NUSANTARA BIOSCIENCE
Vol. 15, No. 2, pp. 172-178
November 2023

ISSN: 2087-3948
E-ISSN: 2087-3956
DOI: 10.13057/nusbiosci/n150205

Chemical composition of *Corymbia citriodora*

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Manuscript received: 16 May 2023. Revision accepted: 22 June 2023.

Abstract. *Dogara AM. 2023. Chemical composition of* Corymbia citriodora. *Nusantara Bioscience 15: 172-178.* Aromatic plants, particularly those in the Myrtaceae family, are widely used both traditionally and commercially to lengthen food's shelf life and safety. The current investigation was prompted by a lack of information on the composition of the plant's oil, which has traditionally been used to treat and manage cancer, malaria, typhoid fever, and various other ailments. The study thoroughly examines the chemical composition of the essential oil obtained from *Corymbia citriodora* (Hook.) K.D.Hill & L.A.S.Johnson. Hydro distillation was used to extract essential oil from the leaves, which were then analyzed using gas chromatography coupled with mass spectrometry. Fourier Transform Infrared spectroscopy (FTIR) was used to identify the functional group in the essential oil. According to the findings, monoterpene compounds make up (0.8137%), sesquiterpenoids (0.6568%) and other compounds (95.7207% of the total). The most abundant substance was 1-Octadecene (7.83%), followed by Oleic acid, 9-Octadecenoic acid, (E)-, (6.16%), Octadecanal, Disparlure, and 1-Octadecene (all of which were at or below 4%), and all other substances. The *C. citriodora* essential oil yielded 11 spectra. The extracts had sharp peaks at 900 cm^{-1} (phenyl), 1400 (mono-, oligo-, and carbohydrates), and 2900 (lipid methoxy compounds of CH_3 and CH_2, which have distinctive C-H stretching vibrations). OH groups from water, alcohols, phenols, polysaccharides, and peroxides are fingerprinted at 3400 cm^{-1}. The study concludes that oleic acid-rich oil from *C. citriodora* leaves could be used as an economical source of oleic acid; the study lays the groundwork for future research on the plant in this issue.

Keywords: *Corymbia citriodora*, essential oils, medicinal plants, oleic acid

INTRODUCTION

Due to their potential use as pharmaceuticals in treating various illnesses, medicinal plants are gaining popularity worldwide (Paw et al. 2020). Due to the lack of available common medicines to treat infectious diseases, numerous studies have recently concentrated on evaluating natural products as the source of novel biologically active molecules (Ginovyan and Trchounian 2019). Using medicinal plants to create novel herbal drugs or nutraceuticals has received more attention over the past 20 years (Behbahani et al. 2020). Due to bioactive components in plant parts or the entire plant, plants that have medicinal value have become the primary resource for treating and enhancing human health worldwide (Mahmoud et al. 2019). Secondary metabolites identified in abundance in plants with intriguing biological activity are present in various structural configurations and serve various functions (Mahmoud et al. 2019). Flavonoids, saponins, resins, oleoresins, phenolic compounds, alkaloids, sesquiterpenes, essential oils, and lipids are only a few of the many chemical components found in plants (Paw et al. 2020; Da Silva et al. 2021).

Volatile and possessing a distinct aroma and flavor, essential oils are a byproduct of the secondary metabolites found in plants (Ferreira et al. 2022). Aromatic plants are commonly used because they contain volatile chemicals and essential oils (Mahmoud et al. 2019). Essential oils derived from plants have recently been used extensively in various businesses, including food and beverage, cosmetics, etc. Essential Oils (EOs) and the chemicals that make them up could be used in food items because they are antifungal, antibacterial, and antioxidant (Salem et al. 2018). There has been a worldwide search for natural products like natural EOs that have several applications due to the negative effects of synthetic antibacterial and antioxidant treatments (Da Silva et al. 2021). EOs are employed as preservatives and antioxidants in food preparation, with effects ranging from moderate to powerful (Elansary et al. 2016; Ferreira et al. 2022). The biological activity of these volatile oils is due to the range of chemical components included in them (Ferreira et al. 2022). Essential oils extracted from medicinal herbs have a wide range of applications in ethnomedicine preservation, cosmetics, food, scent, drinks, and pharmaceuticals.

There are around 55,000 species of trees and shrubs in the Myrtaceae family, divided among 2 subfamilies, 17 tribes, and 124 genera (Abdulrahman et al. 2018a). The southern hemisphere, including Australia, Central America, and South America, is home to the greatest concentration of these plants (Abdulrahman et al. 2018a). Despite the diversity of its species, relatively little is known about this genus (Dewijanti et al. 2020). *Corymbia*, a native plant of Australia, is a distinctive genus of towering trees and shrubs with over 800 species widely grown worldwide; now grown and harvested globally (Goodine and Oelgemöller 2020). The *Citriodora* genus has great form, a well-shaped crown, and thin foliage, especially for the essential oil with a lemon aroma (Nogueira et al. 2021). It is cultivated on a large scale for its citronellal-rich essential oil, which is

used in the perfume and flavoring industries (Batish et al. 2006).

Naturally, citriodora essential oil is used to scent rooms, creating essences, perfumes, disinfectants, soaps, and detergents (Nogueira et al. 2021). However, to the best of our knowledge, and as evidenced by the literature, there aren't many papers that specify the chemical makeup of *Corymbia citriodora* (Hook.) K.D.Hill & L.A.S.Johnson (Luqman et al. 2008; Salem et al. 2018) from other regions of the world, particularly Nigeria. Therefore, the study aimed to provide the essential oil chemical composition of *C. citriodora* from northern Nigeria.

MATERIALS AND METHODS

Study area

The northern Nigerian state of Kaduna (10° 35' N, 7° 19' E) is home to 6,066,562 people across 46,056 km^2. The area experiences two distinct types of weather: dry (from October to May) and wet (from June to August), even though the weather varies with the season. Most of the people in the country are members of the nomadic Hausa and Fulani tribes (Abdulrahman et al. 2022). Their main sources of income come from the government, agriculture, animal husbandry, fishing, and hunting (Abdulrahman et al. 2022).

Plants material

The *C. citriodora* leaves (Figure 1) were taken from the wild in Kaduna state, Nigeria, at the same time. The medicinal plants obtained in the field were identified by comparison with existing literature and thoroughly confirmed by botanists at Ahmadu Bello University (ABU Zaria), after which the identified herbarium specimen was put in the University herbarium (ABU02886).

Essential oil distillation

Fresh leaves were collected, gently washed to eliminate plant stains, dried at room temperature in the shade, and then processed into a fine powder using a blade mill. Next, 100 g of the leaves were dissolved in 2L of water in a round-bottom flask with Clevenger-type equipment. The essential oil was hydro distilled for 5 hours, then dried with anhydrous sulphate before being put in a dark bottle and kept at -4°C for future analysis (Abdulrahman et al. 2022).

Equation illustrates the yield computation as follows (Kheawfu et al. 2021):

$$\text{The yield of the extract} = \frac{\text{Weight of extract}}{\text{Dry weight of the leaves}} \times 100$$

Figure 1. *Corymbia citriodora*

Gas Chromatography Mass Spectrometry (GC-MS) conditions

Agilent Technologies (Malaysia) 7890A/5975C gas chromatography/coupled mass spectrometer was used for the GC/MS analysis. The chemical mixtures were separated on a column in a temperature programmed: HP-5MS 30 m x 0.25 mm, 0.25 mm film thickness. Start at 60°C for 10 minutes, then increase the temperature by 3°C every minute, holding it at 230°C for 1 minute. The injector temperature was 245°C, and the carrier-helium gas flow rate was 1 mL per minute (Abdulrahman et al. 2022). The MS was performed with an ion source and analyzer temperature of 260°C and 70 E V, respectively.

Fourier Transform Infra-Red spectroscopy (FTIR)

The FTIR spectra were generated from the IRPREATIGE-21 model (Malaysia). The FTIR spectra were collected using a Perkin Elmer Spectrum 400 Infrared spectroscopy (Malaysia) equipped with an air-cooled Deuterated Triglycine Sulphate (DTGS) detector, and the spectra were scanned at mid-IR with a spectral range of 4000-400 cm^{-1}. There were eleven technical replicates. Attenuated Total Reflectance (ATR) scans with 16 scans and 4 cm^{-1} resolutions were used on all samples (Abdulrahman et al. 2018b). Each FTIR spectrum was baseline adjusted before being converted to an ASCII file, greatly reducing the spectral difference that could have resulted from baseline shifts. The spectra were evaluated considering the existing literature.

RESULTS AND DISCUSSION

Essential oil composition

Phytochemicals are natural plant compounds that can treat and prevent various diseases (Oladunmoye et al. 2018). Plant resources must be genuine and safe to produce herbal items or modern medications. Quality control is vital in ethnopharmacology to check the quality and authenticity of plants used to create modern pharmaceuticals or herbal supplements. Identifying therapeutic plants requires a scientific understanding of their chemical makeup. Traditionally, morphoanatomical features have been used to categorize plants in the plant taxonomy system (Abdulrahman 2022). Therefore, to evaluate the presence of many substances in each sample, scientists use Gas Chromatography-Mass Spectrometry (GC-MS), a hybrid analytical approach that combines the separation capabilities of gas-liquid chromatography with the detection capability of mass spectrometry (Uka et al. 2022). GC can separate a sample's volatile and thermally stable substitutes, and MS can fragment the target analyte for mass-based identification (Uka et al. 2022). New applications for GC-MS have been made possible by its improved sample identification, higher sensitivity, a wider range of analyzable samples, and faster findings (Uka et al. 2022). Chemicals with widespread physiological and bioactive properties may be derived from plant-derived natural materials (Dewijanti et al. 2020). Plants have both primary and secondary metabolism (Dewijanti et al. 2020).

The primary metabolism produces chemicals used in the biosynthetic process, whereas the secondary metabolism produces medicinally active chemicals; therefore, it is necessary to identify each medicinal plant chemically. Based on dry weight, the *C. citriodora* leaves yielded 1.8% of the distilled oil, produced as a yellow oil through hydro distillation. Furthermore, 82 compounds were identified from qualitative results with a 97.1912% recovery rate (Table 1). The oil yield recovery from the leaf demonstrates that the plant is a good source of essential oil. The findings of our study are congruent with those of earlier research (Tolba et al. 2015; et al. 2018). The extraction method, extraction solvent, chemicals present, and polarity of metabolites all play major roles in the variation in extract yield from medicinal plant parts (Abdulrahman et al. 2019). Climate, geographic distribution, plant genetics, plant part used, degree of freshness, drying period, and extraction process are only (some of the many) factors that affect EO yields, making direct comparisons impossible (Sreepian et al. 2022). According to morpho-anatomical research, the abundance of trichomes in the leaves of *C. citriodora* may be related to the abundance of essential oil in the leaves (Mahmoud et al. 2019). As shown in Table 1 and Figure 2, monoterpenes compounds account for (0.8137%), sesquiterpenoids (0.6568%), and other compounds (95.7207%). Furthermore, 1-Octadecene was the dominant compound identified (7.83%), Oleic Acid and 9-Octadecenoic acid, (E)-, (6.16%, respectively), Octadecanal, Disparlure, 1-Octadecene (4%, respectively) and all other compounds below 4% (Figure 3).

According to location, harvesting season, and leaf age, citriodora oils have different chemical compositions (Goodine and Oelgemöller 2020). Differences in the plant's atmosphere and environment, such as sunlight and rainfall, can affect the plant extract content (Dewijanti et al. 2020). Major components of the leaf EO of *C. citriodora* from Chandigarh, India, include the monoterpenoids citronellal, citronellol, and isopulegol (Salem et al. 2018). Due to harvesting seasons and geographical sources, certain species' essential oils have different chemical compositions (Hamad et al. 2017). Moreover, the cosmetics, flavoring, lubricant, fragrance, and suppository industries all use octadecanoic acid due to its hypocholesterolemic properties (Arora and Meena 2018). Oleic acids are used in vitamin E and K1 productions, both of which play crucial roles in the human body and are required as an ingredient in their production. Various biological properties, such as antifungal, antibacterial, antioxidant, anti-inflammatory, and anti-tumor, are supported by the presence of these key phytoconstituents in the leaf extract, proving the plant's traditional therapeutic usage (Uka et al. 2022). Because of their antibacterial qualities, EOs have been widely employed in traditional medicine and to prolong the shelf life of food (Wińska et al. 2019). The high demand for all-natural substances has dramatically increased widespread use in recent years (Singh and Pulikkal 2022). Therefore, to the best of our knowledge, there is no literature on the chemical composition of *C. citriodora* in northern Nigeria. The current inquiry was motivated by a lack of information on the composition of the plant's oil, as the plant is reported to have traditionally been used to cure and manage cancer, malaria and typhoid fever. The study includes a detailed analysis of the chemical makeup of the essential oil isolated from *C. citriodora* leaves. Therefore, the study provides a foundation for future research on the plant benefits.

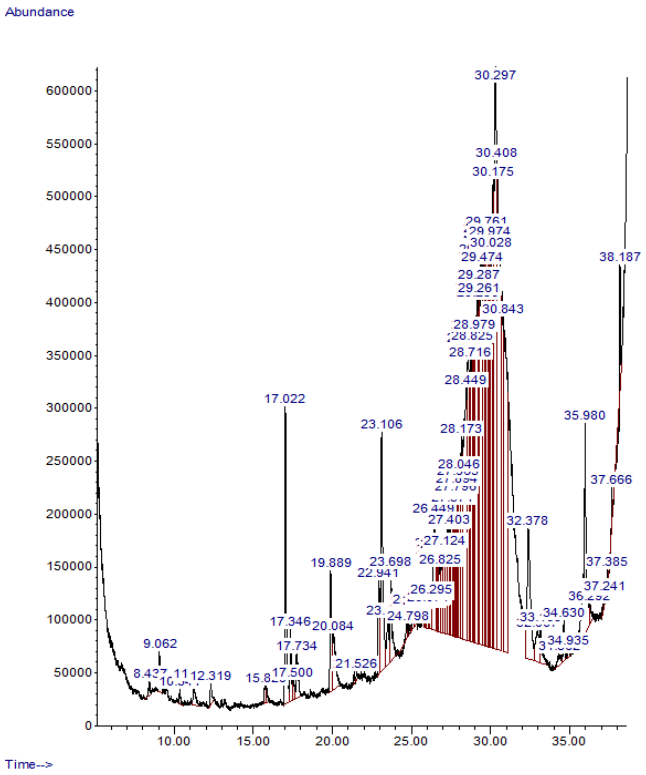

Figure 2. Chromatogram of the essential oil from *Corymbia citriodora* leaves

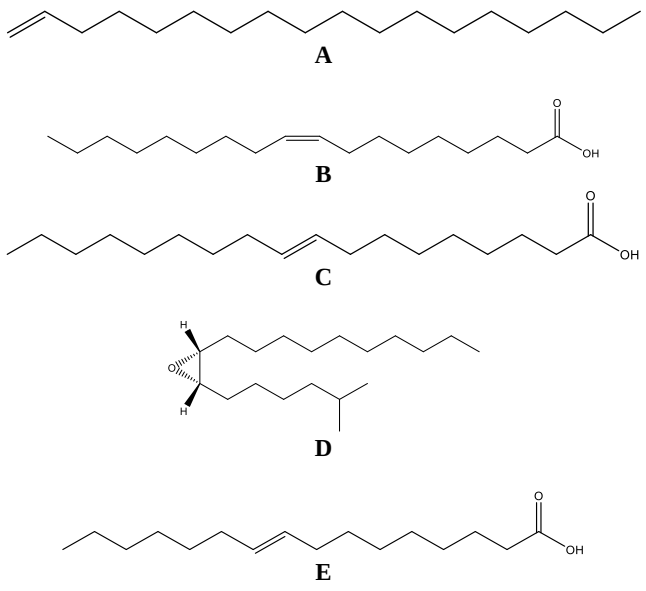

Figure 3. Major compounds in *Corymbia citriodora*: A. 1-Octadecene, B. Oleic acid, C. 9-Octadecenoic acid, (E)- D. Disparlure, E. 9-Hexadecenoic acid

Table 1. The essential oil composition of *Corymbia citriodora*

PK	RT	Compound	Area Pct	Chemical structure
1	8.4371	1H-Cycloprop[e]azulene, decahydro-1,1,7-trimethyl-4-methylene-	0.1101	$C_{15}H_{24}O$
2	9.062	Naphthalene, 1,2,3,4,4a,5,6,8a-octahydro-4a,8-dimethyl-2-(1-methylethenyl)-, [2R-(2.alpha.,4a.alpha.,8a.beta.)]-	0.3074	$C_{15}H_{24}$
3	10.3412	(E,Z)-.alpha.-Farnesene	0.098	$C_{15}H_{24}$
4	11.2315	Dodecanoic acid, methyl ester	0.271	$C_{13}H_{26}O_2$
5	12.3192	Trans-Z-.alpha.-Bisabolene epoxide	0.1673	$C_{15}H_{24}O$
6	15.7241	Nonanoic acid, methyl ester	0.1413	$C_{10}H_{20}O$
7	15.8295	Undecanoic acid, methyl ester	0.114	$C_{12}H_{24}O_2$
8	17.0223	Alpha.-Phellandrene, dimer	1.0821	$C_{20}H_{32}$
9	17.3462	Alpha.-Phellandrene, dimer	0.2884	$C_{20}H_{32}$
10	17.5001	Gamma.-Terpinene	0.1846	$C_{10}H_{16}$
11	17.734	Bicyclo[3.1.0]hex-2-ene, 2-methyl-5-(1-methylethyl)-	0.4878	$C_{10}H_{16}$
12	19.8889	Hexadecanoic acid, methyl ester	1.1065	$C_{18}H_{36}O_2$
13	20.0839	1,2-Benzenedicarboxylic acid, butyl octyl ester	0.8025	$C_{20}H_{30}O_4$
14	21.3819	Heptadecyl heptafluorobutyrate	0.0529	$C_{21}H_{35}F_7O_2$
15	21.5262	Tert-Hexadecanethiol	0.0504	$C_{48}H_{99}$
16	22.9413	8,11-Octadecadienoic acid, methyl ester	0.7533	$C_{19}H_{34}O_2$
17	23.1063	11-Octadecenoic acid, methyl ester	2.4952	$C_{19}H_{36}O_2$
18	23.4926	Pentyl triacontyl ether	0.5103	$C_{35}H_{72}O$
19	23.6984	Methyl stearate	0.8867	$C_{19}H_{38}O_2$
20	24.7092	E,E-10,12-Hexadecadien-1-ol	0.0795	$C_{16}H_{30}O$
21	24.798	Cis-9,10-Epoxyoctadecan-1-ol	0.0779	$C_{18}H_{36}O_2$
22	25.0445	Docosyl propyl ether	0.1339	$C_{25}H_{52}O$
23	25.1903	Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-	0.1049	$C_{23}H_{30}N_2O_5$
24	25.8192	2-Methyl-Z,Z-3,13-octadecadienol	0.0649	$C_{19}H_{36}O$
25	25.9834	1,15-Hexadecadiene	0.1469	$C_{16}H_{30}$
26	26.0744	Cyclododecane, ethyl-	0.1074	$(CH_2)_{12}$
27	26.2473	Z-8-Methyl-9-tetradecenoic acid	0.2418	$C_{15}H_{28}O_2$
28	26.2951	Z-8-Methyl-9-tetradecenoic acid	0.0708	$C_{15}H_{28}O_2$
29	26.4485	cis-9-Tetradecenoic acid, propyl ester	1.3343	$C_{17}H_{32}O_2$
30	26.5788	Cyclopentadecanone, 2-hydroxy-	0.3223	$C_{15}H_{28}O_2$
31	26.6499	2-Methyl-Z,Z-3,13-octadecadienol	0.5179	$C_{19}H_{36}O$
32	26.7373	8-Hexadecenal, 14-methyl-, (Z)-	0.3795	$C_{17}H_{32}O$
33	26.8248	Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-	0.1457	$C_{23}H_{30}N_2O_5$
34	26.9375	Heptadecanoic acid, heptadecyl ester	0.6526	C34H68O2
35	27.1244	Cyclopropaneoctanal, 2-octyl-	0.854	$C_{19}H3_6O$
36	27.2318	Oleic Acid	0.9393	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
37	27.3442	Oleic Acid	0.5391	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
38	27.4025	Oleic Acid	0.5245	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
39	27.571	2-Methyl-Z,Z-3,13-octadecadienol	1.5979	$C_{19}H_{36}O$
40	27.6405	Oleic Acid	0.3642	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
41	27.6766	Oleic Acid	0.4085	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
42	27.7438	Oleic Acid	0.4699	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
43	27.7956	8-Hexadecenal, 14-methyl-, (Z)-	0.4778	$C_{17}H_{32}O$
44	27.8944	Oleic Acid	1.0437	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
45	27.9648	Cis-Vaccenic acid	0.7333	$C_{18}H_{34}O_2$
46	28.046	2-Methyl-E,E-3,13-octadecadien-1-ol	0.2723	$C_{19}H_{36}O$
47	28.1735	9-Octadecenoic acid, (E)-	1.1596	$C_{18}H_{34}O_2$
48	28.4485	Disparlure	4.074	C19H38O
49	28.5622	Oleic Acid	3.1973	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
50	28.7165	8-Hexadecenal, 14-methyl-, (Z)-	1.6674	$C_{17}H_{32}O$
51	28.8251	7,11-Hexadecadienal	2.1473	$C_{16}H_{28}O$
52	28.8821	2-Methyl-Z,Z-3,13-octadecadienol	1.9328	$C_{19}H_{36}O$
53	28.9787	7,11-Hexadecadienal	1.1991	C16H28O
54	29.1653	1-Octadecene	4.6336	$C_{18}H_{36}$

55	29.2356	Oleic Acid	0.677	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
56	29.2608	cis-7,cis-11-Hexadecadien-1-yl acetate	0.5275	$C_{18}H_{32}O_2$
57	29.2869	Oleic Acid	0.9154	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
58	29.3725	Oleic Acid	3.9393	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
59	29.474	Cyclopropaneoctanal, 2-octyl-	1.322	$C_{19}H_{36}O$
60	29.6153	Oxacyclopentadecan-2-one	3.2977	$C_{14}H_{26}O_2$
61	29.6546	2-Methyl-Z,Z-3,13-octadecadienol	2.1783	C19H36O
62	29.7607	Octadecanal	4.2682	$C_{18}H_{36}O$
63	29.8906	Oleic Acid	1.8738	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
64	29.9739	Cyclotetradecane, 1,7,11-trimethyl-4-(1-methylethyl)-	1.7717	$C_{20}H_{40}$
65	30.0277	Oleic Acid	2.1765	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
66	30.1751	9-Hexadecenoic acid	3.766	$C_{16}H_{30}O_2$
67	30.2967	9-Octadecenoic acid, (E)-	6.6481	$C_{18}H_{34}O_2$
68	30.4079	1-Octadecene	7.8358	$C_{18}H_{36}$
69	30.8432	Oleic Acid	6.1692	$C_{18}H_{34}O_2$
70	32.378	Trimetozine	2.336	$C_{14}H_{19}NO_5$
71	32.9868	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	0.5519	$C_{21}H_{40}O_4$
72	33.1628	1-Octadecanesulphonyl chloride	0.3963	$C_{18}H_{37}C_{l}O2S$
73	34.3623	Oleic Acid	0.168	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
74	34.6303	Hexadeca-2,6,10,14-tetraen-1-ol, 3,7,11,16-tetramethyl-	0.2845	$C_{20}H_{34}O$
75	34.9348	9-Octadecenal	0.036	$C_{18}H_{34}O$
76	35.98	Tetratetracontane	2.694	$C_{44}H_{90}$
77	36.2924	Ricinoleic acid	0.1479	$C_{18}H_{34}O_3$
78	37.1895	Cyclohexane, 1-(1,5-dimethylhexyl)-4-(4-methylpentyl)-	0.046	$C_{20}H_{40}$
79	37.241	Oleic Acid	0.006	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
80	37.3847	Oleic Acid	0.0701	$CH_3–(CH_2)_7–CH=CH–(CH_2)_7–COOH$
81	37.6661	(S)(+)-Z-13-Methyl-11-pentadecen-1-ol acetate	0.1097	$C_{18}H_{34}O_2$
82	38.1874	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	0.4526	$C_{21}H_{40}O_4$

Note: S/N: Serial number, RT: Retention Time

Fourier Transform Infra-Red spectroscopy (FTIR)

The authenticity and safety of plant components are crucial to the progress of any herbal product or contemporary medication. Since identifying and distinguishing the genuine plant is essential to solving the problems of adulterations and ensuring consumer safety, it is necessary to adopt a strategy or concept to this end (Abdulrahman et al. 2018b). The spectroscopy analytical technique known as fingerprinting is quick, easy, accurate, and non-destructive. It also doesn't require sample pre-treatment before analysis. The wide variety of medicinal plants makes them a gold mine for discovering novel compounds that can be utilized as drugs or as building blocks for developing new medicines with unique mechanisms (Oladunmoye et al. 2018). When taken singly or combined, many phytochemicals and secondary metabolites in plant extracts have anti-disease activities. Fourier transform infrared spectrometry, a physico-chemical analytical technique, is better used to identify the functional groups of the bioactive components in a plant or other related materials based on the peak value in the infrared radiation range (Oladunmoye et al. 2018). The "fingerprint" of the sample might be considered a biochemical or metabolic signature created by the FTIR method, which analyses the vibrations of bonds in chemical functional groups (Alex et al. 2018). Therefore, by analyzing infrared spectrum absorption, the bond in the chemical can be identified (Bouyanfif et al. 2018). The spectra were captured using air-cooled deuterated triglycine sulphate and a Perkin Elmer Spectrum 400 Infra-Red (IR) spectroscope. Due to the numerical data generated by the noise, the instrumental noise region of the spectrum (below 400 cm^{-1}) was eliminated; furthermore, 11 spectra were obtained from *C. citriodora* essential oil preparations. The peaks of the extracts were sharp at 900 cm^{-1}, which represents C-H stretching (phenyl), 1400 correlates to C-O stretching vibration absorptions (mono-, oligo-, and carbohydrates), 2900 corresponds to the methoxy compounds of CH_3 and CH_2 from lipids, which have unique C-H stretching vibrations. Next, the spectral region of 3400 cm^{-1} t represents the fingerprints of OH groups (from water, alcohols, phenols, carbohydrates, and peroxides) (Figure 4). Then, the vibration assignments for both stretching and bending were compared to information from the literature (Agatonovic-Kustrin et al. 2020). The information provided by the FTIR fingerprint helps enhance the community's economic and consumer health by indicating the prospect of finding different biological potentials in this plant to develop innovative functional herbals/drugs.

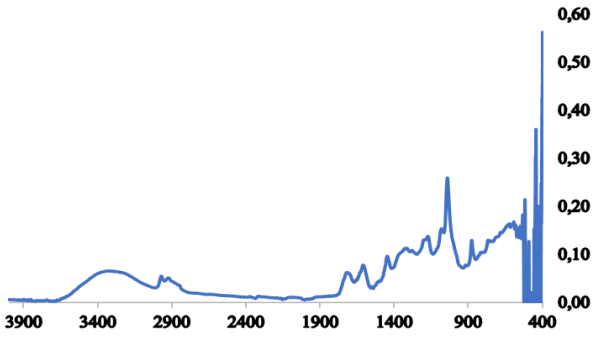

Figure 4. Overlay spectra of *Corymbia citriodora* leave

In conclusion, many ancient societies worldwide, particularly those of Africa, rely heavily on plant life for sustenance; traditional medicine places great value on using plants. Humans have used medicinal and aromatic plants for thousands of years to treat various ailments. Therefore, to the best of our knowledge, the chemical makeup of *C. citriodora* in northern Nigeria has not been documented in the literature. The plant has long been used to cure and manage diseases, including cancer, malaria, typhoid fever, and many others. However, little is known about the makeup of the oil collected from the plant, which is why the current study was necessary. This study describes the chemical composition of the essential oil extracted from northern Nigerian *C. citriodora* leaves. According to the data, monoterpene compounds (0.8137%), sesquiterpenoids (0.6568) and other compounds (95.7207% of the total) make up most of the total. Furthermore, 1-Octadecene (7.83%) was the most prevalent substance, followed by Oleic Acid, and 9-Octadecenoic acid, (E)-, (6.16%), Octadecanal, Disparlure, and 1-Octadecene (all of which were at or below 4%), and all other compounds. The *C. citriodora* essential oil yielded 11 spectra. The extracts had sharp peaks at 900 cm^{-1} (phenyl), 1400 (mono-, oligo-, and carbohydrates), and 2900 (lipid methoxy compounds of CH_3 and CH_2, which have distinctive C-H stretching vibrations). OH, groups from water, alcohols, phenols, polysaccharides, and peroxides are fingerprinted at 3400 cm^{-1}. The research on bioactive substances has laid the groundwork for synthesizing new drugs and developing novel pharmaceutical formulations. Future research on the mentioned plant will be built on the foundation created by this study.

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