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Short Communication

Natural Indicator as a substitute to Synthetic indicator-A Developmental Approach

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ABSTRACT

Synthetic indicators had perpetually been an alternative choice for all types of titration since long time. However price had always been a tangle. Therefore development of an indicator from natural source i.e. from the flower extracts had been the main aim of this present research work. The current work complies data regarding the comparison of Natural indicator and synthetic indicator and whether or not it may be substituted from Synthetic indicator.

INTRODUCTION

Impatiens balsamina, family Balsaminaceae is commonly known as Garden or Annual balsam (Warren 1998). It is native of India, grown also in South-East Asia and Africa. The plant is about 8 dm tall, leaves are oblanceolate and serrate; flowers occur as single or as paired and are of several colours i.e. purple, white (Rhoads et al 2007) etc. The plant grows best in rich, moist and well-drained soil (Halpin 2004). This plant is reported to prepare red dye and also used as a substitute to henna due to the presence of lawsone and derivatives, anthocyans and also flavonoids (Jansen, 2005).

MATERIALS AND METHODS

Plant materials

Fresh flowers of *Impatiens balsamina* was collected from Natun Pally, Benachity of Durgapur, West Bengal, India and authentified at Botanical Survey of India, Central National Herbarium, Botanical Garden, Howrah with a Specimen No. CP-503.

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Reagents

The study was performed using Analytical grade reagents and the whole experimental work was carried out using the same set of glassware's.

Preparation of flower extract

Adequate amount of the fresh petals of *Impatiens balsamina* was collected, cleaned followed bymaceration with sufficient alcohol for 48 hrs.

Methods

Flowers were cleaned and cut into small pieces and macerated in alcohol for 48 hrs. After sufficient time interval filtrate was collected and the resulted extract was used as natural indicator in various titrations. The extract was then preserved in light closed container and protected from direct sunlight for future use. Titrant of 10 ml with 2 to 3 drops of indicator of both Natural and Standard indicator (Phenolphthalein, Methyl Orange, Methyl red) was titrated against strong acid-strong base, strong acid-weak base, weak acid-strong base, weak acid–weak base (Watson, 1999). The results are depicted in the Table I, II, III, and IV. Each titration was repeated for 3 times by using strengths of 0.1(N), 0.5(N), 1.0(N) of acids and alkalis respectively. The results were recorded as mean ± SD.

Table I: Titration of HCl with NaOH **.**

Titration	Strength (N)	Indicator	Mean ± S.D.	Color change
HCl/ NaOH	0.1	Phenolphthalein	4.33 ± 0.288	Colourless to pink
	0.5		6.10 ± 1.10	
	1.0		4.10 ± 0.10	
	0.1	Methyl Red	5.167 ± 0.288	Pinkish red to yellow
	0.5		4.533 ± 0.152	
	1.0		4.133 ± 0.152	
	0.1	Methyl Orange	4.90 ± 0.10	Reddish orange to yellowish brown
	0.5		5.967 ± 0.208	
	1.0		3.7 ± 0.10	
	0.1	Flower Indicator	4.833 ± 0.577	Light blue to yellow
	0.5		6.60 ± 0.264	
	1.0		4.033 ± 0.057	

Table II: Titration of CH_3COOH with NaOH.

Titration	Strength (N)	Indicator	Mean ± S.D.	Color change
CH_3COOH/ NaOH	0.1	Phenolphthalein	16.03 ± 0.115	Color-less to pink
	0.5		15.67 ± 0.208	
	1.0		15.83 ± 0.057	
	0.1	Methyl Red	15.20 ± 0.10	Pinkish red to yellow
	0.5		15.33 ± 0.305	
	1.0		15.97 ± 0.057	
	0.1	Methyl Orange	15.80 ± 0.20	Reddis h pink to yellow
	0.5		16.10 ± 0.20	
	1.0		15.87 ± 0.152	
	0.1	Flower Indicator	16.07 ± 0.115	Light blue to yellow
	0.5		16.43 ± 0.115	
	1.0		15.73 ± 0.115	

Table III: Titration of HCl with NH_4OH .

Titration	Strength(N)	Indicator	Mean ± S.D.	Color change
HCl/ NH_4OH	0.1	Phenolphthalein	15.13 ± 0.208	Colourless to pink
	0.5		15.60 ± 0.10	
	1.0		15.83 ± 0.057	
	0.1	Methyl Red	15.77 ± 0.208	Pinkish red to yellow
	0.5		15.33 ± 0.305	
	1.0		15.80 ± 0.10	
	0.1	Methyl Orange	15.77 ± 0.057	Pink to yellow
	0.5		16.10 ± 0.20	
	1.0		15.43 ± 0.208	
	0.1	Flower Indicator	15.37 ± 0.115	Light blue to yellow
	0.5		15.27 ± 0.152	
	1.0		15.47± 0.115	

Table IV: Titration of CH_3COOH with NH_4OH.

Titration	Strength (N)	Indicator	Mean ± S.D.	Color change
CH_3COOH/NH_4OH	0.1	Phenolphthalein	3.56 ± 0.057	Colourl ess to pink
	0.5		2.86 ± 0.152	
	1.0		3.0 ± 0.10	
	0.1	Methyl Red	4.30 ± 0.10	Reddish orange to yellow
	0.5		3.40 ± 0.10	
	1.0		3.467 ± 0.115	
	0.1	Methyl Orange	4.23 ± 0.057	Orange to yellow
	0.5		3.43 ± 0.057	
	1.0		5.63 ± 0.152	
	0.1	Indicator (Violet)	4.367 ± 0.152	Light blue to yellow
	0.5		3.167 ± 0.0577	
	1.0		2.933 ± 0.0577	

Extraction of Anthocyanins

Extraction of Anthocyanin was done by taking small amount of fresh petals and crushing it with an adequate amount of Methanol containing 1% conc. HCl. The extract was then concentrated until the volume had reduced to one fifth of the original volume. Chromatographic procedure was performed by using solvent system: n-butanol: Acetic acid: Water (Harborne 2005) and the R_f value was calculated.

RESULTS AND DISCUSSION

The flower extract used as indicator were screened for its use in acid base titration and the results were compared with the results obtained by standard indicators such as Phenolphthalein, Methyl orange, Methyl red. The end point of the titrations using the natural indicator either coincided or reached near the equivalence point using the standard indicators.The standard deviation calculated for synthetic indicator and floral extract of natural indicator showed very less variation within the results. So statistically also the utilization of natural indicator in acid base titration may be concluded. Because the floral extract offer similar results thus floral extract can be used with reliability and accuracy for acid base titration. Literature survey also revealed that similar works carried out on the flowers of *Rosa indica*and *Hibiscus rosa-sinensis (*Bhagat 2008)*; Ipomoeabiloba*(Abbas 2012); *Dahlia pinnata* (Sahu2013) also suggested that flower extract could be an alternative.So the utilization of natural indicator in acid base titration is more beneficial because of its economy, easy to prepare, simplicity, availability and correct results. The R_f value of the TLC system of Anthocyanin was found to be 0.75.

CONCLUSION

The results obtained in all types of acid base titrations lead us to conclude that the presence of Anthocyanin(Aras 2007) may be the result for the sharp color changes which had occurred at end point of titrations

Thus the study helped to interpret that the flower pigment of *Impatiens balsamina* could be efficaciously used as an alternative to the presently existing indicators as a consequence of the factors like easy preparation, sensible performance and correct and definite results.

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REFERENCES

Warren W (1998) Tropical Flowers. Periplus Editions (HK) Ltd., Singapore, pp 13.

Rhoads AF, Block TA (2007) The Plants of Pennsylvania: An Illustrated Manual. University of Pennsylvania Press,2nd Edition,pp 720.

Halpin AM (2004) The Window Box Gardening Book: An Inspirational and practical guide. Rockport Publishers Inc., Singapore, pp92.

Jansen PCM, Cardon D (2005) Dyes and Tannins. Plant Resources of Tropical Africa 3. PROTA Foundation/ Backhugs Publishers / CTA, Wageningen, Nethetlands, pp87.

Watson DG (1999) Pharmaceutical Analysis: A Textbook for Pharmacy students and Pharmaceutical Chemists. Churchill Livingstone. Harcourt Publishers Limited. UK, pp51-52.

Harborne JB (2005) Phytochemical Methods, A Guide to modern Techniques of Plant Analysis. Springer Private Limited, New Delhi, 3rd Edition,pp 70-71.

Aras A, Cevahir G, Yentur S, Eryilmaz F, Sarsag M, Cag S,Investigation of Anthocyanin localization in various parts of *Impatiens balsamina* L. Biotechnol. & Biotechnol.EQ. 21/2007/1, 69-73.

Bhagat VC, Patil RD, Channekar P R, Shetty S C, Akarte AS. Herbal indicators as a substituent to synthetic indicators. Int. J Green Pharm 2008;2:162-163.

Abbas SK. Study of acid-base indicator property of flowers of *Ipomoea biloba*. International Current Pharmaceutical Journal; 2012; 1: 420-422.

Sahu A, Sharma P,Jain AP. *Dahlia pinnata* Flower Extract: A NaturalIndicator for Acid Base Titration. Inventi Rapid: Pharm Analysis & Quality Assurance; 2013: 2: 1-2.

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