Phytoesters Profiling of *Cola lepidota* (Yellow Monkey Kola) Nut

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DOI: 10.56201/rjpst.v7.no1.2024.pg49.53

Abstract

The phytoester profiling of the nut of yellow monkey kola (Cola lepidota) has been carried out. Fresh nuts were isolated from the fresh fruits. The nuts were chopped, dried and blended before being macerated using n-hexane for 64 hrs. The extract was concentrated under vacuum and stored below room temperature. The concentrated extract was then profiled for its phytoester constituents via gas chromatography-mass spectrometry (GC-MS) technique. The result of the analysis revealed the present of acetic acid, fluoro-ethyl ester (16.91%), formic acid, ethenyl ester (0.17%), butanoic acid, methyl ester (0.11%), propanoic acid, 2- methyl-methyl ester (0.08%), carbamic acid, ethyl - methyl ester (0.04%) and glycine, N-(3 methyl-1-oxobutyl) methyl ester (0.04%) as the phytoesters present in the nut of Cola lepidota.

Keywords**:** *Cola lepidota nut, phytoesters, gas chromatography-mass spectrometry*

Introduction

Medicinally, plants are more and more being sourced for alternative medicines due to the myriads of phytochemicals the kingdom is known for. This has attracted global attention resulting in research and development for a sustainable complimentary potential anti-infective, antipyretic, analgesic, anti-inflammation and other therapeutical agents that can withstand multiple resistant pathogens and diseases that are making many orthodox drugs outdated.

Phytoesters comprising lipids have been associated with numerous health benefits from the consumption of nuts and other plant tissues. Lipid profiling has led to the discovery of triglycerides, high and low density lipoproteins, cholesterol of hematological significant. Diseased conditions such as diabetes and insulin resistance (Meikle *et al*., 2014), cancer (Llorente *et al*., 2013), cardiovascular (Hiukka *et al*., 2009), cystic fibrosis (Desbenoit *et al*., 2014) hypertention (Hu *et* al., 2011). The present work seeks to explore the phytoesters present in the nut of *Cola lepidota*.

Materials and Methods

Collection and Identification of Plant Material

Fresh fruits of yellow monkey kola were purchased from two randomly selected outlet vendor in Yenagoa, Bayelsa state, Nigeria and were identified at the Department of Biology, Federal University Otuoke, Bayelsa state, Nigeria to be *Cola lepidota*.

Extraction of Phytoesters

The identified fruits were washed and dried at room temperature. The dried fruits were then peeled and the inner endocarp (nut) removed. The nut was dried, crushed, blended and then macerated in a non-polar n-hexane solvent system at room temperature. The extract was then concentrated under reduced pressure with the aid of a rotatory evaporator (Rotor 250).

Identification and Quantification of Phytoesters

The identification and quantification of phytoesters present in the nut of *Cola lepidota* were carried out via gas-liquid chromatography and mass spectrometry (GC-MS) (Agilent technologies, GC system 7890A coupled with MSD 5975C) equipment with an injection mode 7683B series and a NIST 14 data library (Uzoekwe and Odokwo, 2023; Odokwo and Uzoekwe, 2022; Hamilton-Amachree and Odokwo, 2022; Odokwo, and Onifade, 2020).

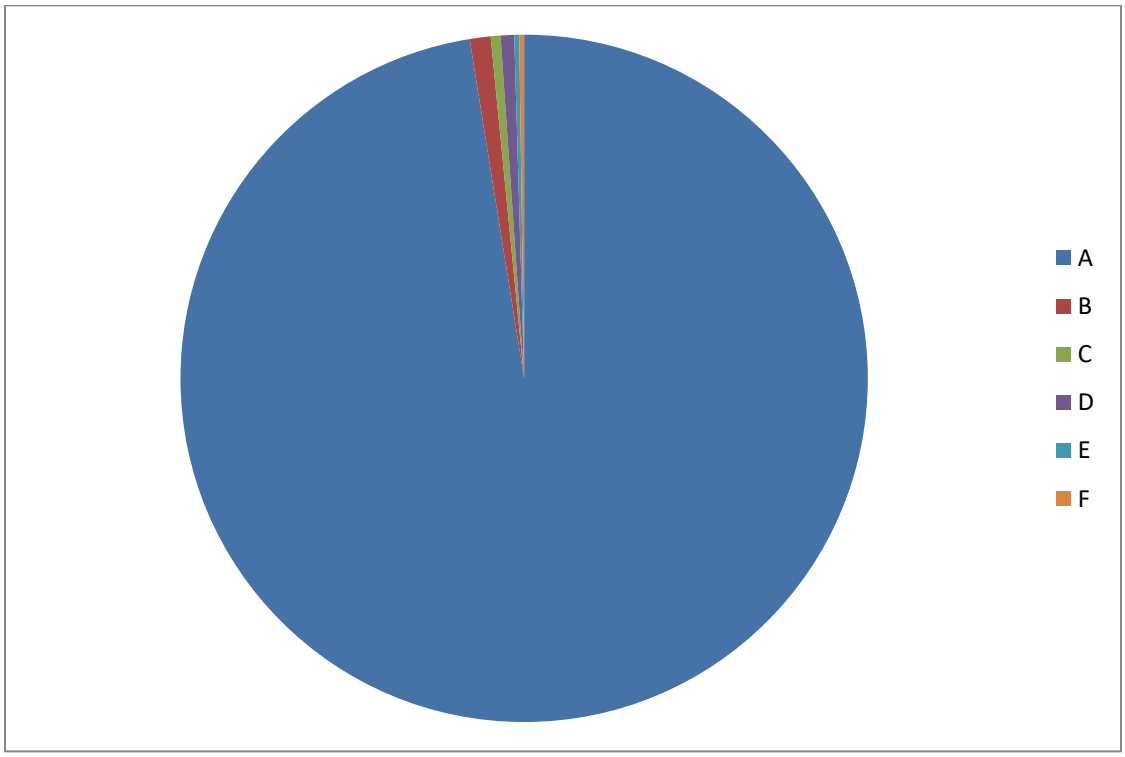
Result and Discussion

Table 4.1 Phytoester profiling of *Cola lepidota*

S/N	Phyto Esters	Retention time (min)	Conc. (%)	Molecular formula	Molecular weight (g/mol)
1	Acetic acid, fluro-, ethyl ester	4.568	16.91	$C_4H_7FO_2$	106.0956
2	Formic acid, ethenyl ester	4.935	0.17	$C_3H_4O_2$	72.0627
3	Propanoic acid, 2-methyl - methyl ester	5.467	0.08	$C_5H_{10}O_2$	102.13
4	Butanoic acid, methyl ester	5.493	0.11	$C_5H_{10}O_2$	102.13

5	Carbanic acid, ethyl-methyl ester	6.705	0.04	$C_4H_8O_3$	104.1045
6	Glycine, N- (3 methyl-1-oxo butyl) - methyl ester	8.506	0.04	$C_8H_{15}NO$	173.2096

Six phytoesters (table 1) have been identified and quantified. Acetic acid, fluoro-ethyl ester being the major constituent is a derivative of the parent acetic acid, ethyl ester (ethyl acetate) in which a hydrogen atom as replaced has been replaced on the ethyl residue end of the alcohol component. The effect of the present of fluorine over the conventional smell and fragrant characteristics associated with esters has been observed to be similar to the parent compound and could either improve or worsen skin sensitization characteristic (Charpentier *et al*., 2020). The parent compound is a known versatile organic compound often employed as flavor, fragrances, solvents for extraction, pharmaceuticals, paint production and as raw material for the chemical process industries (Wells 1991). It acts as toxin in plants that are poisonous (O'Neil *et al*., 2013).



*A- Acetic acid, Fluro-, ethyl ester, **B-** Formic acid, ethenyl ester, **C-** Butanoic acid, methyl ester
D- Propanoic acid, 2-methyl - methyl ester, **E-** Glycine, N- (3 methyl-1-oxo butyl) - methyl ester

Figure 1 Phytoester distribution of *Cola lepidota*

However, other phytoesters such as formic acid, ethenyl ester, butanoic acid, methyl ester, propanoic acid, 2- methyl-methyl ester, carbamic acid, ethyl - methyl ester and glycine, N-(3 methyl-1-oxobutyl) methyl ester are found in minute quantities when compared to the major phytoester: acetic acid, fluoro-ethyl ester. These phytoesters can work synergistically or more majorly due to the overall masking activity of the major candidate. Acetic acid, fluoro-ethyl ester, butanoic acid, methyl ester carbamic acid, ethyl - methyl ester and glycine, N-(3 methyl-1-oxobutyl) methyl ester have been profiled to be present in the nut of *S. mombin* ((Uzoekwe and Odokwo, 2023).

Conclusions

The phytoesters present in the nut of *Cola Lepidota* have been established and this will further establish the data on the phytochemical constitution of the medicinal plant. The phytoesters profiled has further justified the associated local claims with the nut of *Cola lepidota*.

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