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QUALITY CONTROL OF *GREWIA TILIFOLIA* VAHL BY UV-VIS SPECTROPHOTOMETRIC ANALYSIS

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ABSTRACT

The aim of present study is to explore a complete profile on UV-Visible spectrum of *Grewia tilifolia vahl* leaf extracts in concern with the polarity. Hence, UV-Vis spectrophotometer was employed in this study for identifying as well isolated the compounds in plants and further their intensities along with absorbance were compared. The solvents like chloroform, acetone, petroleum ether, Benzene, methanol and ethyl acetate at three different concentrations (50µL, 100µL and 2mg/3mL), among them, petroleum ether exhibits higher absorbance (>1) at lower concentration. The experimental spectra stated that the quantity will be more to isolate based on intensities and can be used as a neutraceuticals.

Key words: *Grewia tilifolia Vahl*, UV-Vis spectrophotometer, quality control.

1. INTRODUCTION

Spectroscopic techniques have great importance in structural elucidation of plant extract. Mostly, UV-Visible spectrometer is a simple, cost-effective, friendly user and frequently used it in research, pharmaceuticals, analytical chemistry, and industries as it is capable to identify the impurities in organic compounds, their structural elucidation and complementary analysis (both qualitative and quantitative). In specific, UV-Vis spectrophotometer has a remarkable attention in study the optical properties of plant extract.

In view of that, *Grewia tiliaefolia* (*G. tiliaefolia*) is useful in vitiated conditions of pitta and kapha, burning sensation, rhinopathy, hyperdipsia, ulcers, skin diseases, haematemesis and general debility. In general, *G.tiliaefolia* is a medium sized tree upto 20 m in height, leaves are simple, alternate. Commonly, the flowers are yellow, small on thick auxiliary peduncles and fruits are globose drupes of the size of a pea, 2-4 lobed, black when ripe, seeds 1-2. The bark is astringent, sweet, acrid, refrigerant, oleaginous, expectorant, antipruritic, constipating, emetic, styptic, aphrodisiac and tonic [1-7]. Recently, FTIR analysis used to interprets the data of *G.tiliaefolia*. Therefore, considering the clinical importance, the present study was designed to evaluate the standardised quality control of *G.tiliaefolia* leaf by UV-Visible spectrophotometer, however based on the literature review, no work has been done on standardisation of *G.tiliaefolia* leaf using UV-Vis spectral analysis, so the steps has been taken to standardize the plant part, for future identification and can be used for further research on the plant.

2. EXPERIMENTAL METHODS

2.1Collection, authentication and Processing of Plant Material

The desired plant material was collected from the place Kambalakonda forest which is located at Visakhapatnam, India in 2016 and the same was authenticated by a taxonomist Dr B.S. Padal, Department of Botany, Andhra University, Visakhapatnam, India. The Voucher specimen (A.U. (B.D.H), NO.22231) was deposited in the herbarium, A.U. College of Pharmaceutical Sciences, Andhra University.The gathered samples were washed thoroughly with running tap water to remove soil particles and adhered debris and

finally washed with double distilled water. The leaves were cut into small pieces which further allowed to shade drying, and finally ground into fine powder, stored in air tight polythene bags for further analysis.

2.2 Plant Sample Extraction

Soxhlet extraction was used in this study for extracting the components from *G.tiliaefolia*. In a brief, a dried sample powder (0.5 kg) was extracted in solvents such as hexane, petroleum ether, Chloroform, ethyl acetate, methanol, acetone, benzene and distilled water using soxhlet extraction for 72 h and finally, concentrated the sample to 4 mL. The solution was filtered through Whatmann No. 1 filter paper and the filtrate was collected (crude extracts) which is then transferred to glass vials and stored at 4°C until analysis done.

2.3UV-VIS Spectroscopic analysis

The extracts were examined under UV-Visible light for proximate analysis using UV-VIS spectrophotometer. For that, the extracts were vortexed and centrifuged at 3000 rpm for 10 min and filtered through Whatmann No. 1 filter paper by using high pressure vacuum pump [8-12].

3. RESULTS AND DISCUSSION

The solvents showed a great influence in extraction of plant leaf. For that, the extracts were examined under UV-Visible light for proximate analysis at different concentrations of *G.tiliaefolia* leaf extracts were dissolved in methanol and centrifuged. The supernatant was collected, scanned at the wavelength from 200 to 900 nm using a UV-Visible spectrophotometer and the characteristic peaks were reported in Table 1. The changes in solvent concentration that more influenced on extraction as shown in Fig 1-5, the significant difference was noticed in absorbance of the higher to lower concentration. Ethyl acetate shows maximum absorbance (1.035) at the lower concentration of plant extract as shown in Table 1. In contrast, Petroleum ether shows greater absorption at other concentrations (0.542).

UV Spectral data of hexane extract showed an absorbance at different wavelength 211,405,665, at 50 µl concentration 209,404,666 at 100 µl and 209,404,666 at 2mg/3mL concentration. Pet ether extract showed an absorbance at different wavelength 210,272,405,665, at 50 µl concentration 210,278,407,666 at 100 µl and 209,404,666 at 2mg/3mL concentration. Chloroform extract showed an absorbance at different wavelength 209,408,666, at 50 µl concentration 210,274,325,411,413,473,506,536,608,666 at 100 µl and 210,274,325,411,413,473,506,536,608,666 at 2mg/3mL concentration. Ethyl acetate extract showed an absorbance at different wavelength 218,278,410,666, at 50 µl concentration, 210,410,439, 666 at 100 µl and 210,410,439, 666 at 2mg/3mL concentration. Methanol extract showed an absorbance at different wavelength 211,272,410,666, at 50 µl concentration 220,270,327,408, 666 at 100 µl and 220,270,327,408, 666 at 2mg/3mL concentration. Acetone extract showed an absorbance at different wavelength 210,407,665, at 50 µl concentration 210,407,665 at 100 µl and 210,407,665 at 2mg/3mL concentration. Benzene extract showed an absorbance at different wavelength 206,406,664, at 50 µl concentration 206,406,664, at 100 µl and 210,406,664 at 2mg/3mL concentration.

Table 1 different concentration of different extracts their wave lengths and the absorbences of *Grewia tiliaefolia* vahl leaf

Extracts	50 µl concentration		1000 µl concentration		2mg/3mL concentration	
	wavelength	Absorbance	wavelength	Absorbance	Wavelength	Absorbance
Hexane	211	0.490	209	0.291	209	0.291
	405	0.069	404	0.041	404	0.041
	665	0.024	666	0.017	666	0.017
Pet ether	210	0.496	210	0.542	210	0.542

	272	0.047	278	0.106	278	0.106
	405	0.068	407	0.044	407	0.044
	666	0.028	666	0.019	666	0.019
Chloroform	209	0.366	210	0.468	210	0.468
	408	0.111	274	0.059	274	0.059
	666	0.043	325	0.061	325	0.061
	-	-	411	0.174	411	0.174
	-	-	413	0.089	413	0.089
	-	-	473	0.042	473	0.042
	-	-	506	0.02	506	0.02
	-	-	536	0.01	536	0.01
	-	-	608	0.015	608	0.015
	-	-	666	0.063	666	0.063
Ethyl acetate	218	1.035	210	0.0378	210	0.0378
	278	0.207	410	0.181	410	0.181
	410	0.095	439	0.088	439	0.088
	666	0.034	666	0.068	666	0.068
Methanol	211	0.618	220	0.531	220	0.531
	272	0.075	270	0.09	270	0.09
	410	0.113	327	0.073	327	0.073
	666	0.043	408	0.108	408	0.108
	-	-	666	0.039	666	0.039
Acetone	210	0.608	210	0.488	210	0.488
	407	0.284	407	0.088	407	0.088
	665	0.111	665	0.030	665	0.030
Benzene	206	0.090	206	0.128	206	0.128
	406	0.037	243	0.05	243	0.05
	664	0.012	271	0.128	271	0.128
	-	-	406	0.07	406	0.07
	-	-	664	0.025	664	0.025

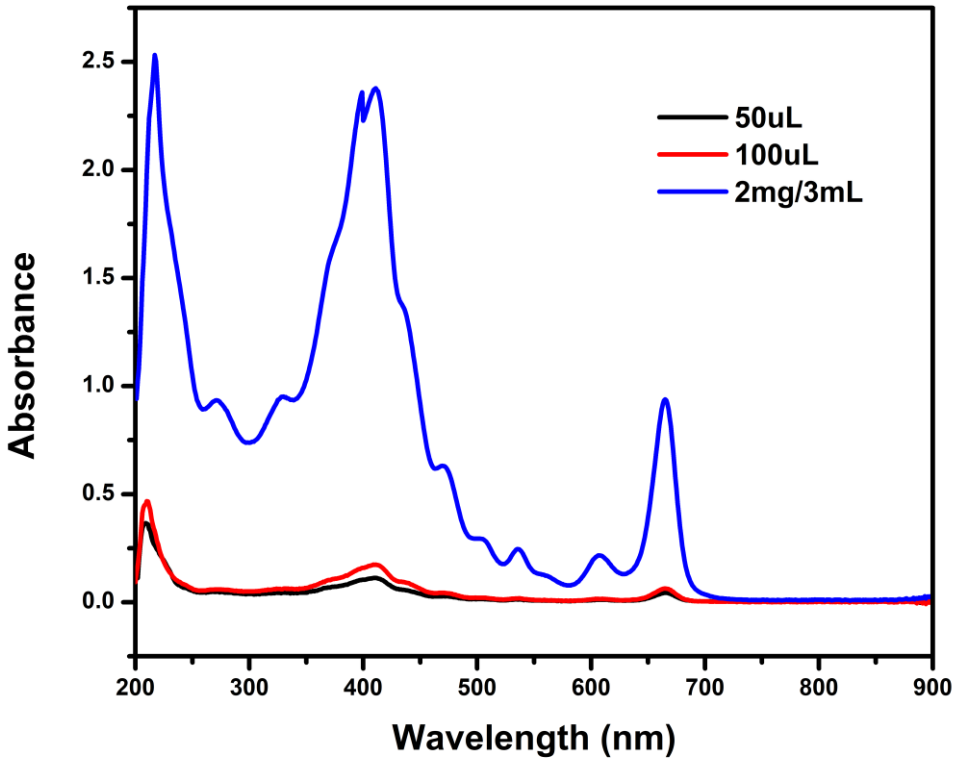

Fig 1: UV Spectra of Chloroform

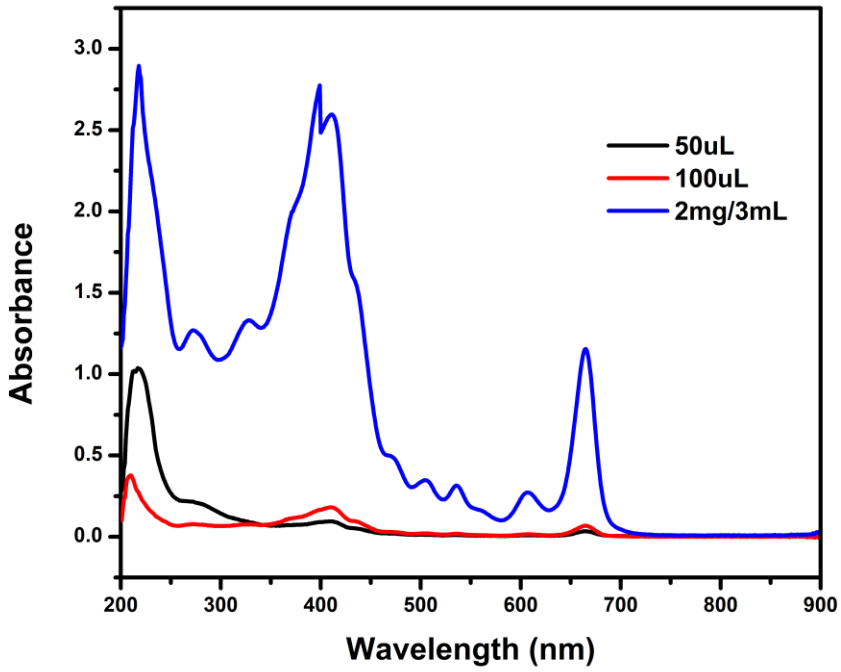

Fig 2: UV Spectra of Ethyl acetate

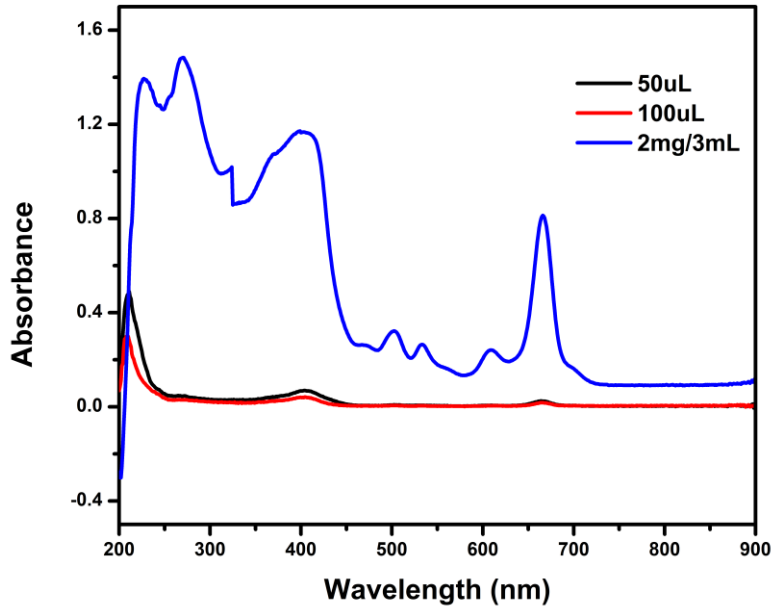

Fig 3: UV Spectra of Hexane

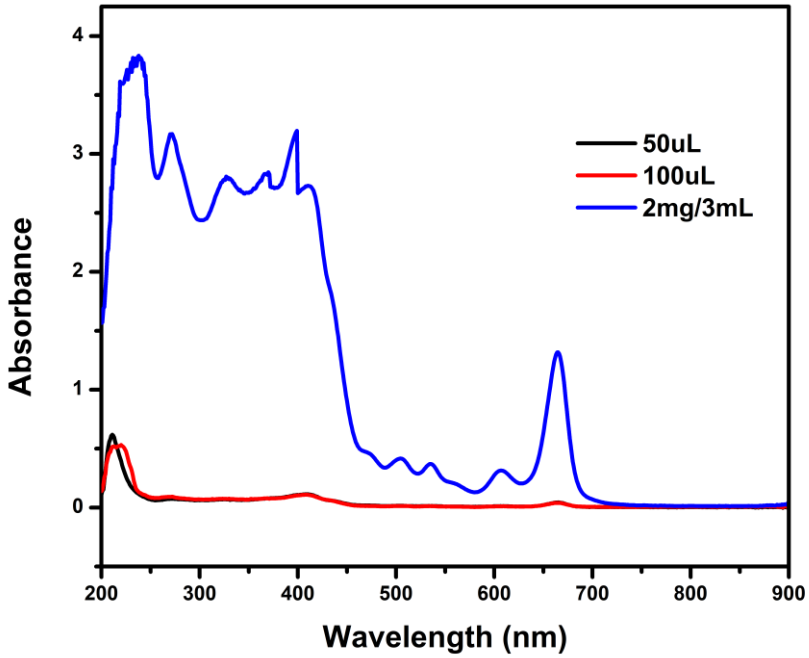

Fig 4: UV Spectra of Methanol

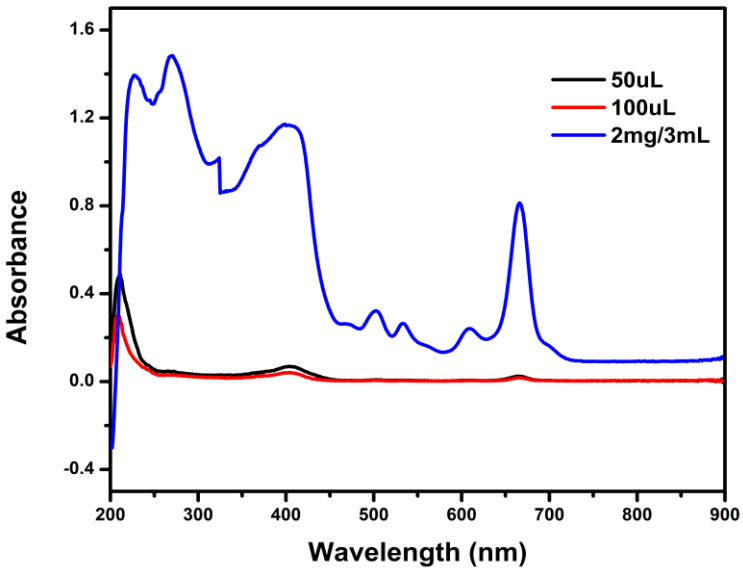

Fig 5: UV Spectra of Benzene

4. CONCLUSION

The spectral data for various concentrations of different plant extracts implies a strong correlation between concentration and intensity of absorption. Thus by generating library of spectral data of genuine raw samples, it would be possible to test quality control using UV-Vis spectrometer even without costly markers. Further studies are needed to come to conclusion that these data can be used in quality control of herbal drug *Grewia tilifolia vahl* which is having the more importance in ayurvedic therapies as the spectral data shows this plant has many compounds of interest and can perform column chromatography for isolation of compounds and can be used as neutraceuticals as they are in higher concentrations known by comparing the peak intensities.

CONFLICT OF INTEREST STATEMENT

We declared that we have no conflict of interest.

5. ACKNOWLEDGEMENT

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REFERENCES

1. DEVI, D. R., & BATTU, G. R. (2019). Qualitative Phytochemical Screening and FTIR Spectroscopic Analysis of Grewia Tilifolia (Vahl) Leaf Extracts. *International Journal of Current Pharmaceutical Research*, *11*(4), 100–107. https://doi.org/10.22159/ijcpr.2019v11i4.34936
2. Dharmasoth Rama Devi, Ganga Rao Battu. (2019). Phytochemical and Pharmacological review of Grewia tiliaefolia Vahl. International Research journal of pharmacy,10(9),39-42.

3. Devi, D. R., Battu, G. R., Mekala, V. G. R., Vishala, C., Haritha, P., & Basavaiah, K. Hepatoprotective Effect Of *Grewia tiliaefolia* Vahl Extracts On Wistar Albino Rats. Nveo-Natural Volatiles & Essential Oils, 2021;16283-16297.

4. Dharmasoth Rama Devi. Investigation of Antitubercular activity using Almar blue dye, In vitro antioxidant activity of different extracts of *Grewia tiliaefolia* Vahl leaf. Natural Volatiles & Essential Oils ,2021;8(6):5572-5580

5. Dharmasoth Rama Devi, Ganga Rao Battu, K. Basavaiah. Quantitative Standardization of different extracts of *Grewia tliaefolia* Vahl leaf. Natural Volatiles & Essential Oils,2021;8(5):13339-133345

6. DR Devi, Battu GR, and Basavaiah K: Pharmacognostic studies of *Grewia tiliaefolia* Vahl. Int J Pharm Sci & Res 2022; 13(3): 1393-00. DOI: 10.13040/IJPSR.0975-8232.13(3).1393-00.DOI: 10.13040/IJPSR.0975-8232.13(3).1393-00.

7. Dharmasoth, R. D., B. Ganga Rao, S. Nageswara, and K. Basavaiah. "Investigation of Antibacterial Activity of Methanolic Extract and Isolation of Sterol and Triterpenoids from *Grewia Tiliaefolia* Vahl Leaf". *International Journal Of Pharmacy And Pharmaceutical Sciences*, 2022, Vol. 14, No. 4, 34-43, Doi:10.22159/Ijpps.2022v14i4.44105.

8. Sridhar C, Subburaju GV, Venkateshwaralu Y, Venugopal RT. New acylated iridoid glycosides from *Vitex altissima*. Journal of Natural Products 2004; 67:2012-2016.

9. Ibrahim M, Hameed AJ, Jalbout A. Molecular Spectroscopic Study of River Nile Sediment in the Greater Cairo Region. Applied Spectroscopy 2008; 62(3):306-311.

10. Udaya Prakash NK, Selvi CR, Sasikala V, Dhanalakshmi S, Bhuvaneswari S. Phytochemistry and bio-efficacy of a weed, *Dodonaea viscosa*, International Journal of Pharmacy Pharmaceutical Sciences. 2012; 4: 509-512.

11. Anonymous. Manual of Shimadzu UV 1800 Double beam UV Vis Spectrophotometer. Shimadzu.

12. Devi SA, Ganjewala D. Antimicrobial activity of *Acorus Calamus* (L.) rhizome and leaf extract. *Acta Biologica Szegediensis*. 2009; 53(1): 45-49.