



Volatile and non-volatile chemical compositions, *in-vitro* antioxidant and antidiabetic activities of *Leptoderris micrantha* (Dunn)

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INTRODUCTION

- About 80% of the world population depends on plants for their therapeutic purpose [1]
- Diabetes mellitus commonly called diabetes is a metabolic disorder resulting from a high glucose concentration (hyperglycemia) in the bloodstream [2]. It is currently considered the fifth leading cause of death worldwide.
- Hyperglycemia leads to several complications such as retinopathy, nephropathy, and neuropathy. Oxidative stress is a major factor in the mortality of diabetics, and antioxidants have been identified as potential treatments. [2]

PREVALENCE OF DIABETICS

WORLD

- 537 million adults live with diabetes
- 6.7 million mortality rate in 2021
- 3 in 4 adults live with diabetes in low and middle-income countries (IDF 2022)

AFRICA

- 24 million people are diagnosed with diabetes (rise 129% to 55 million in 2045)
- 416, 000 death in 2021

NIGERIA

- 11.2 million Nigerians are diagnosed with diabetes

- Hypoglycemic agents such as acarbose have been used in the treatment of diabetes but result in several side effects such as bloating, and diarrhea. Therefore, there is a need to search for new potent hypoglycemic agents with no or fewer side effects from natural source.

- *L. micrantha* (Family: *Fabaceae*) is a climbing woody flower, native to Guinea, Ghana, and Southern Nigeria. It is locally called “atariobuko”, “adagba” or “ewe awo”.
- Ethnomedicinal uses include treatment of stomach upset, swellings, dropsy, and pulmonary troubles.



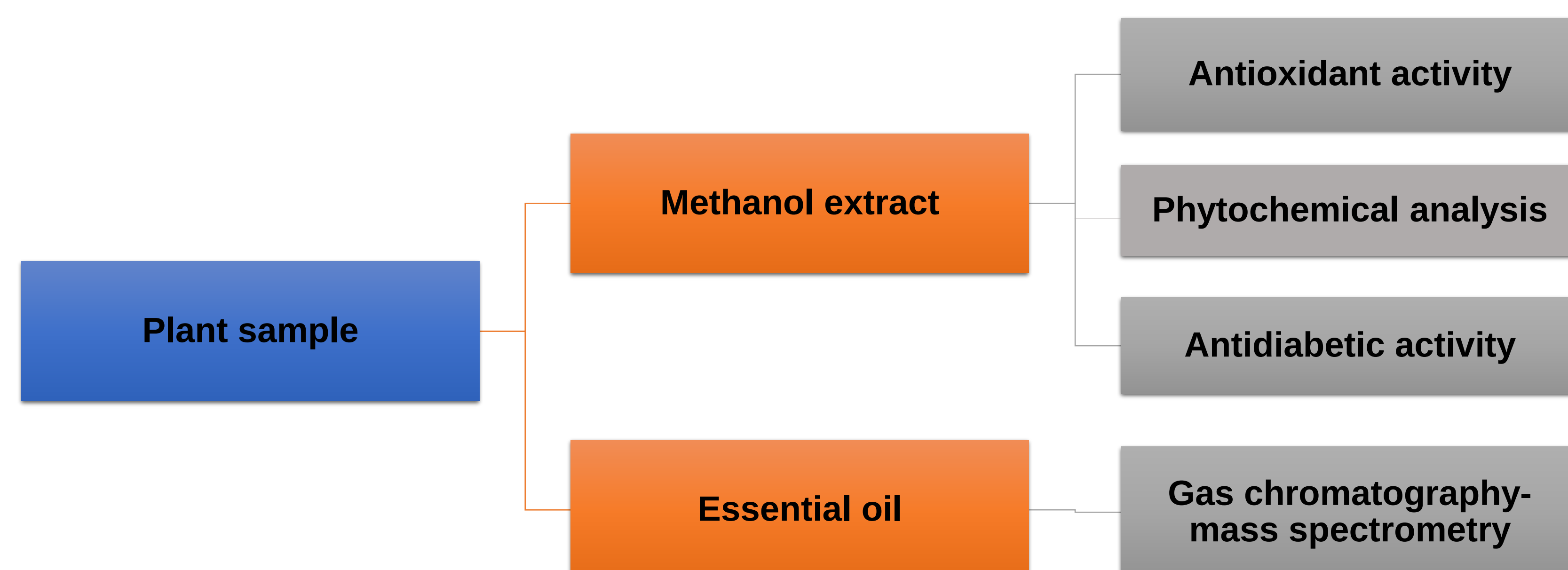
Fig 1. *L. micrantha* leaves

AIM

- To evaluate the chemical constituents, *in-vitro* antioxidant and antidiabetic activities of the methanol extract, and essential oil composition of *Leptoderris micrantha* leaves.

METHODOLOGY

- Leaves of *L. micrantha* were collected at Abatudu village Ikire, Osun state, Nigeria.



RESULTS

Table 1: Phytochemicals of *L. micrantha* methanol extract

Phytochemicals	LMM
Alkaloids	+
Flavonoids	+
Phenols	+
Phlobatannin	-
Reducing sugar	+
Saponins	+
Steroids	+
Tannins	+
terpenoids	+

Key : + = present, - = absent
LMM; *Leptoderris micrantha* methanol extract

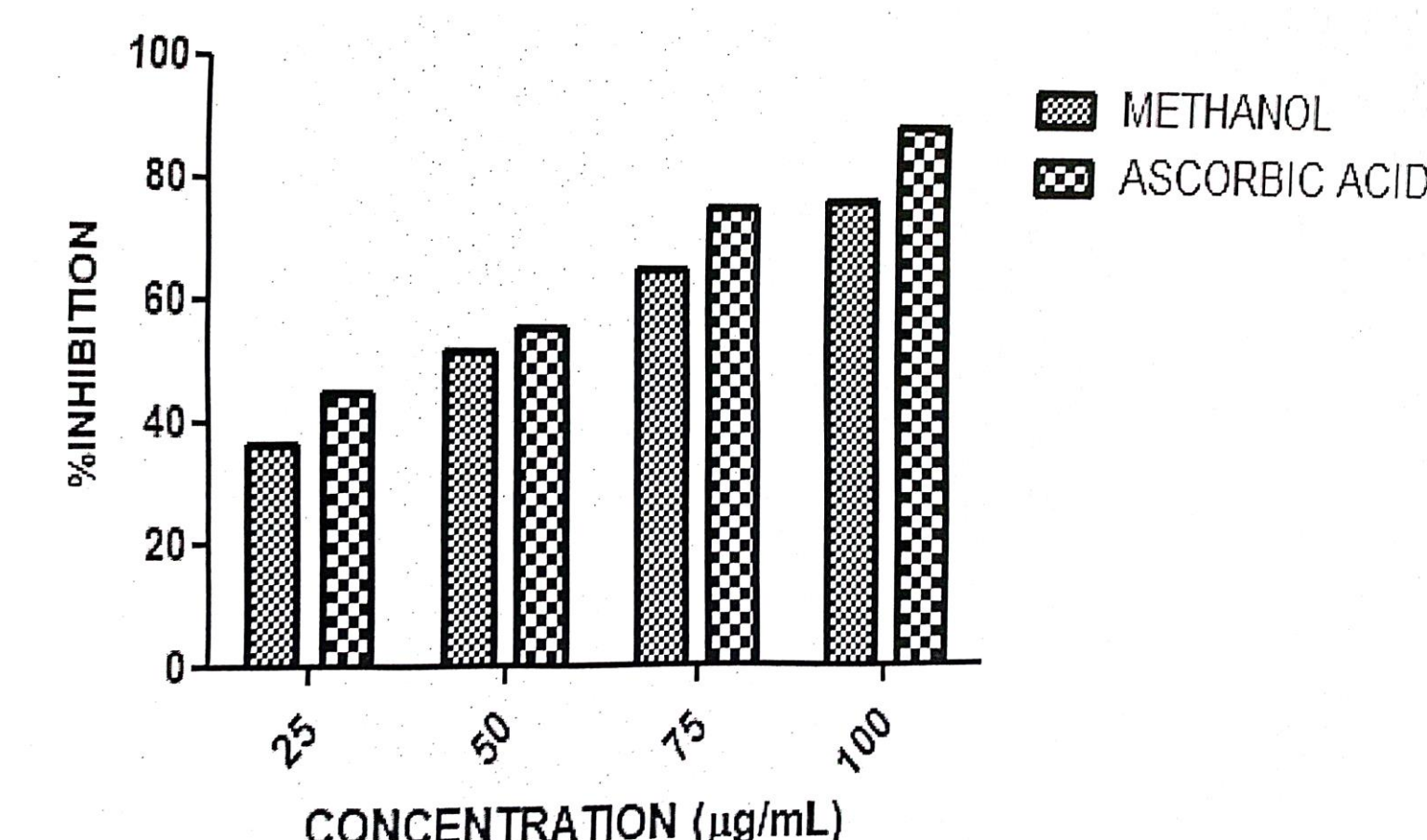


FIG. 2: DPPH radical scavenging effect of *L. micrantha* methanol extract. Values expressed as Mean $\pm$ SD (n=3).

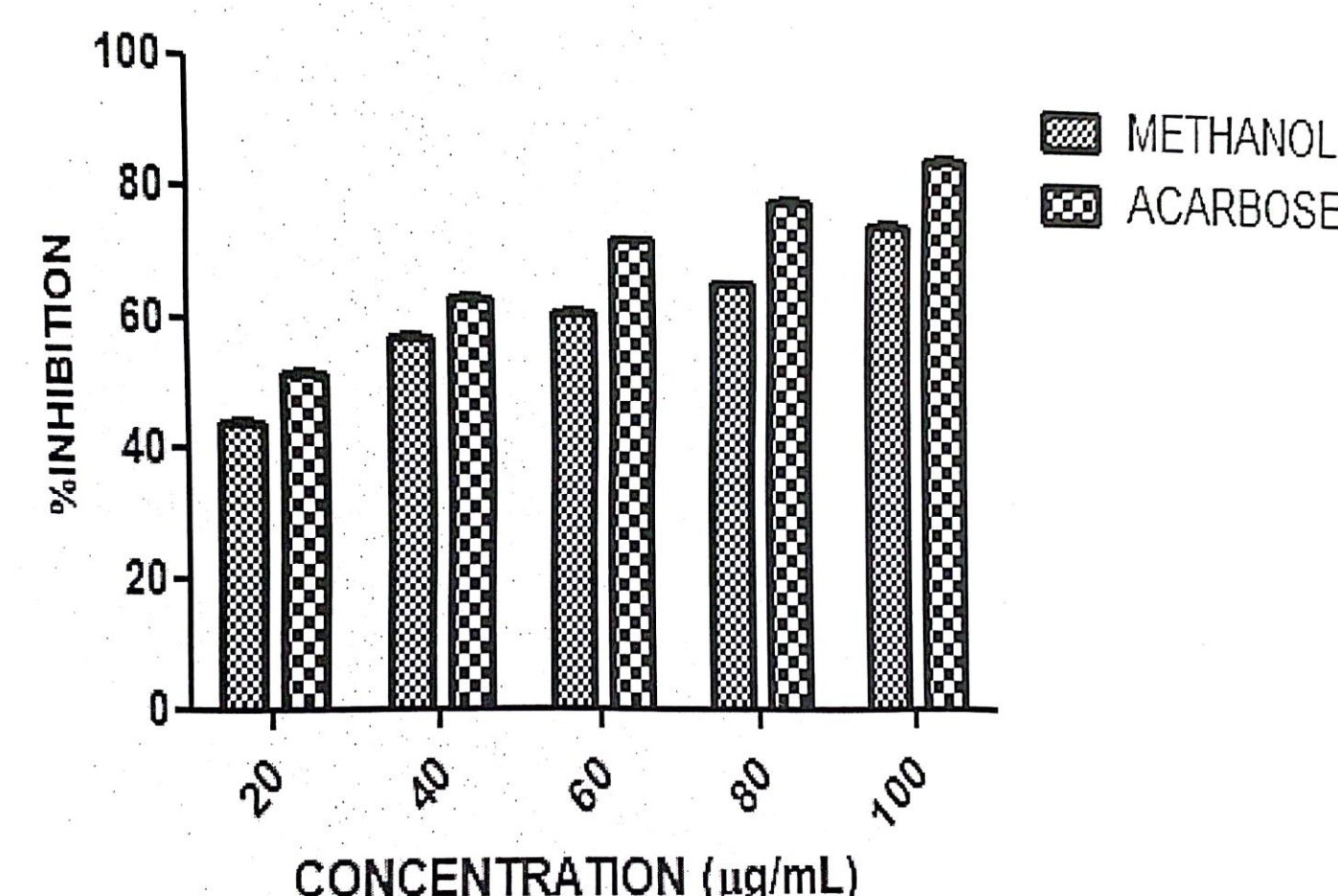


FIG. 4: inhibitory potency of *L. micrantha* leaves against α -amylase activity. Values expressed as Mean $\pm$ SD (n=3).

Table 2: IC₅₀ of *L. micrantha* methanol extract for antioxidant activities

ASSAY	IC ₅₀ (mg/mL)
DPPH	43.61 $\pm$ 0.04
NO	48.94 $\pm$ 0.05

Table 3: IC₅₀ of *L. micrantha* methanol extract for antioxidant activities

ASSAY	IC ₅₀ (mg/mL)
α -glucosidase	47.06
α -amylase	34.02

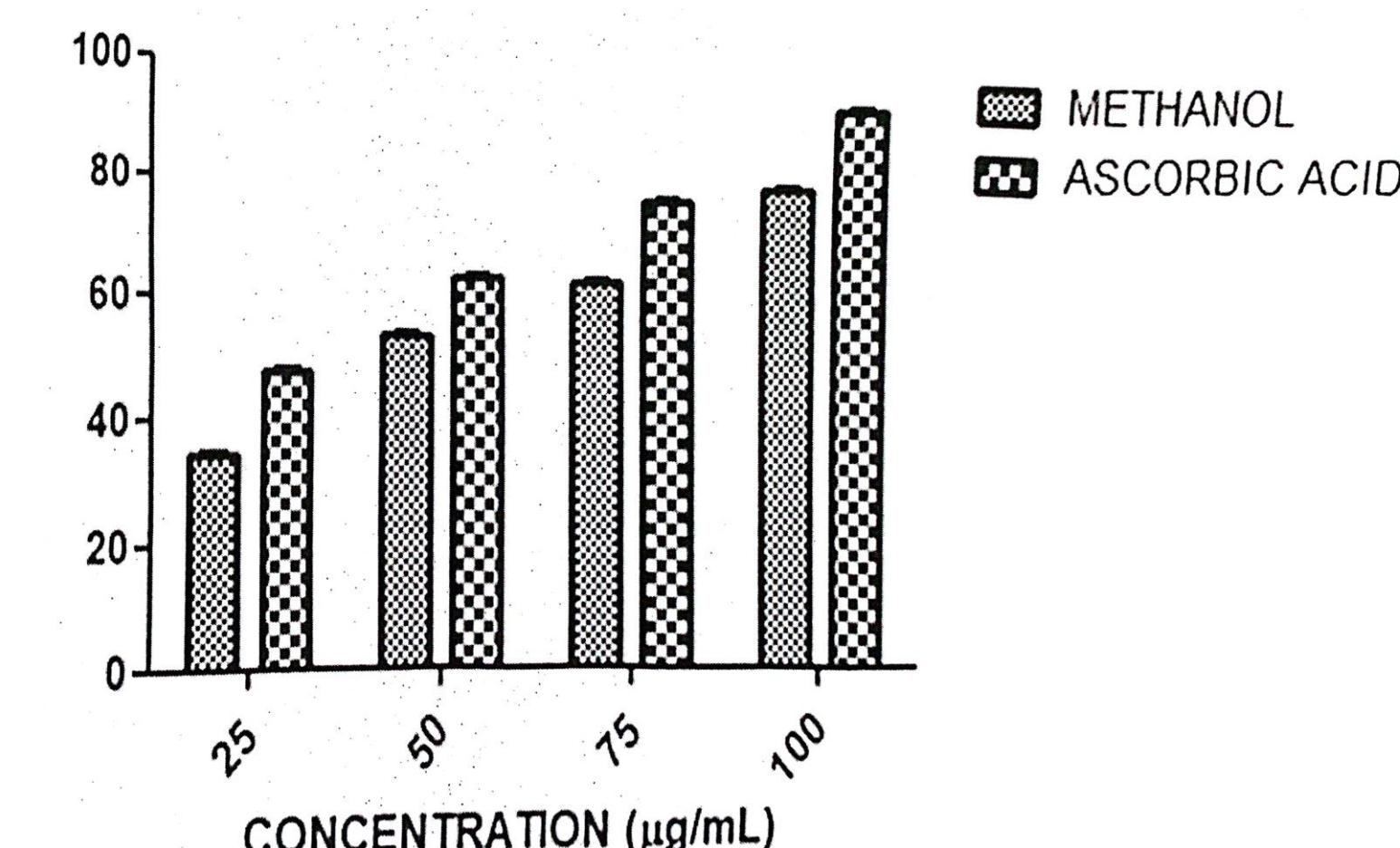


FIG. 3: Nitric oxide radical scavenging effect *L. micrantha* methanol extract. Values expressed as Mean $\pm$ SD (n=3).

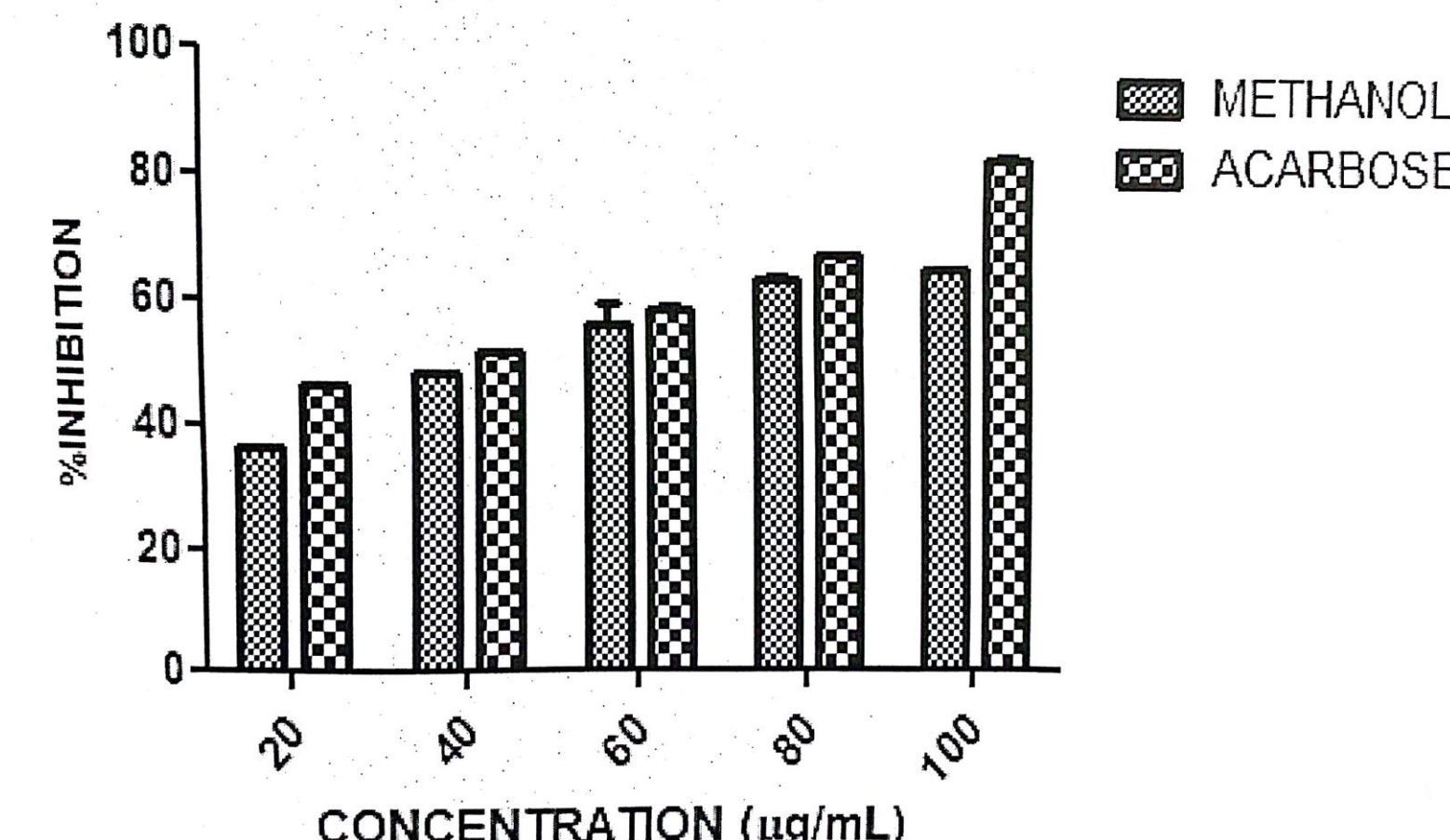
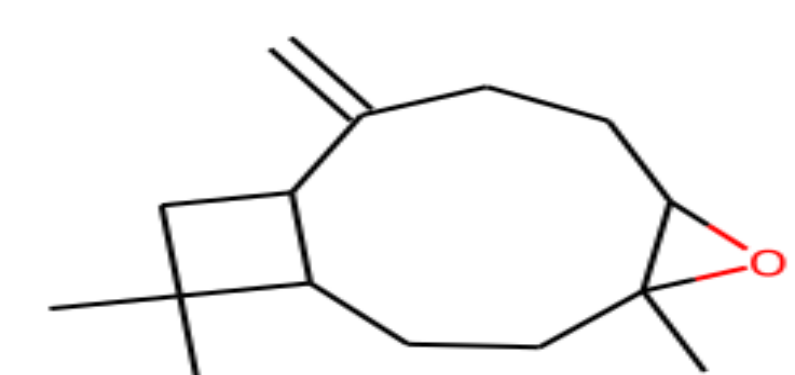
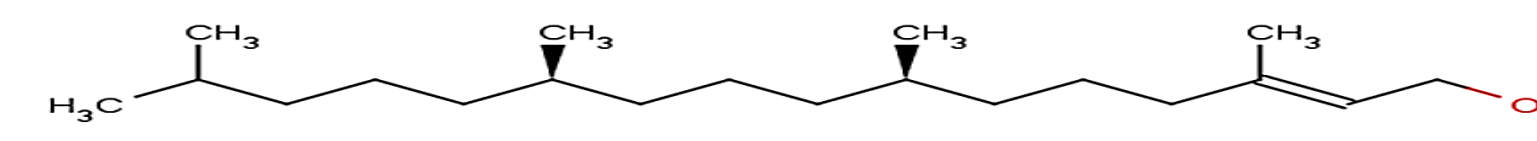


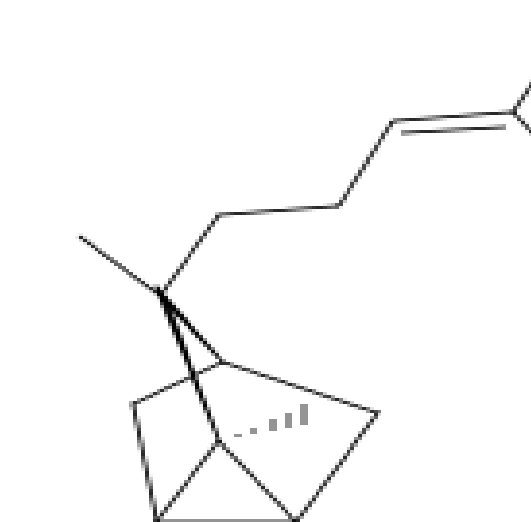
FIG. 5: inhibitory potency of *L. micrantha* leaves against α -glucosidase activity. Values expressed as Mean $\pm$ SD (n=3).



Caryophyllene oxide



Phytol



Alpha-santalene

FIG 6: Structural examples of identified constituents in the essential oil of *L. micrantha*

DISCUSSION

- The result of the phytochemical screening revealed the presence of phenols, flavonoids, tannins, terpenoids, steroids, reducing sugar, alkaloids, and saponins.
- Methanol extract displayed a higher total phenol (40.83 mg/ 100 g), flavonoid (60.68 mg/ 100 g) and alkaloid (31.29 mg/ 100 g) contents.
- Methanol extract revealed significant scavenging activity against 1,1 diphenyl-2-picrylhydrazine (DPPH) (IC₅₀: 43.61 mg/mL) and Nitric oxide (NO) (IC₅₀: 48.94 mg/mL).
- Methanol extract displayed inhibitory potency against α -glucosidase and α -amylase at an IC₅₀ of 47.56 mg/mL and 34.02 mg/mL.
- The antioxidant and antidiabetic activity displayed by the methanol extract may be due to the higher phenol and flavonoid contents. Phenol and flavonoid compounds are known to possess radical-scavenging characteristics and can effectively mitigate oxidative cell damage, owing to their water-soluble nature[3].
- The Gas chromatography-mass spectrometry (GC-MS) analysis of the essential oil revealed the presence of 60 chemical constituents which include Phytol (74.83 %), Caryophyllene oxide (55.45%), Alpha-santalene (45.46%), Phytone (69.59%), and Neryl acetone (47.21%) which have been reported to exhibit antioxidant and antidiabetic activities

CONCLUSIONS

- *L. micrantha* leaves contain active phytochemicals with therapeutic potential in the management of diabetes and oxidative stress-related ailments.

- This study is in accordance with the Sustainable Development Goal 3 (Good Health and Well-being).

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