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Antioxidant Potential of Garcinia cambogia L. and Averrhoa carambola L.

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Abstract: *Fruits are the rich source of primary and secondary phyto-constituents, along with enriched antioxidants like Vitamin A, C, and E, β-carotene, phenolic compounds, flavonoids, dietary glutathione and endogenous metabolites. Enriched bioactive molecules present in fruits are also mentioned as the super food or functional food. Both ripe and unripe forms of fruits carry an antioxidant. Antioxidants are substance donates an electron to the ROS (reactive oxygen species), stabilize them and reduces chronic & cellular damage of the body. In this study, ripen fruits are used for the evaluation of anti-oxidative potential of Garcinia cambogia L. and Averrhoa carambola L. The crude extract of ripen fruits are prepared using ethanol and chloroform as solvent. The experimental result suggests that ethanolic extract of A. carambolaand chloroform extract of G. cambogiahave strong anti-oxidative potential.*

Keywords: Phyto-constituents, Antioxidants, Fruits, Garcinia cambogia L., Averrhoa carambola L.

I. INTRODUCTION

All plants on the earth have potent medicinal properties (Latif& Nawaz, 2025). Since, ancient times, plants are used for well-being and treatments of ailments. The therapeutics such as Ayurveda, Unani and Siddha are depends on the plant-based remedies (Arora et al., 2025).All medicinal plants recognized as the pool of bioactive compounds with therapeutic potential. Among them, ***Averrhoa carambola* L.** and ***Garcinia cambogia* L.** stand out for their diverse phytochemical and pharmacological profile.

***Averrhoa carambola* L.**, also known as star fruit, is indigenous to Southeast Asia and widely grows in tropical regions. It contains potential antioxidants such as **flavonoids (epicatechin), phenolic compounds, vitamin C and organic acids** (Dhara et al., 2025). Several reports are available on the free radical scavenging activity of *A. carambola*, as it contains high amount of flavonoid and polyphenol compounds (Nowak et al., 2023).

***Garcinia cambogia* L.**, commonly called as Malabar tamarind, often used as medicine and cuisine. Their fruits are rich in **hydroxycitric acid (HCA) which possess strong** antioxidative, anti-inflammatory and anti-obesity potential (Baky et al., 2022).Several reports are available on HCA, but very fewer authors has given attention to other component present in the fruits. This study aimed at characterization and evaluation of antioxidative potential of *A. carambola* and *G. cambogia* using a DPPH scavenging assay.

II. MATERIAL AND METHOD

Collection and extraction of plant material

The fruits of *A. carambola* L. and *G. cambogia* L. were collected from the garden of Yeshwant Mahavidyalaya Nanded, Maharashtra and ***G. cambogia*** fruits were collected from the Bhoomi Nutraceuticals Pvt. Ltd. Basmath, Hingoli, Maharashtra. Fruits washed under running tap water and then cut into small slices. These sliced fruits further

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dried under the shade and powdered using mortar pestle. The obtained powder stored in airtight container for further use.

These powder used for the extraction using Ethanol and Chloroform through soxhletion. Around 20gm of dry powder of each fruit extracted with the 200ml of ethanol and chloroform (Harborne, 1984).The coloration of obtained crude extract was observed as dark green to dark brown.

Each extract were encoded with a specific code **AcFe** (*Averrhoa carambola* fruit ethanolic extract), **AcFch** (*Averrhoa carambola* fruit chloroform extract) **GcFe** (*Garcinia cambogia* fruit ethanolic extract) **GcFch** (*Garcinia cambogia* fruit chloroform extract) for experimental convenience.

The percentage yield of extraction calculated by formula (Abbas et al., 2021)

$$\text{Percent yield extraction} = \frac{\text{Weight of the extract after drying}}{\text{Dry weight of sample}} \text{ X } 100$$

Antioxidative Profiling

DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity

Antioxidant activity of plant extracts was estimated by using their free radical scavenging potential (Baliyan et al., 2022). The different concentrations of plant extract were prepared and maintained in 1 ml (20, 40, 60, 80, 100µg/ml). One ml of sample further mixed with 1.5ml of 0.1% methanolic DPPH solution and incubated for 30 minutes in dark condition. The samples were then observed for discoloration; from purple to yellow and read the absorbance on colorimeter at 510 nm.

Radical scavenging activity can be calculated by using the formula

$$\text{DPPH radical scavenging activity (\%)} = \frac{Ao - A1}{A0} \text{ X } 100$$

Where, A_0 is absorbance of control and A_1 is absorbance of sample.

III. RESULT AND DISCUSSION

Percent Yield of Extract

The ethanolic extract shown greater yield in comparison to chloroform in case of both plants (Table 1). It suggest that the number of components in ethanolic extracts may be more than the chloroform one (Figure 1).

Table 1: Yield extract of plant sample

Sr.No.	Sample code	Solvent used for extraction	Yield extract	
			Dry weight (gm)	% yield of extract
1	AcFe	Ethanol	8.0	40
2	AcFch	Chloroform	3.6	18
3	GcFe	Ethanol	7.0	35
4	GcFch	Chloroform	4.3	21.5

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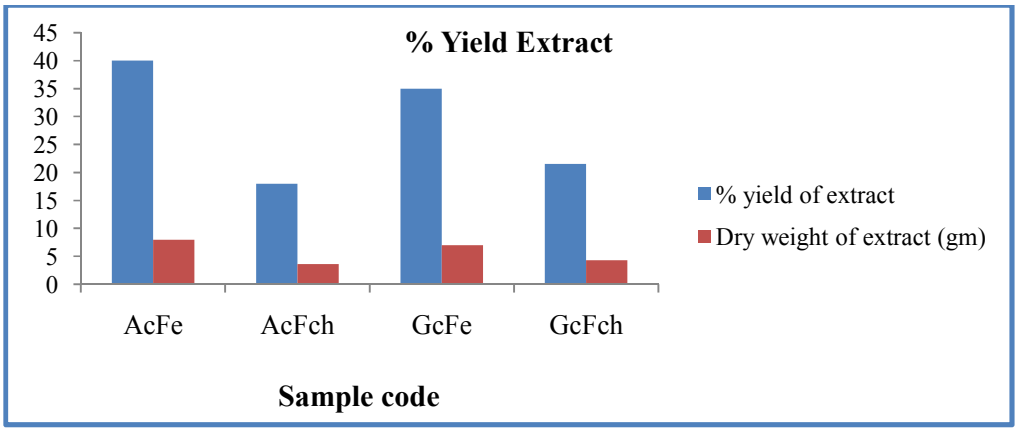

Figure 1: Graph of sample yield extract

Antioxidant profile

The free radical scavenging capacity of the extracts was evaluated with the DPPH assay, which measures the ability of phytochemicals to donate electrons or hydrogen atoms (Ouyang et al., 2020). The plant extracts evaluated for the antioxidaitvepotentialand results shows that chloroform extract of AcFch- shown 51.30% inhibition, followed by GcFe shown58.55% inhibition, GcFch-shown 61.14% inhibition and AcFe-shown64.44% inhibition. Among tested extracts, AcFe demonstrated the strongest radical scavenging activity, with the lowest DPPH IC50 75.06 (Table 2).

Table 2: Antioxidant activity of *G. cambogia* L and *A. carambola* L

Sr.No.	Sample code	Antioxidant analysis		
		Extract concentrations for DPPH activity (µg/ml)	DPPH (% inhibition)	IC50 (µg/ml)
1	AcFe	100	64.77	75.06
2	AcFch	100	51.30	98.07
3	GcFe	100	58.55	91.45
4	GcFch	100	61.14	78.07

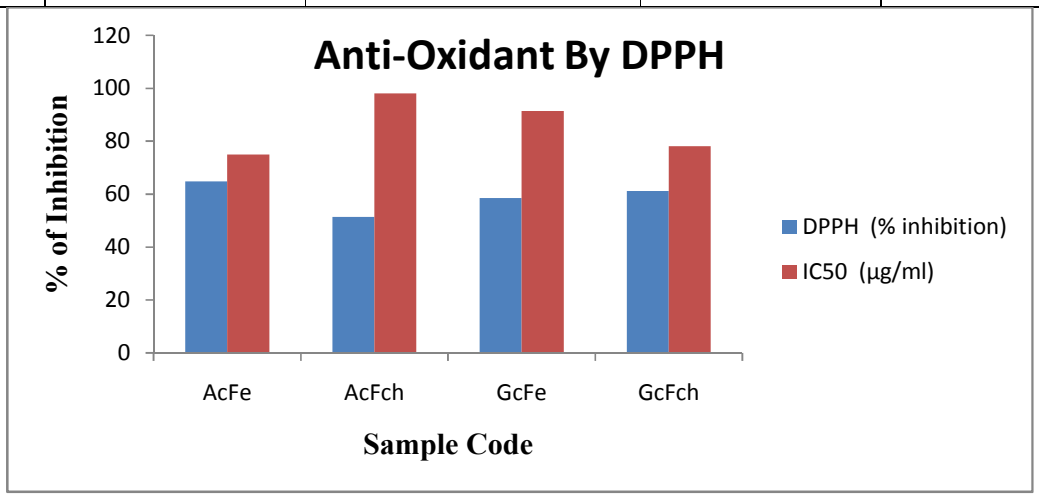

Figure 2: Graph of % inhibition of fruit extracts.

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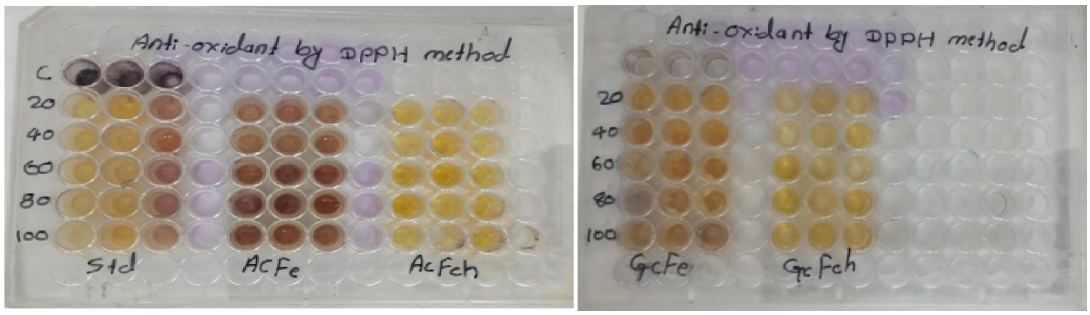

Fig. 3: Experimental result of Antioxidant Assay by DPPH method.

IV. CONCLUSION

Fruits are the excellent natural sources of antioxidants, containing a wide variety of protective compounds. Because of these health benefits, they are often referred to as "superfoods" or "functional foods" (Nisansala et al., 2017).Most often antioxidants are carotenoides, vitamins, phenolic compounds, flavonoids, dietary glutathione and endogenous metabolites. They plays vital role several protective pathways such as removing free radicals, neutralizing singlet and triplet oxygen, blocking certain enzymes, breaking down peroxides, and show synergistic effect along with compounds for the antioxidant effects (Halliwell B., 2024).

V. ACKNOWLEDGMENT

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