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Estimation of phenolic and flavonoids content and antioxidant activity of *Garcinia talbotti* Raiz ex Sant

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Abstract
Phytochemical screening of crude extract of *Garcinia talbotti* was carried out with different solvents such as acetone, alcohol, ethanol, methanol and water. The total phenolic content, total flavonoid content and DPPH radical scavenging activity were determined in leaves of *Garcinia talbotti*. The total phenolic content was 2.609±0.130 % and the total flavonoid content was 5.043±0252 mg/100 gm in the methanolic extract of this plant. The DPPH radical scavenging activity in investigated sample was 73.51±3.68%.

Keywords: *Garcinia talbotti*, DPPH, total flavonoid content, total phenolic content

Introduction
Garcinia is a large genus of the family Clusiaceae, which represents more than 35 genera and over 800 species. *Garcinia* species are widely distributed throughout the tropical Asian and African countries and have tremendous potential as spice species and as medicinal plants. In India, about 36 species of *Garcinia* are reported and 7 species are endemic to the Western Ghats, 6 species recorded from Andaman and Nicobar Islands and 4 species are recovered from North-east India (Arora 1998). *Garcinia talbotii* Raiz. ex Sant. is locally called as Undal, Tavir, Phansada, Chivar. It is endemic to the Western Ghats. The fruits yield an inferior quality of yellow gutta-gum and dried fruits are used like tamarind in curries.
In the present study phytochemical screening of crude extract with different solvents such as acetone, alcohol, ethanol, methanol and water was carried out. The total phenolic content, total flavonoid content and the antioxidant activity was analyzed using DPPH free radical scavenging activity.

Material and method
Plant material
Fresh leaves of *Garcinia talbotti* were collected from Botanical Garden of Yashwantrao Chavan College of Science, Karad. The voucher specimen has been deposited at the Herbarium of Department of Botany, Yashwantrao Chavan College of Science, Karad.

Preparation of plant extract
The fresh leaves were washed thoroughly 2-3 times with running tap water and once with sterile distilled water. The plant leaves were air dried at room temperature and grind to a fine powder using a laboratory grinder. The powder was sieved using 20 mm mesh to obtain a uniform powder for the analysis. Powdered material was maintained at room temperature and protected from light until required for analysis. Extraction was achieved by adding 1 g of powdered material of Acetone, Alcohol, Ethanol, Methanol and distilled water. Then the extracts were filtered through filter paper (Whatman no. 1) and filtrate was kept at 4°C temperature for further analysis.

Preliminary phytochemical screening of the plant
The extract of different solvent used for preliminary phytochemical screening was carried out using standard procedures to test the presence of bioactive compounds described by Joshi *et al.*, (2011) [3] with slight modification.

Determination of total phenol content
Total phenolic content of the extracts were quantified using Folin-Ciocalteu method described by Upadhya *et al*., (2013) [4] with some modification. The plant extracts (0.125 ml) with distilled water 0.5 ml was mixed with 0.125 ml Folin-Ciocalteu reagent and kept for 10 min for incubation at 37 ˚C to it 1.25 ml of 7 % sodium carbonate was added and kept for 90 min at room temperature. The absorbance was measured at 760 nm on UV-Visible spectrophotometer. Gallic acid (10–1000 mg/l) was used for calibration of a standard curve and the amount of total phenol was calculated as % dry powder as Gallic acid equivalents (GAE).

Determination of total flavonoid content
Total flavonoid content of all the plant extracts were quantified by using the aluminium chloride colorimetric method described by Deshmukh *et al*., (2009) [2]. The extracts (1 ml) were mixed with 1 ml 2 % aluminium chloride. The mixture was vortexed and the reaction was kept at the room temperature for 10 min in dark and absorbance of reaction mixture was measured at 367 nm using UV-Visible spectrophotometer. Quercitin (10–200 mg/l) was used for calibration of a standard and the amount of total flavonoid was calculated as mg/100g dry powder as Quercitin equivalents (QUE).

DPPH radical scavenging activity

The antioxidant activities of all the plant extracts were determined by using 2,2-Diphenyl-1- picrylhydrazyl (DPPH) assay described by Upadhya *et al*., (2015) [5]. The DPPH reagent was prepared by dissolving 2.5 mg of DPPH in 100 ml of methanol. The plant extracts (0.1 ml) were allowed to react with 2.9 ml of DPPH reagent. The reaction mixtures were allowed to interact properly and stand in the dark at room temperature for 30 min. The absorbance was measured at 517 nm on UV-Visible spectrophotometer. The percent radical scavenging activity was calculated using following formula:

$$\% \text{ RSA} = \frac{\text{Abb}_{\text{Blank}} - \text{Abb}_{\text{treatment}}}{\text{Abb}_{\text{Blank}}} \times 100$$

Abbreviations

Total Phenolic content (TPC); Total Flavonoid Content (TFC); DPPH % RSA: Diphenyl Picryl Hydrazyl percent Radical Scavenging Asssay.

Results and Discussion

Preliminary Phytochemical screening

Table 1. Shows phytochemical screening of various extracts of *Garcinia talbotii*. Methanol, Ethanol and Alcohol extracts of *Garcinia talbotii* showed presence of Alkaloids, Terpenoid, Flavones, Carbohydrates, Glycosides, Saponins, Phenols, Protein and Amino acid, Catecholic Tannin and Reducing Sugar. The tests for Steroid, Flavonoid and Gallic Tannins showed negative results.

Table 1**:** Phytochemical screening of *Garcinia talbotii*

Phytochemical groups	*Garcinia talbotii*				
	Methanol	Ethanol	Alcohol	Acetone	Aqueous
Alkaloids	+	++	++	-	-
Steroid	-	-	-	-	-
Terpenoid	+++	+++	+++	-	+
Flavonoid	-	-	-	-	-
Flavones	+++	++	+++	-	-
Gallic Tannins	-	-	-	-	-
Catecholic Tannin	+++	++	+++	-	-
Reducing Sugar	+++	+++	++	++	+++
Carbohydrates	+++	+++	+++	++	+++
Glycosides	+++	++	++	+++	++
Saponins	++	+++	+++	-	++
Phenols	+++	++	++	++	+++
Protein and Amino acid	+++	+++	+++	+++	+++

- = Not detected; + = Low concentration; ++ = Moderate concentration; +++ = High concentration

Antioxidant capacity

Total phenolic content (TPC) of the methanolic extract was determined by Folin–Ciocalteu method and expressed in % dry powder as Gallic acid equivalents (GAE). It shows 2.609±0.130 % (Table 2). Total flavonoid content (TFC) was determined by $AlCl_3$ method. Results were expressed as mg/100 g dry powder as Quercitin equivalents (QUE). The TFC of *Garcinia talbotti* was observed to be 5.043±0.252 mg/100 g (Table 2). Antioxidant activity of *Garcinia talbotti* was also evaluated using DPPH assay. The results show 73.51±3.68% radical scavenging activity (RSA) (Table 2). To our knowledge, there was no prior report on DPPH radical scavenging activity of this plant.

Table 2: Total phenolic content, total flavonoid content and DPPH (RSA)

Sample	TPC %	TFC mg/100g	DPPH % RSA
G. talbotii	2.609 ±0.130	5.043 ±0.252	73.51 ±3.68

Figure no. 1 and Figure no. 2 presents the standard calibration plots for the determination of phenols and flavonoids respectively (concentration verses absorbance).

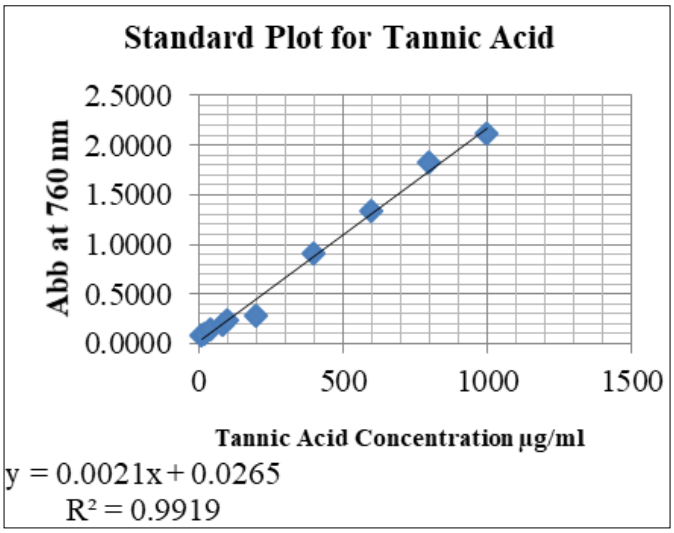

Fig 1

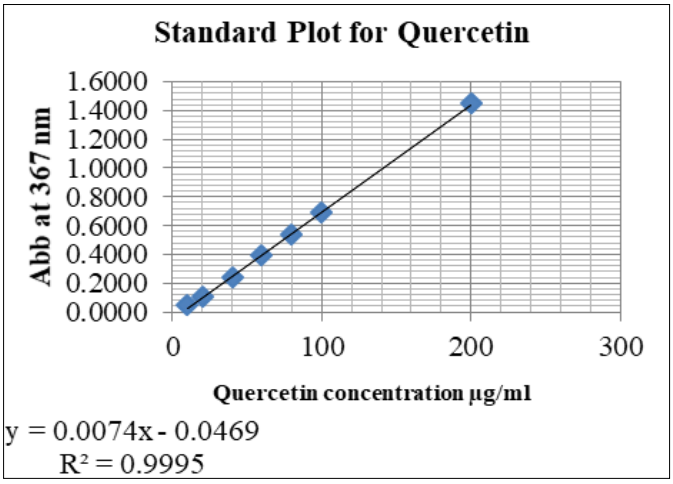

Fig 2

Conclusion

The phytochemical screening of *Garcinia talbotii* Raiz ex Sant. leaves showed the presence of various bioactive compounds such as alkaloids, steroids, terpenoids, flavonoids, tannins, reducing sugars, carbohydrates, glycosides, saponins, phenols, proteins and amino acids. The antioxidant activity from *Garcinia talbotii* possessed considerable amount of phenolic and flavonoid content and exhibited good antioxidant activity by DPPH method.

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