the absorbance of the control, and A_1 is the absorbance of the sample.

The absorbance was measured in three folds at different concentrations and the mean absorbance for each concentrationwere determined. Parallel to examination of the antioxidant activity of the plant extracts, the value for the standard compound (Ascorbic acid) was obtained and compared to the values of the antioxidant activity and percentage inhibition of the standard and the extracts was determined using the expression above.The IC_{50} values (Inhibition Concentration at 50%) were estimated from the %inhibition versus concentration graph[6].

Anti-Inflammatory Assay of the Crude Extract

Anti-Lipoxygenase activity

Anti-Lipoxygenase activity was studied using linoleic acid as substrate and lipoxidase as enzyme[7]. Test samples were dissolved in 0.25 mL of 2 M borate buffer pH 9.0 and added 0.25ml of lipoxidase enzyme solution (20,000 U/mL) and incubated for 5 min at 25^{o}C. After which, 1.0mL of linoleic acid solution (0.6 mM) was added, mixed well and absorbance was measured at 234nm. Indomethacin was used as reference standard. The percentage inhibition was

calculated from the following equation, % inhibition= [{Abs control- Abs sample}/Abs control] x 100, A dose response curve was plotted to determine the IC_{50} values. IC_{50} is defined as the concentration sufficient to obtain 50% of a maximum scavenging capacity. All tests and analyses were run in triplicate and averaged

Membrane stabilization test

Preparation of red blood cells (RBCs) suspension.

Fresh whole human blood (10 mL) was collected and transferred to the centrifuge tubes. The tubes were centrifuged at 3000 rpm for 10min and were washed three times with equal volume of normal saline. The volume of blood was measured and reconstituted as 10% v/v suspension with normal saline[8].

GC-MS analysis of the extracts

GC-MS analysis of the two plants' extracts was performed with Agilent 19091GC plus automatic sampler system coupled with a quadruple Mass Spectrometer 433HP-5MS. Compounds were separated in HP5MS column fused with phenylmethylsilox, (length; 30 m x 250 µm; film thickness 0.25 µm). Samples were injected at a temperature of about 25^{o}C with a split ratio of 10:1 with a flow rate of helium 1 mL/min.

RESULTS AND DISCUSSION

Antioxidant activity of Funtumiaafricana

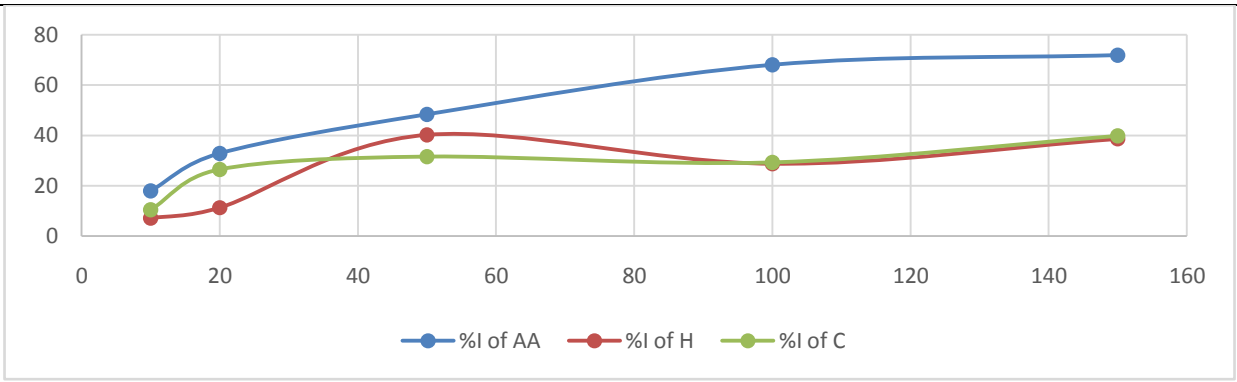
The ability of the plants' extracts (n-hexane and chloroform) against peroxide radical scavenging was analyzed.

Antioxidant Activity (IC_{50} Graph) of F. africana leaf extracts

Hexane extract of *Funtumiaafricana* leaves exhibited antioxidant activity on peroxide radicals at different concentrations, using ascorbic acid as standard antioxidant. Hexane extract of the plant leaves showed inhibition of peroxide radicals at concentrations in the range of 10-150 µg/mL, by scavenging the free radicals with IC_{50} of 195 µg/mL while chloroform extract of the plant shows inhibition of peroxide radical scavenging with IC_{50} of 218 µg/mL.

Table 1:Hydrogen Peroxide Radical Scavenging of Hexane and ChloroformExtract of *Funtunmia Africana* Leaves

	Concentration (µg/ml)	Absorbance 1	Absorbance 2	Absorbance 3	Mean	%Inhibition
Ascorbic acid	10	0.1903	0.1828	0.2385	0.030226864	17.93755
	20	0.2965	0.2012	0.1974	0.056150601	32.86092
	50	0.5081	0.3608	0.2534	0.127869817	48.35491
	100	0.5844	0.448	0.4298	0.084495917	68.01345
	150	0.6802	0.5735	0.5296	0.077451555	71.85589
Hexane extract	10	0.343	0.3368	0.4634	0.3674	7.102227
	20	0.3442	0.3501	0.3977	0.301567	11.2628
	50	0.2432	0.2325	0.2601	0.280733	40.20803
	100	0.2868	0.2969	0.2936	0.290167	28.70957
	150	0.2929	0.2226	0.2402	0.246967	38.59093
Chloroform extract	10	0.2899	0.2623	0.2799	0.381067	10.43393
	20	0.268	0.2635	0.2567	0.364	26.48302
	50	0.2395	0.2211	0.2162	0.245267	31.56184
	100	0.2321	0.2078	0.2079	0.292433	29.26215
	150	0.2015	0.1978	0.2007	0.2519	39.7936



AA=Ascorbic Acid, H=Hexane extract, C=Chloroform extract.

Table 2: Anti-inflammatory activity of hexane and chloroform extracts of *F. africana*leaves (Lipoxidase).

	Concentration (µg/mL)	Absorbance 1	Absorbance 2	Absorbance 3	Mean	%Inhibition
Indomethacin $A_{control}$ =0.103251	10	0.03685	0.094	0.0327	0.034256471	47.19987
	20	0.046325	0.041125	0.027575	0.009679919	62.86557
	50	0.041725	0.02355	0.033575	0.009103605	68.08748
	100	0.031425	0.0258	0.037075	0.005637505	69.55639
	150	0.020075	0.017225	0.021478	0.002167138	81.02424
Hexane extract	10	0.043681	0.03035	0.03425	0.006854066	66.78805
	20	0.039665	0.031475	0.032675	0.004422974	67.10282
	50	0.047587	0.02085	0.028249	0.01385619	75.35972
	100	O.038992	0.029225	0.024828	0.0031099149	76.06157
	150	0.029098	0.021454	0.025775	0.03832843	78.35243
Chloroform extract	10	0.047	0.041625	0.042319	0.002923583	57.69403
	20	0.040075	0.041425	0.037495	0.001996822	61.58391
	50	0.040161	0.042175	0.060425	0.011163545	53.91134
	100	0.037225	0.041875	0.037875	0.002518101	62.23604
	150	0.02042	0.039225	0.02765	0.009485792	71.81787

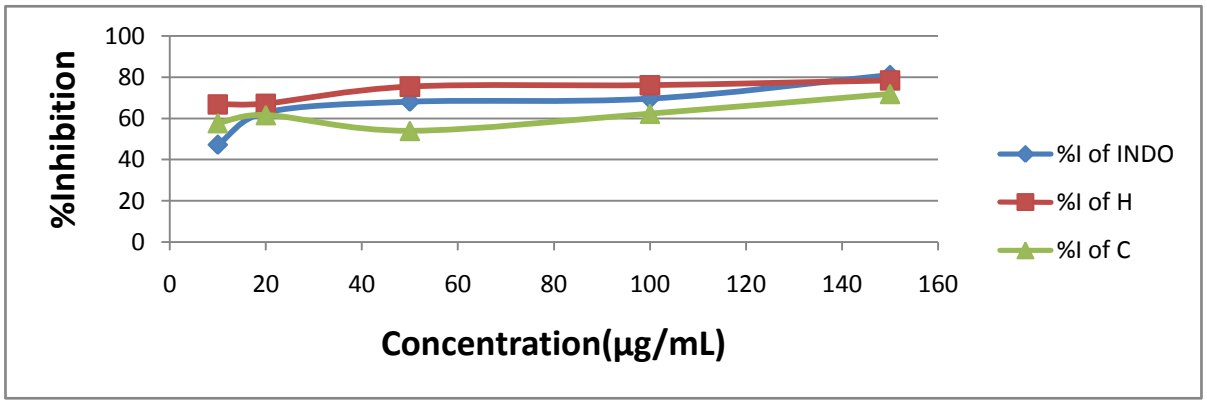


Figure 2a: AntiinflammatoryActivity of hexane and chloroform extracts of*F.africana* leaves (lipoxidase)

Table 3:Membrane Stabilization Activity of hexane and chloroform extracts of *F.africana* leaves

	Concentration (µg/ml)	Absorbance	Absorbance	Absorbance	Mean	%Inhibition
Indomethacin $A_{control}$ =1.103	10	0.4661	0.4394	0.3971	0.034792672	37.53702
	20	0.6528	0.6972	0.5596	0.07022744	42.19704
	50	0.6528	0.6993	0.5315	0.086634077	42.6715
	100	0.6537	0.6582	0.6008	0.0319202265	42.29072
	150	0.7193	0.7212	0.6264	0.05419265	60.63463
Hexane extract	10	0.7328	0.5844	0.604	0.08061608	41.94016
	20	0.7151	0.5525	0.5486	0.095022997	45.11333
	50	0.5977	0.5704	0.4877	0.057277948	49.96071
	100	0.5261	0.5338	0.5184	0.0077	52.30281
	150	0.5192	0.5087	0.5138	0.005250714	53.40888
Ethyl acetate extract	10	0.6187	0.6456	0.6151	0.016667433	43.20338
	20	0.6491	0.6146	0.6098	0.021438983	43.38169
	50	0.6339	0.5901	0.6247	0.023094877	44.13116
	100	0.6016	0.5882	0.5868	0.008170679	46.31006
	150	0.574	0.5907	0.6106	0.0183233	46.34935

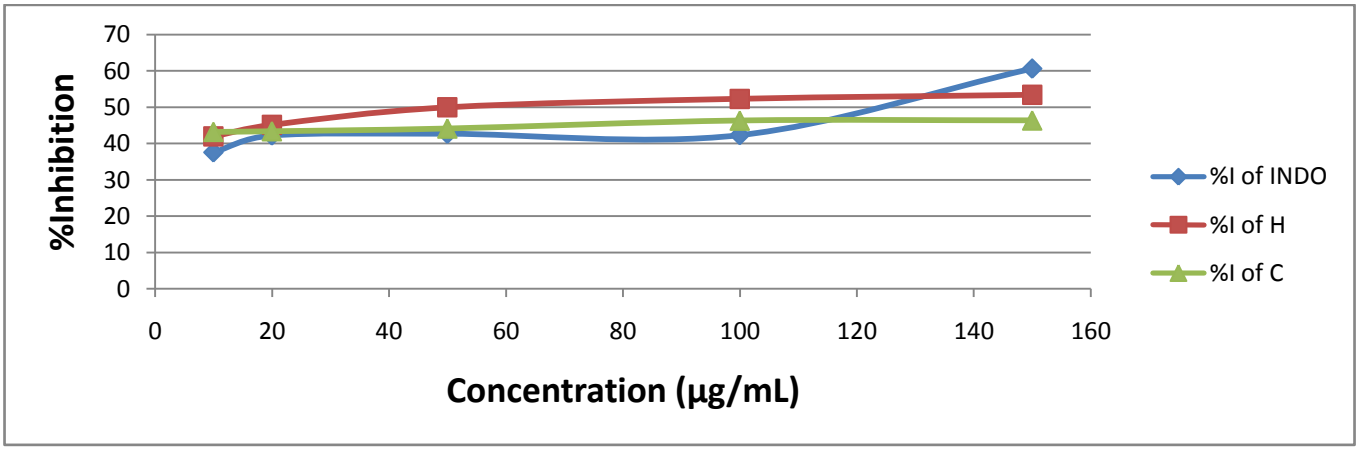


Figure 2b: AntiinflammatoryActivity of hexane and chloroform extracts of *F. africana* leaves (membrane stabilization) INDO=Indomethacin, H=Hexane, C=Chloroform.

Lipoxidase

Hexane and chloroform extracts of *F. africana*leaves exhibited antiinflammatory activity with an IC_{50}values of 211 and 62.5µg/mL respectively with IC_{50} value of the indomethacin standard being 18.86 µg/mL. chloroform extract out of the two extracts is more anti-inflammatory active than the other extract because of its closer value to the value of the standard.

Membrane Stabilization

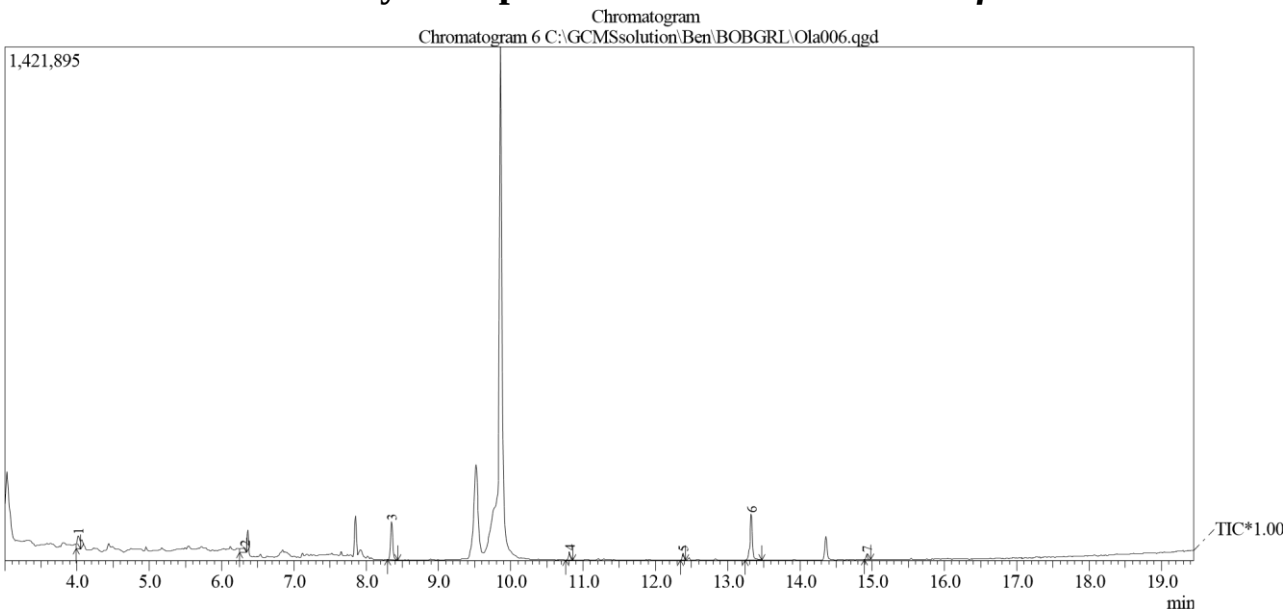
Hexane and chloroform extracts of *Funtumia africana* leaves exhibited anti-inflammatory activity with an IC_{50} values of 86.27 and 280µg/mL respectively while the value of indomethacin is 103.97µg/mL. Hexane extract out of the two extracts shows a more pronounced anti-inflammatory activity than the other extract.

GC-MS Results of Hexane and chlorofoam extracts of F. africana leaves

The GC-MS analysis hexane extract of *F.africana*revealed the presence of seven vertical peaks, the comparison of the peak with the pherobase library indicated the presence of seven compounds as shown above, 1,2-Benzenedicarboxylic acid, bis (2-methylpropyl)ester is the most abundant with % abundance of 40.98, molecular formula $C_{16}H_{22}0_4$ and retention time of 13.328.

The GC-MS analysis of choroform extract of *F.africana*leaves showed the presence of twenty-eight compounds.The principal compounds terpenoids, fatty acids and unsaturated hydrocarbons as its principal components include α-Bisabolol, Carophyllene,1-Nonadecene, Phytol and 13-Methyl pentadecanoic acid, with their corresponding % of abundance of 20.30, 15.71, 6.71, 4.36 and 2.92 respectively.

GC-MS Analysis Report Hexane Extract of *F. Africana* Leaves



Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area	Area%	Height	Height%	A/H	Mark	Name
1	4.018	3.992	4.050	94802	12.45	37047	10.90	2.56	V	Undecane,
2	6.316	6.250	6.342	51988	6.83	12665	3.73	4.10	V	Cyclohexasiloxane, dodecamethy
3	8.352	8.300	8.433	208271	27.35	105371	31.00	1.98		Cycloheptasiloxane, tetradecamethy
4	10.811	10.758	10.858	43486	5.71	21759	6.40	2.00		Cyclooctasiloxane, hexadecamethyl- $
5	12.383	12.350	12.417	29107	3.82	18654	5.49	1.56		S)-(+)-6-Methyl-1-octanol
6	13.328	13.242	13.475	312026	40.98	127284	37.45	2.45		1,2-Benzenedicarboxylic acid, bis(2-methy
7	14.924	14.892	14.975	21697	2.85	17140	5.04	1.27		14-Heptadecenal
				761377	100.00	339920	100.00			

Method

[Comment]
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Column Oven Temp.:60.0 °C
Injection Temp. :250.00 °C Injection Mode
:Split
Flow Control Mode:Linear Velocity
Pressure :100.2 kPa
Total Flow :39.4 mL/min
Column Flow :1.61 mL/min
Linear Velocity :46.3 cm/sec Purge Flow
:5.6 mL/min
Split Ratio :20.0
High Pressure Injection:OFF
Carrier Gas Saver :OFF
Splitter Hold :OFF
Oven Temp. Program

Rate	Temperature(°C)	Hold Time(min)
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10.00	280.0	2.00

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SPL1 : Yes
MS : Yes
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< Ready Check Baseline Drift >

< Ready Check Injection Flow >
SPL1 Carrier : Yes SPL1 Purge
: Yes
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< Ready Check Detector APC Flow >
External Wait :No
Equilibrium Time :3.0 min
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[GCMS-QP2010 Plus]
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Interface Temp. :250.00 °C
Solvent Cut Time:2.50 min
Detector Gain Mode:Relative
Detector Gain :0.00 kV
Threshold :1000
[MS Table]
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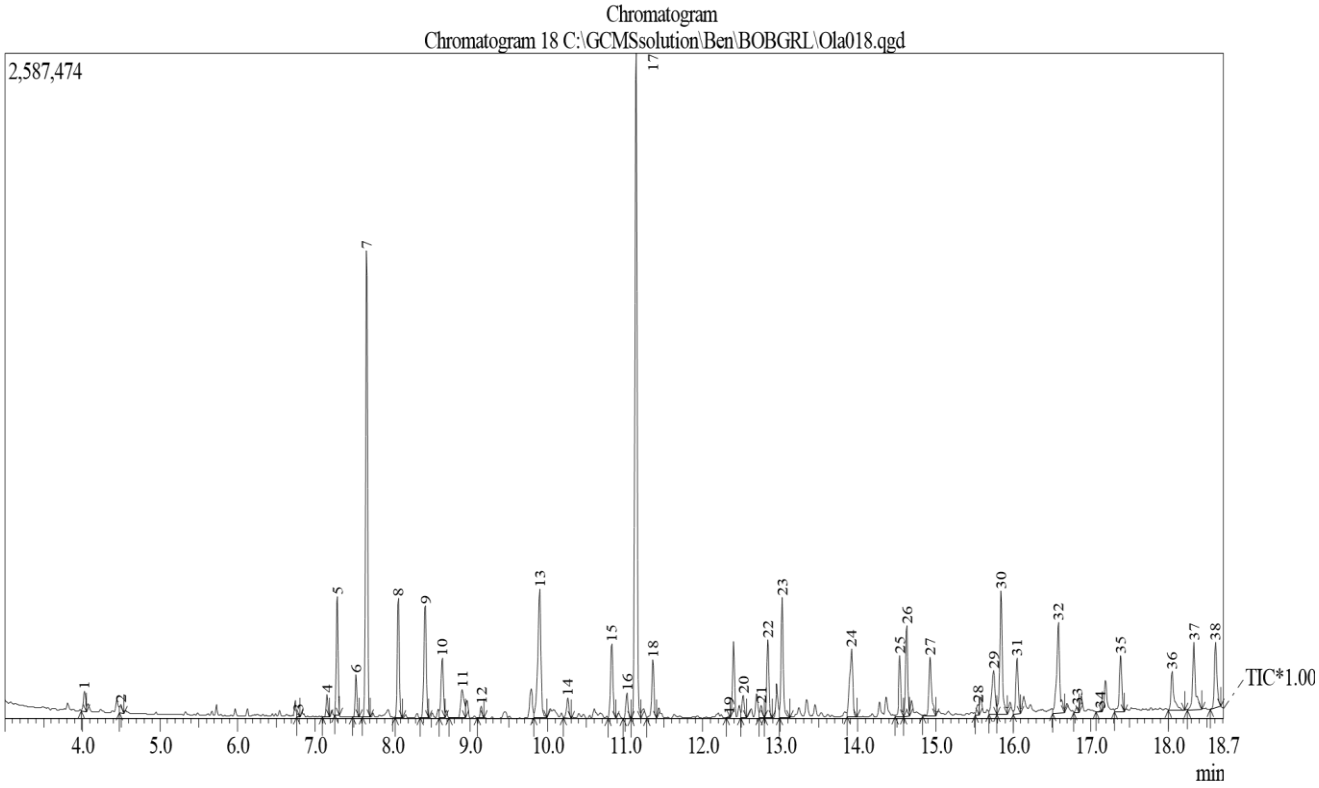
End Time :21.00min
ACQ Mode :Scan
Event Time :0.50sec
Scan Speed :1428
Start m/z :45.00
End m/z :700.00
Sample Inlet Unit:GC
[MS Program]Use MS Program :OFF

Interpretation of GC-MS analysis of hexane extract of *F. africana*leaves

S/N	Compounds	% Abundance	Molecular formula	Retention time
1	5,7-dimethylundecane	12.45	$C_{13}H_{28}$	4.018
2	Dodecamethylcyclohexasiloxane	6.83	$C_{12}H_{36}O_6Si_6$	6.316
3	Tetradecamethylcycloheptasiloxane	27.35	$C_{14}H_{42}O_7Si_7$	8.552
4	Hexadecamethylcyclooctasiloxane	5.71	$C_{16}H_{48}O_8Si_8$	10.811
5	(S)-(+)-6-methyl-1 octanol	3.82	$C_9H_{20}0$	12.383
6	1,2-Benzenedicarboxylic acid, bis (2-methylpropyl) ester	40.98	$C_{16}H_{22}0_4$	13.328
7	Cyclohexanepropanol	2.85	$C_9H_{18}O$	14.924

GC-MS Analysis Report Chloroform Extract of *F. Africana* Leaves



Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area	Area%	Height	Height%	A/H	Mark	Name
1	4.024	3.983	4.058	178861	0.72	79384	0.67	2.25	V	Hexane, 3,3-dimethyl-
2	4.494	4.475	4.533	65910	0.27	32494	0.27	2.03	V	Octane, 2,3,6,7-tetramethyl-
3	6.781	6.767	6.808	13489	0.05	11612	0.10	1.16	V	Bicyclo[3.1.0]hexane, 6-isopropylidene-1-
4	7.150		7.092	7.183	131084	0.53	86151	0.72	1.52	V	Copaene
5	7.288		7.258	7.317	749641	3.02	461971	3.88	1.62	MI	Cyclohexane, 1-ethenyl-1-methyl-2,4-bis(1
6	7.527		7.483	7.567	241382	0.97	164433	1.38	1.47		Benzene, 2-(1,1-dimethylethyl)-1,4-dimeth
7	7.661		7.608	7.708	3117804		12.56	1814950		15.26	1.72 Caryophyllene
8	8.072		8.033	8.125	839829	3.38	462808	3.89	1.81		alpha.-Caryophyllene
9	8.421		8.358	8.467	930330	3.75	435934	3.66	2.13		1,6-Cyclodecadiene, 1-methyl-5-methylene
10	8.639		8.600	8.675	503495	2.03	233436	1.96	2.16	V	gamma.-Elemene
11	8.898		8.725	8.942	351117	1.41	112699	0.95	3.12	V	Benzoic acid, 4-ethoxy-, ethyl ester
12	9.141		9.092	9.175	80501	0.32	47731	0.40	1.69	V	2(4H)-Benzofuranone, 5,6,7,7a-tetrahydro
13	9.898		9.825	9.992	1392196		5.61	501875	4.22	2.77	V : Cyclohexane, 1,1,4,4-tetramethyl-2,5-dim
14	10.256	10.200	10.300	168777	0.68	78595	0.66	2.15	V	12-Oxabicyclo[9.1.0]dodeca-3,7-diene, 1,5
15	10.822	10.775	10.883	647297	2.61	290183	2.44	2.23	V	Cyclooctasiloxane, hexadecamethyl-

16	11.023		10.975	11.075	190881	0.77	98107	0.82	1.95		Aromadendrene oxide-(2)
17	11.138	11.075	11.200	5113550		20.60	2584588		21.72	1.98	V alpha.-Bisabolol
18	11.352	11.275	11.408	465613	1.88	227376	1.91	2.05	V		2,5-Dimethoxy-4-ethylamphetamine
19	12.333	12.300	12.350	12047	0.05	5604	0.05	2.15			1-Nonadecene
20	12.521	12.492	12.567	180635	0.73	87062	0.73	2.07	V		2,5-Dimethoxy-4-ethylamphetamine
21	12.751	12.725	12.792	95458	0.38	47517	0.40	2.01	V		Hexadecanal
22	12.835	12.792	12.892	576918	2.32	304711	2.56	1.89	V		Cyclononasiloxane, octadecamethyl-
23	13.025	12.992	13.125	905183	3.65	468569	3.94	1.93	V		2-Pentadecanone, 6,10,14-trimethyl-
24	13.915	13.858	13.983	735803	2.96	265020	2.23	2.78	V		Pentadecanoic acid, 13-methyl-, methyl es
25	14.541	14.475	14.592	489810	1.97	237606	2.00	2.06	V		Cyclodecasiloxane, eicosamethyl-
26	14.630		14.592		14.667	687235	2.77	352012	2.96	1.95	V 1-Nonadecene
27	14.927	14.833	15.000	570836	2.30	227751	1.91	2.51	V		Octadecanal
28	15.544	15.508	15.558	92635	0.37	40041	0.34	2.31	V		2-Hydroxy-1,1,10-trimethyl-6,9-epidioxyd
29	15.750	15.692	15.792	506561	2.04	170516	1.43	2.97	V		11,14,17-Eicosatrienoic acid, methyl ester
30	15.844	15.792	15.925	1099272		4.43	480380	4.04	2.29	V	Phytol $
31	16.047		16.000	16.100	491543	1.98	219089	1.84	2.24	V	Cyclooctasiloxane, hexadecamethyl-
32	32	16.581	16.508	16.667	989349	3.99	353470	2.97	2.80	V	1-Nonadecene
33	16.826	16.783	16.850	49398	0.20	20700	0.17	2.39	V		Oxirane, hexadecyl-
34	17.118	17.067	17.150	15186	0.06	5916	0.05	2.57			3,7,11,15-Tetramethyl-2-hexadecen-1-o
35	17.387	17.308	17.433	485166	1.95	217493	1.83	2.23	V		Cyclononasiloxane, octadecamethyl-
36	36	18.048	18.000	18.217	409264	1.65	151968	1.28	2.69	V	4,8,12,16-Tetramethylheptadecan-4-olide
37	18.332	18.250	18.433	674537	2.72	262973	2.21	2.57	V		1-Heptacosanol
38	18.607	18.542	18.675	572655	2.31	254455	2.14	2.25			Cyclodecasiloxane, eicosamethyl- $
						24821248	100.00	11897180	100.00		

Method

[Comment]
===== Analytical Line 1 =====
[GC-2010]
Column Oven Temp.:60.0 °C
Injection Temp. :250.00 °C
Injection Mode :Split
Flow Control Mode :Linear Velocity
Pressure :100.2 kPa
Total Flow :39.4 mL/min
Column Flow :1.61 mL/min
Linear Velocity :46.3 cm/sec
Purge Flow :5.6 mL/min
Split Ratio :20.0
High Pressure Injection :OFF
Carrier Gas Saver :OFF
Splitter Hold :OFF
Oven Temp. Program

Rate	Temperature(°C)	Hold Time(min)
-	60.0	0.00
15.00	160.0	2.00
10.00	280.0	2.00

< Ready Check Heat Unit >
Column Oven : Yes
SPL1 : Yes
MS : Yes

< Ready Check Detector(FTD) >
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SPL1 Carrier : Yes
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< Ready Check APC Flow >
< Ready Check Detector APC Flow >
External Wait :No
Equilibrium Time :3.0 min
[GC Program]
[GCMS-QP2010 Plus]
IonSourceTemp :200.00 °C
Interface Temp. :250.00 °C
Solvent Cut Time:2.50 min
Detector Gain Mode:Relative
Detector Gain :0.00 kV
Threshold :1000
[MS Table]
--Group 1 - Event 1--
Start Time :3.00min
End Time :21.00min
ACQ Mode :Scan
Event Time :0.50sec
Scan Speed :1428
Start m/z :45.00
End m/z :700.00
Sample Inlet Unit:GC
[MS Program]
Use MS Program :OFF

Interpretation of GC-MS analysis of chloroform extract of *F. africana*leaves

S/N	Compound	% Abundance	Molecular formula	Retention time
1	Copaene	0.52	$C_{15}H_{24}$	7.150
2	1-ethenyl-1-methyl-2,4 bis(1-methylethenyl) cyclohexane	2.98	$C_{15}H_{24}$	7.288
3	2-(1,1,dimethyl)-1,4-dimethoxy Benzene	0.96	$C_{12}H_{18}O_2$	7.527
4	Caryophyllene	15.71	$C_{15}H_{24}$	7.661
5	1-methyl-5-methylene-8-(1-methylethyl)-1,6-cyclodecadiene	3.69	$C_{15}H_{24}$	8.421
6	Gamma-elemene	2.00	$C_{15}H_{24}$	8.639
7	4-ethoxy ethyl Benzoate	1.39	$C_{11}H_{14}O_3$	8.898
8	2(4H)-Benzofuranone,5,6,7,7a-trimethyl(R)	0.32	$C_{11}H_{16}O_2$	9.141
9	1,1,4,4-tetramethyl-2,5 dimethylene	5.53	$C_{11}H_2O$	9.898

	cyclohexanol			
10	12-oxabicyclo[9.1.0]dodeca-3,7diene,1,5,5,8 tetramethyl	0.67	$C_{15}H_{24}O$	10.256
11	Hexadecamethylcyclooctasiloxane,	4.52	$C_{16}H_{48}O_8Si_8$	10.822
12	Aromedendrene oxide-(2)	6.76	$C_{15}H_{24}O$	11.023
13	Alpha- Bisabolol	20.30	$C_{15}H_{26}O$	11.138
14	2,5-Dimethoxy-4-ethylamphetamine	2.57	$C_{13}H_{21}NO_2$	12.521
15	Hexadecanal	0.38	$C_{15}H_{30}O$	12.751
16	Octadecamethylcyclononasioxane	4.22	$C_{18}H_{54}O_9Si_9$	12.835
17	6,10,14-trimethyl-2-Pentadecanone	3.59	$C_{18}H_{36}0$	13.025
18	13-methyl Pentadecanoic acid	2.92	$C_{17}H_{34}O_2$	13.915
19	Eicosamethylcyclodecasiloxane,	4.01	$C_{20}H_{60}O_{10}Si_{10}$	14.541
20	1-Nonadecene	6.71	$C_{19}H_{38}$	14.630
21	Octadecene	2.27	$C_{18}H_{36}$	14.927
22	2-Hydroxyl-1,1,10-trimethyl 1,6,9-epidioxydecalin	0.37	$C_{13}H_{22}O_3$	15.544
23	Methyl-11,14,17-eicosatrienoate	2.01	$C_{21}H_{36}O_2$	15.750
24	Phytol $	4.36	$C_{20}H_{40}O$	15.844
25	Hexadecyl oxirane,	0.20	$C_{18}H_{36}O$	16.826
26	3,7,11,15-tetramethyl-2-hexadecene-1-ol	0.60	$C_{20}H_{40}O$	17.118
27	4,8,12,16-tetramethyl heptadecane-4-olide	1.62	$C_{21}H_{40}O_2$	18.048
28	1-Heptacosanol	2.62	$C_{27}H_{56}O$	18.332

CONCLUSION

Hexane and chloroform extracts of *Funtumiaafricana*leaves showed high antioxidant and antiinflammatory activity. This may be due to the presence of active compounds in the plant extracts.

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