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Evaluation of Nephroprotective Effect of Ethanolic Extracts of Banana (Musaceae) Stem and Banana Modified Leaf (BRACT)

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***Abstract*-- The present study utilized both banana stem and modified banana leaf to find their efficacy towards antioxidant activity and nephroprotective effect.**

Preliminary investigation of phytochemicals (both qualitative and quantitative) was also employed in the present study.It shows the presence of alkaloids, amino acids, carbohydrates, flavonoids in banana stems and presence of alkaloids, carbohydrates, flavonoids, sterols, protein and tannins in banana modified leaves.

In addition, phytochemicals were quantified and presented in which represents the total alkaloids, total tannins, total flavonoids and total phenols in banana stem and banana modified leaf. It shows that modified banana leaf was found to be an excellent source of phytochemicals than banana stem

Antioxidant activity was tested for both the extracts towards ferric ion and superoxide ion, which shows the increased inhibition activity by banana stem. Total antioxidant capacity was tested which shows the comparatively increased in for banana stem

It also shows that modified leaf was found to be significantly imparting nephroprotective effect revealed from comparatively increased AC Einhibition for modified leaf than stem extract. It is suggesting that the presence of essential phytochemicals insignificant amounts and the mediated free radical scavenging activity may be attributed to their nephroprotective effect.

I. Introduction

The banana plant, scientifically classified as Musa species, is a large, herbaceous flowering plant, often mistaken for a tree. It's characterized by a pseudostem (a false trunk composed of leaf sheaths) and large, spirally arranged leaves, with the plant producing a single bunch of bananas before dying and being replaced by suckers. Banana tree parts, such as the peels and leaves, have antioxidant activities and biological functions, including anti-diabetic, anti-diarrheal, anti-tumor, anti-mutagenic, and anti-ulcerogenic properties.

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The banana stem is the main supporting structure of the banana plant, composed of tightly wrapped leaf sheaths that form a cylindrical, fibrous core. Banana stems are a good source of fiber, potassium, and other nutrients, and are believed to have diuretic properties and other potential health benefits.

The banana stem juice has assisted in disintegrating stones deposited in the kidneys and also prevents accumulation of different types of kidney stones in urinary bladder vast studies explored the medicinal properties of banana fruit, leaves, stem, root, flowers, etc.; however, studies were not explored the efficacy of modified banana leaf that is the outer covering of the inflorescence.

Hence, our study investigated the nephroprotective activity of modified banana leaf extract and also banana stem. Since, banana stem is well known for their nephroprotective effect, banana stem (the most utilized banana plant part)Modified banana leaf (the most underutilized banana plant part) were tested and compared for their efficacy in terms of phytochemicals, antioxidant activity and nephroprotective activity.In the present study, banana stem and modified banana leaf were used for assessing their nephroprotective role. In addition, preliminary investigation of phytochemicals (both qualitative and quantitative), antioxidant activity was also tested for both banana stem and modified banana leaf extract.

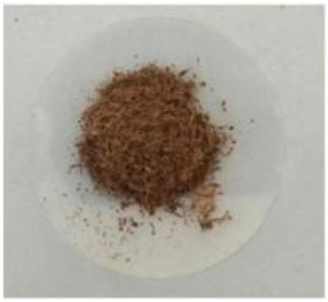
1. Preliminary Phytochemicalqualitative Secreening:

II. Materials And Methods

Preparation Of Banana Stem And Bananamodified Leaf (Bract) Extracts: Stem and Leaves were separately dried at room temperature in uncovered recipients, grounded to a fine powder and dried again.

Extraction process: A type of maceration was utilized for the extract preparation. After grinding into fine powder, they were placed in a clean container. Then the extraction solvent, 50% ethanol is then poured on top of the sample material, soaked, and kept for a short period of time (24h) to extract the bioactive constituents that are readily soluble. Then, the samples were filtered with grade 1 Whatman paper 0.7% extracts were prepared using 50% ethanol; stored and utilized for further analysis



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- TEST FOR ALKALOIDS
- TEST FOR AMINO ACID
- TEST FOR CARBOHYDRATE
- TEST FOR PHENOLIC COMPOUND
- TEST FLAVNOIDS
- TEST FOR STEROLS
- TEST FOR PROTEINS
- TEST FOR TANNINS
- TEST FOR QUINONES

2. Preliminary Quantification:

- QUANTIFICATION OF ALKALOIDS
- QUANTIFICATION OF TANNINS
- QUANTIFICATION OF TOTAL PHENOLS
- QUANTIFICATION OF FLAVNOIDS

3. Assay Of Antioxidant Activity

- SUPEROXIDE RADICAL SCAVENGING ACTIVITY
- FERRIC REDUCING ABSORPTION POWER ASSAY (FRAP)
- PHOSPHOMOLYBDATE ASSAY (TAC)

4. Determination Of In Vitro Nephroprotective Effect

Evaluation Of Angiotensin-Converting Enzyme (Ace) Inhibition Activity – In Vitro

III. Results

- Phytochemical screening of ethanolic extracts of banana stem and banana modified leaf.
- It showed the presence of alkaloids, amino acid, carbohydrates, flavonoids in banana stem
- Alkaloids, carbohydrate, flavonoids, sterols, protein and tannins in banana modified leaf

EXPERIMENT	STEM	M leaf (bract)
Test for alkaloids	Present	Present
Test for amino acid	Present	Present
Test for carbohydrates (molisch test)	Present	Present
Test for phenols	Absent	Absent
Test for flavonoids	Present	Absent
Test for flavonoids conc Hcl	Absent	Present
Test for sterols	Absent	Present
Test for protein	Present	Present
Test for tannins	Absent	Present
Test for quinones	Absent	Absent
Test for glycosides	Absent	Absent

QUANTIFICATION OF PHYTOCHEMICALS OF ETHANOLIC EXTRACT OF BANANA STEM AND BANANA MODIFIED LEAF (BRACT)

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A. Total Alkaloids In Banana Stem And Banana Modified Leaf (Bract)

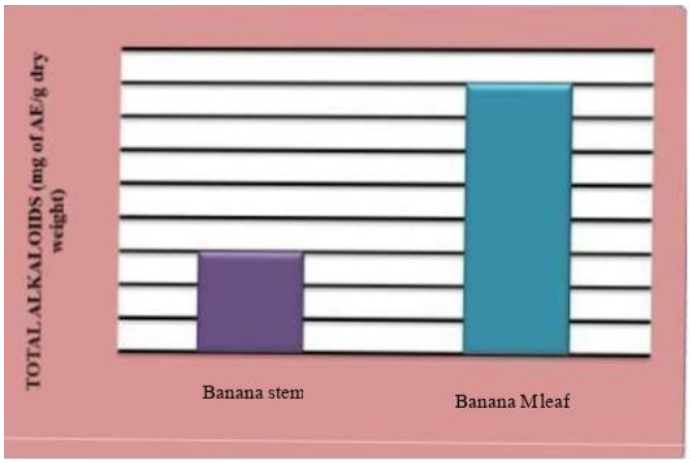

Figure 1A represents the total alkaloids in banana stem and banana modified leaf. It shows the increased alkaloids in banana modified leaf then by banana stem

B. Tannins In Banana Stem And Banana Modified Leaf (BRACT)

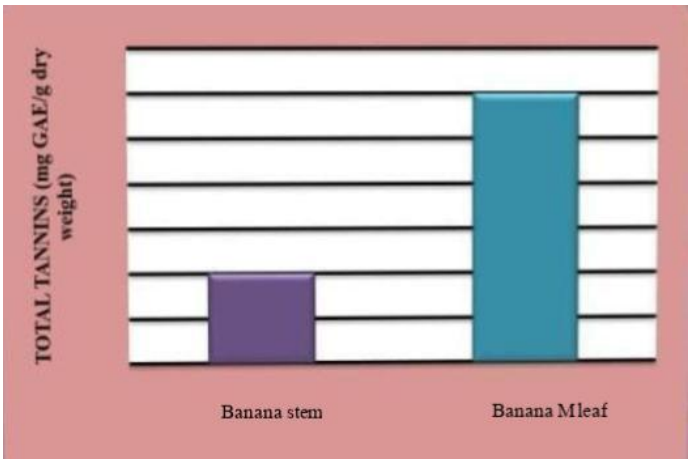

Figure 1B represents the total tannins in banana stem and banana modified leaf. It shows the increased tannins in banana modified leaves then by banana stem.

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C. Total Flavonoids In Banana Stem And Banana Modified Leaf (BRACT)

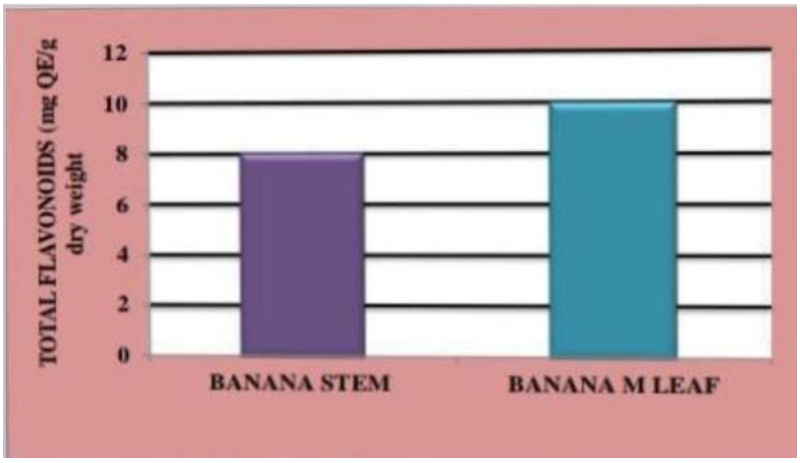

Figure 1C represents the total flavonoids in banana stem and banana modified leaf. It shows the increased flavonoids in banana modified leaf then by banana stem

D. Total Phenols In Banana Stem and Banana Modified Leaf (BRACT)

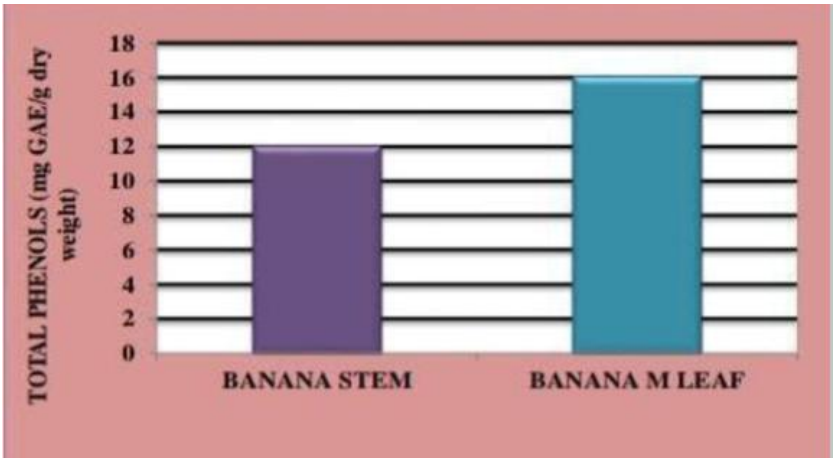

Figure 1D represents the total phenols in banana stem and banana modified leaf. It shows the increased phenols in banana modified leaf then by banana stem

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Figure 2 Antioxidant Activity Of Ethanolic Extract Of Banana Stem And Banana Modified Leaf (BRACT) (N=5)

A. Ferric Reducing Absorption Power Assay(FRAP)

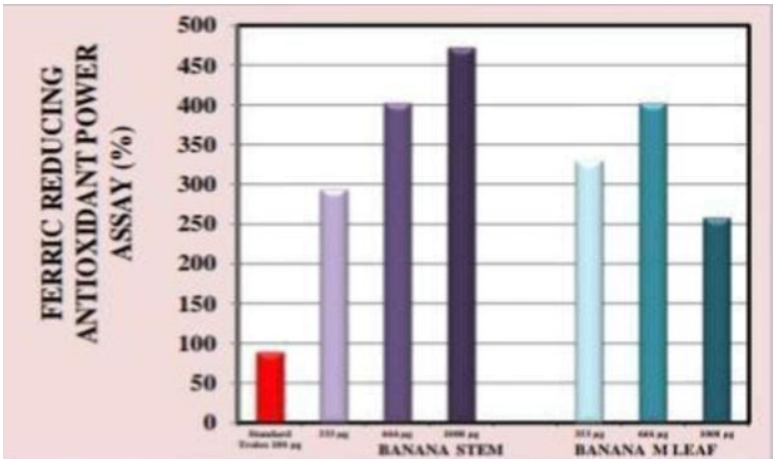

Figure 2A represents the ferric ion radical scavenging activity which shows the comparatively increased inhibition activity by banana stem then by banana leaf.

B. Superoxide Radical Inhibition Assay

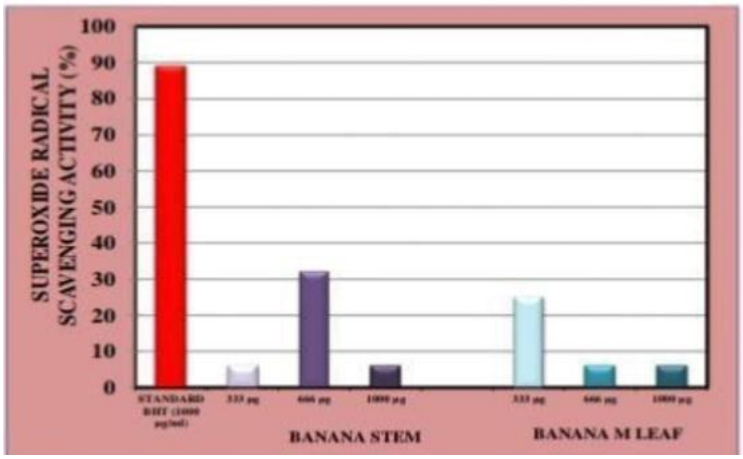

Figure 2B represents the superoxide radical scavenging activity which shows the comparatively increased inhibition activity by banana stem then by banana leaf.

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C. Total Antioxidant Capacity

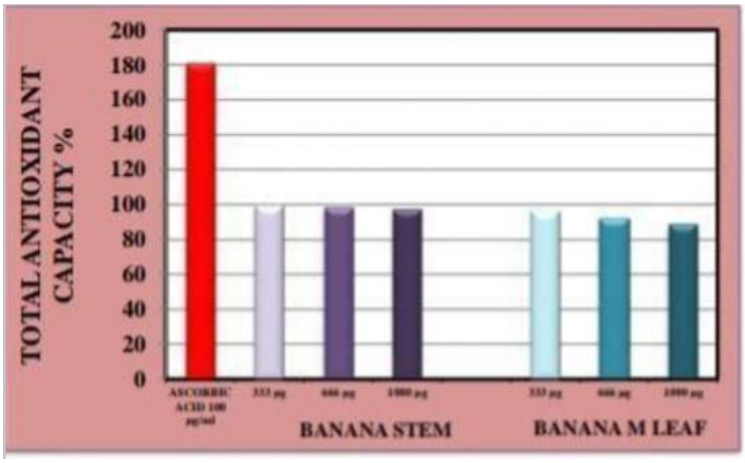
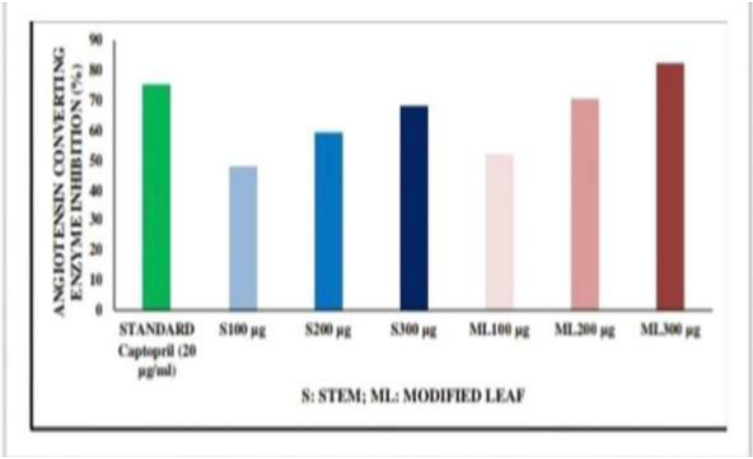


Figure 2C represents the total antioxidant capacity of banana stem and banana modified leaf, which shows the comparatively increased total antioxidant capacity for banana stem then by banana modified leaf.

Figure 3. Nephroprotective Effect Of Ethanolic Extract Of Banana Stem And Banana Modified Leaf (Bract) Based On Angiotensin Converting Enzyme Inhibition (N=5)



It shows that modified leaf was found to be significantly imparting nephroprotective effect revealed from comparatively increased angiotensin converting enzyme inhibition for modified leaf than stem extract.

IV. Conclusion

The study focused on elucidating the antioxidant and nephroprotective effect of banana stem and banana modified leaf (Bract), which showed the excellent antioxidant and the associated nephroprotective effect imparted by both extracts.

Nephroprotective effect of banana stem and banana modified leaf based on angiotensin converting enzyme inhibition, which shows gradual increase in angiotensin converting enzyme inhibition on increasing the concentration of both banana stem and banana modified leaf.

It also shows that modified leaf was found to be significantly imparting nephroprotective effect revealed from comparatively increased angiotensin converting enzyme inhibition for modified leaf than stem extract.

The inhibition of ACE was tested in vitro and found significant nephroprotective effectsfor both banana stem and modified banana leaf.

It also highlights the need for further deep investigation on the modified banana leaf to explore medicinal phytoconstituents for the management and treatment of various diseases and the associated complications.

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