

Biochemical Estimation of Metabolites from Medicinally Important Plant *Tecomella undulata* (sm.) Seem

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Abstract: *Tecomella undulata* is the richest source of phytoconstituents and have been used frequently in folk medicine. The results for total phenolic, total flavonoid content, total alkaloid content, total tannin content is studied in various plant extracts of leaves and stem. The highest amount of total phenolic content (31.04mg/g), total flavanoids content (32.23 mg/g), total tannin content (14.27mg/g), total alkaloids content (14.38mg/g) was observed in leaves and chlorophyll (12.68 mg/g) in leaves. The powerful biological activities as exhibited by plant phenolics and flavonoids posed the need of determining their contents in *Tecomella undulata* leaves and stem. The contents were determined by spectrophotometric assays by measuring the absorbance at different wavelengths. Total phenolic content were estimated by the Folin–Ciocalteu colorimetric method whereas the total flavonoid content was estimated by aluminium chloride colourimetric method. The results clearly indicate that *T. undulata* is a rich source of phenolics and flavonoids the basis of its traditional use in different systems of medicines.

Keywords: *Tecomella undulata*, total phenolic, total flavonoid content, total alkaloid content, total tannin content, plant extracts of leaves and stem

1. Introduction

The plants *Tecomella undulata* are widely used for the treatment of a broad-standing human ailments since extensive times. The plant is known, a number of activities, such as antibacterial, cardiogenic and chloretic, mild relaxant, hepatoprotective, anticancer activity etc. In ayurveda *Tecomella undulata* is used for the different diseases, skin diseases, cancer, diabetes, jaundice, gonorrhoea, leucoderma enlargement of spleen, central nerves system, liver diseases, urinary disorders and swellings. Seeds are used against abscess and flowers are used for Hepatitis. Leaves shows significant antimicrobial activity and is potent to anti-human immunodeficiency virus due to the presence of oleanolic acid and ursolic acid (Azam, M. M., 2000). Today, the collection of medicinal plants in nature as a raw material widely used in pharmaceutical industry as well as the various medical the inevitable cultural practices. It has great ayurvedic properties and also used in preparation of ayurvedic drug viz. rohitakarista, rohitakadhya churna and rohitaka ghrta. The most important bioactive substances of plants are alkaloids, flavonoids, glycosides, saponins, tannins, phenolic compounds, quinones, anthroquinones, sterols which create certain physiological action on human body and assist defense activity against microorganisms, insects and herbivores and play diverse role in plant for the discovery of therapeutic agents.

2. Material and Method

For the quantitative estimation of secondary metabolites different protocols were used. Leaves and stem of the mature plant were collected, washed with distilled water, shade dried and powdered. The powder was used for analysis of

total phenolic, total flavonoid content, total alkaloid content and total tannin content of the selected plant species.

1. Determination of total phenolic content

Total phenolic content was determined by Folin -ciocalteu reagent method. Take 1ml of different plant extracts (leaves and stem) of *Tecomella undulata*. Add 0.5 ml 1N Folin – ciocalteu reagent. Allow standing for 10 min. 4 ml Na₂CO₃ solution added. The reaction mixtures were incubated for 30 min. The total phenolic content was measure at 750 nm. Gallic acid solutions used as standard and was expressed in terms of mg/g phenolic content.

2. Determination of total alkaloids content

Take 1ml different plant extracts *Tecomella undulata*. Add 5ml phosphate Buffer. Then add 5 ml of bromocresol green solution. The mixture was shaken with 4 ml chloroform. After that the reaction mixtures is collected in volumetric flask (10ml) and make final volume 10ml with chloroform. The total alkaloid content was measure at 470 nm. Atropine solutions used as standard and expressed in terms of mg/g alkaloid content.

3. Total tannin content determination

Folin - Ciocalteu method was used for the determination of tannins using tannic acid as a standard. Take 1 ml of plant extract is collected in volumetric flask (10ml). 4.0 ml D/W was added. Then add 0.4 ml of 1N Folin- ciocalteu reagent. Then add 2 ml of saturated Na₂CO₃ solution. Make final volume 10 ml with distilled water. Measured OD against the blank at 700 nm with spectrophotometer. The results were expressed in mg /g of plant extract.

4. Total flavanoid content determination

Aluminium chloride method was used for determination of total flavanoids content. Quercetin was used as standard for

determination of total flavonoids content. 1ml of various plant extracts were collected in volumetric flask (10ml). 4 ml water was added and allows standing for 5 min. Then add 0.5 ml 10% $AlCl_3$. 0.5 ml of 5 % CH_3COONa ($NaOAc$) was added and allows standing for 5 min. Add 2ml of 1 M $NaOH$ in test solution and make 10 ml final volume with D/W. Measured the OD at 415 nm against a blank with an UV spectrophotometer. The content was expressed in mg/g dry weight of extracts.

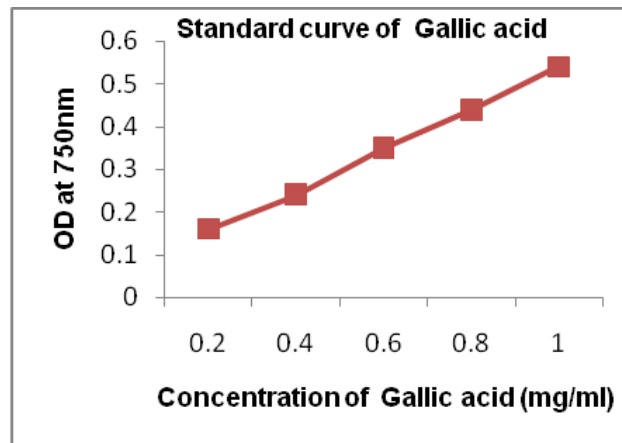
3. Results and Discussion

The present work indicates the plant *T. undulata* is the richest source of phenolic, tannin and flavonoid content. The results for total phenolic, total flavonoid content, total alkaloid content and total tannin content is studied in various plant extracts of leaves and stem are presented in the graph. The leaf of plant *Tecomella undulata* contains higher total phenolic content, total flavanoid content, total alkaloids content and total tannin content then stem exception of ethyl acetate stem extracts show higher phenolic content than leaves extracts. The highest value was 31.04mg/g recorded in petroleum ether leaves extracts followed by 28.66 mg/g in methanol 21.46mg/g in chloroform, 16.77mg/g in acetone, 12.44mg/g in ethyl acetate and 6.25 in water (graph 2). The high value was 23.28 mg/g recorded in petroleum ether stem extracts followed by 20.42mg/g in methanol 18.86mg/g in chloroform, 14.38mg/g in acetone and 15.6 mg/g in ethyl acetate. No phenolic content was observed in water stem extracts (graph 2).

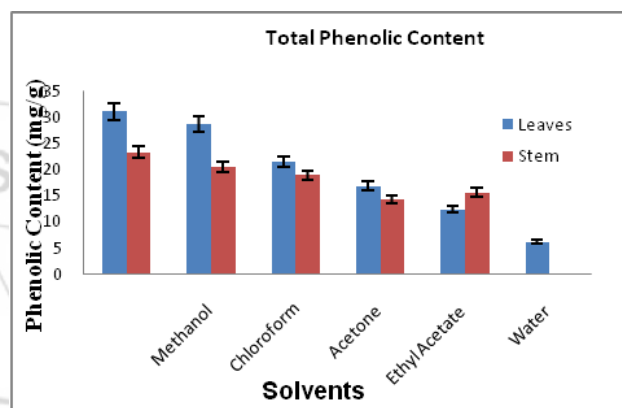
The highest flavanoid content was 32.23 mg/g recorded in methanol leaves extracts followed by 24.36 mg/g in chloroform and 23.94 mg/g was recorded in methanol stem extracts. No flavanoid content was observed in water stem extracts. The results will be shown in and represented in graph 4. The high alkaloid content was 14.38 mg/g recorded in methanol leaves extracts followed by 11.28 mg/g in petroleum ether. No alkaloids present in CH, EA and water extract (graph 6). The highest tannin content was 18.5 mg/g recorded in petroleum ether stem extracts and 13.25mg/g recorded in petroleum ether leaves extracts (graph 8). No tannin content was observed in acetone leaf extracts.

4. Conclusion

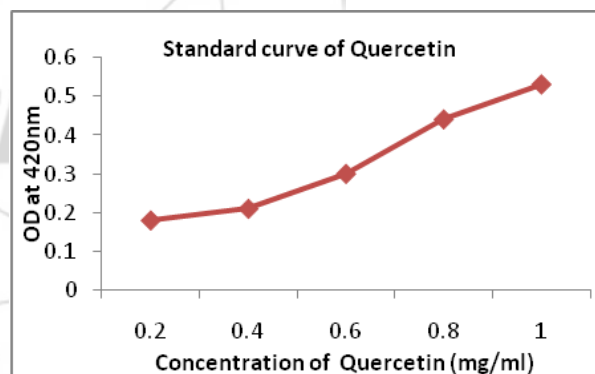
The present study revealed that plant *Tecomella undulata* contains high content of phenolic compound, flavanoids, alkaloids contribute to the antioxidant activity and is considered to be great potential source of antimicrobial principles. For this reason, it is resistant to bacteria and fungal attacks.



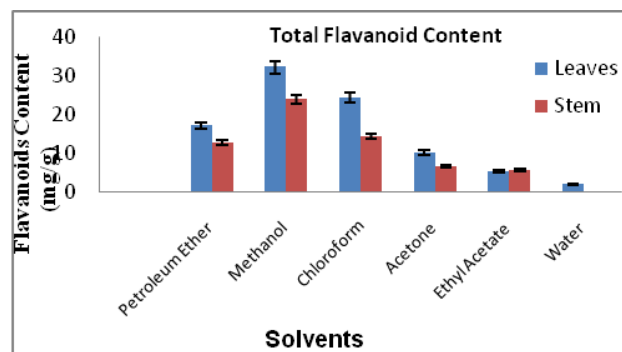
Graph 1: Standard curve of Gallic acid



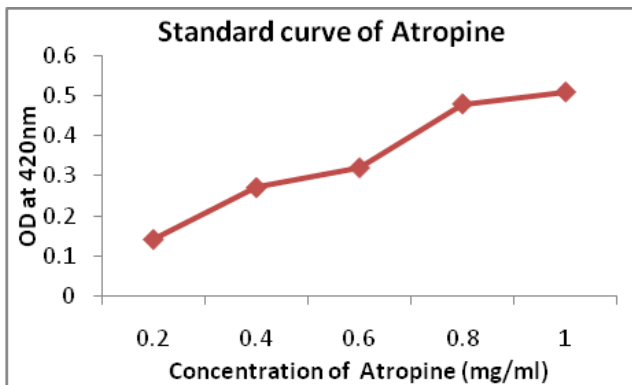
Graph 2: Determination of total phenolic content



Graph 3: Standard curve of Quercetin

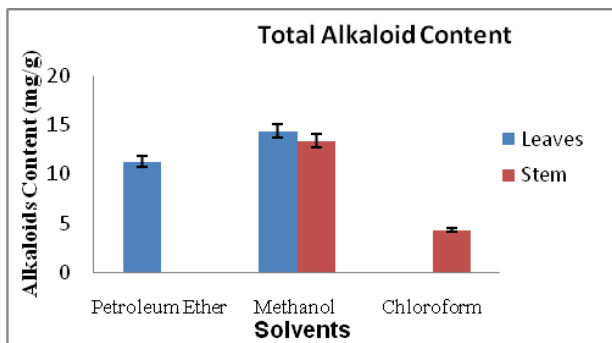


Graph 4: Determination of flavonoids content

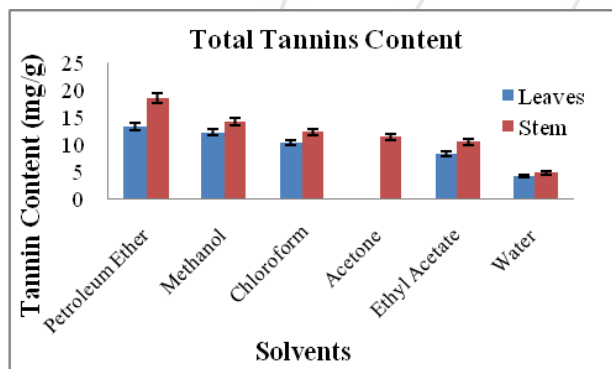


Graph 5: Standard curve of Atropine

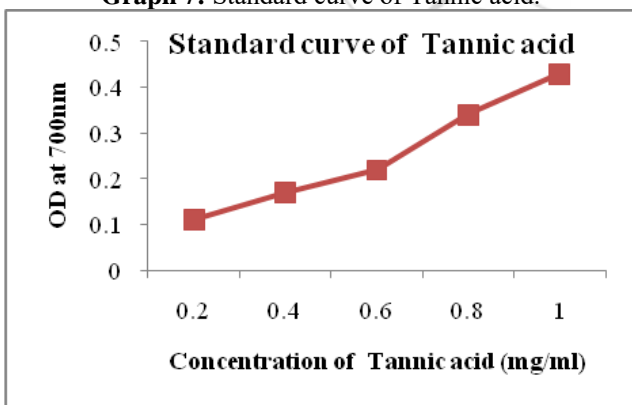
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Graph 6: Determination of Alkaloids



Graph 7: Standard curve of Tannic acid.



Graph 8: Determination of tannin content

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