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Flower Extract of Ixora Coccinea as A Natural Indicator in Acid Base Titration

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Abstract: ***Ixora coccinea Linn may be a species of the genus Ixora, that belongs to the Rubiaceae. The present study indicates the utilization of Ixora coccinea flower extract as an acid base indicator in several sorts of acid base titrations. The equivalence point that was obtained by the flower extract was found to be coincident with the equivalence point obtained by standard indicators. The results obtained by the flower extract matched with the result obtained by standard indicator just in case of weak acid and weak base titration. This natural indicator was found to be a really useful, economical, simple and accurate for the said titration.***

I. INTRODUCTION

Ixora coccinea (also referred to as jungle geranium, flame of the woods or jungle flame or pendkuli) may be a species of angiosperm within the Rubiaceae . it's a standard shrub native to Southern India, Bangladesh, and Sri Lanka . Ixora Coccinnea may be a dense, multi-branched evergreen shrub, commonly 4–6 ft (1.2–1.8 m) tall , but capable of reaching a selection which will exceed its height. The leaves are seen to be glossy,leathery and have an oblong shape .These leaves are about 4 in (10 cm) long, with entire margins, and are carried in opposite pairs or whorled on the stems. Small tubular, scarlet flowers in dense rounded clusters 2–5 in (5.1–12.7 cm) across are produced most year long.The flowers of Ixora coccinea Linn are orange. the looks of orange color is thanks to presence of flavonoids and anthocyanins

The biological activities of plant were extensively reviewed.Some o them were found to possess antioxidant , anti-inflammatory, cytotoxic and antitumor ,antinociceptive activities.

As flavonoids, anthocyanins are present in flowers of Ixora coccinea Linn.These flowers were found to be PH sensitive.By this we will assume that the flower extract might be utilised as an indicator for various sorts of acid base titrations.Hence the flavonoids were extracted to place them for his or her potential use as an acid base indicator in many acid base titrations.

II. MATERIAL AND METHODS

Analytical grade reagents were made available by Shivajirao.S.Jondhale college of Engineering.Reagents and volumetric solutions were prepared as per standard information.The Flowers and Leaves of Ixora coccinea were collected from the hilly region of panvel within the month of february 2022.The plant was also authenticated at the Department of Botany.

The fresh petals of the flower Ixora Coccinea were dig small pieces.Then they were kept at temperature for a few time.The petals were dried, ground into fine powder with a mechanical blender.

The resulting powder with the assistance of methanolic acid .

Then the anthocyanins were converted into their corresponding soluble chlorides.A solution was obtained from this process.From this solution,the anthocyanins were isolated by using ether.Finally the obtained extract was then filtered and used as an indicator. The experimental work was administered by using an equivalent set of glasswares for all sort of titrations.As the same aliquots were used for both titrations i.e. titration by using standard indicators and flower extract.The equimolar titrations were performed using 10 ml of titrant with three drops of indicator.. a group of 5 experiments was administered and mean and variance were calculated from results.

III. RESULTS AND DISCUSSION

The flower extract was first screened for to be used as an acid base indicator in various acid base titrations.the results of this screening compared with the results obtained by standard indicators azo dye , mixed indicator [methyl orange: bromocresol green (0.1:0.2)] for strong acid v/s strong base (HCl and NaOH), Strong acid v/ s weak base (HCl and NH4 OH), weak acid v/s strong base (Oxalic acid and NaOH), and weak acid v/s weak base (Oxalic acid and NH4 OH) titrations were compared.All these parameters are listed in Table-1.

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Table. 1: Parameters Used For Analysis and the Comparison of Color Change.

Titrant	Titrate	Indicator Color Change	
		Standard (pH range)	Flower Extract (pH range)
HCl	NaOH	Yellow to Red (8.6-3.7)	Green to Pink (11 - 4.16)
HCl	NH_4OH	Yellow to Red (8.2-3.4)	Green to Pink (11 -4.50)
Oxalic acid	NaOH	Yellow to Red (8.7 -3.9)	Green to Pink (11-5.22)
Oxalic acid	NH_4OH	Blue-green to Orange (7.5-4 .4)	Blue to Pink (11-5.12)

HCl: Hydrochloric Acid, NaOH: Sodium Hydroxide, NH_4OH: Ammonium Hydroxide.

The equivalence point obtained by the flower extract matched with the equivalence point obtained by standard indicators for all the titrations.The screening results were listed in Table-2.

Table. 2: Screening Results of various titrations.

Sr.No	Titration (Titrant v/s Titrate)	Strength in Moles	Indicator	Readings with S.D. (±)
1	HCl V/S NaOH	0.1	Methyl orange	10.1±0.15
			Flower extract	10.18 ± 0.19
		0.5	Methyl orange	10.12 ± 0.13
			Flower extract	10.06±0.08
		1	Methyl orange	10.1 ± 0.07
			Flower extract	10.2 ± 0.10
2	NH_4OH V/S HCl	0.1	Methyl orange	5.08 ± 0.08
			Flower extract	5.14 ± 0.05
		0.5	Methyl orange	5.16 ± 0.11
			Flower extract	5.04± 0.08
		1	Methyl orange	5.14 ± 0.11
			Flower extract	5.08 ± 0.13
3	Oxalic Acid V/S NaOH	0.1	Methyl orange	10.3± 0.15
			Flower extract	10.06 ± 0.11
		0.5	Methyl orange	10.08± 0.19
			Flower extract	10.2 ± 0.14
		1	Methyl orange	10.18 ± 0.14
			Flower extract	10.12 ± 0.13
4	Oxalic Acid V/S NH_4OH	0.1	Mixed indicator	4.7 ± 0.15
			Flower extract	4.72 ± 0.08
		0.5	Mixed indicator	4.74 ± 0.11
			Flower extract	4.66± 0.11
		1	Mixed indicator	4.68 ± 0.14
			Flower extract	4.78 ± 0.10

HCl - Hydrochloric Acid, NaOH - Sodium Hydroxide, NH_4OH- Ammonium Hydroxide. S.D.- Standard Deviation.

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IV. CONCLUSION

The extract of the flower Ixora coccinea can alone serve the aim of an indicator in weak acid and base titrations. On the opposite hand generally the mixed indicators are employed. Another advantage of this titration is that it gives colorless end point at the equivalence point. If we add more amount of titrant (acid) it gives pink colored solution. It are often thus concluded that it had been thanks to the presence of flavonoids, sharp color change occurred at the top point of the titrations. Due to the economic value, the simplicity of the flower and therefore the easy availability of this flower we will say that it's advantageous to use Ixora coccinea flower extract as an indicator altogether sorts of acid base titrations.

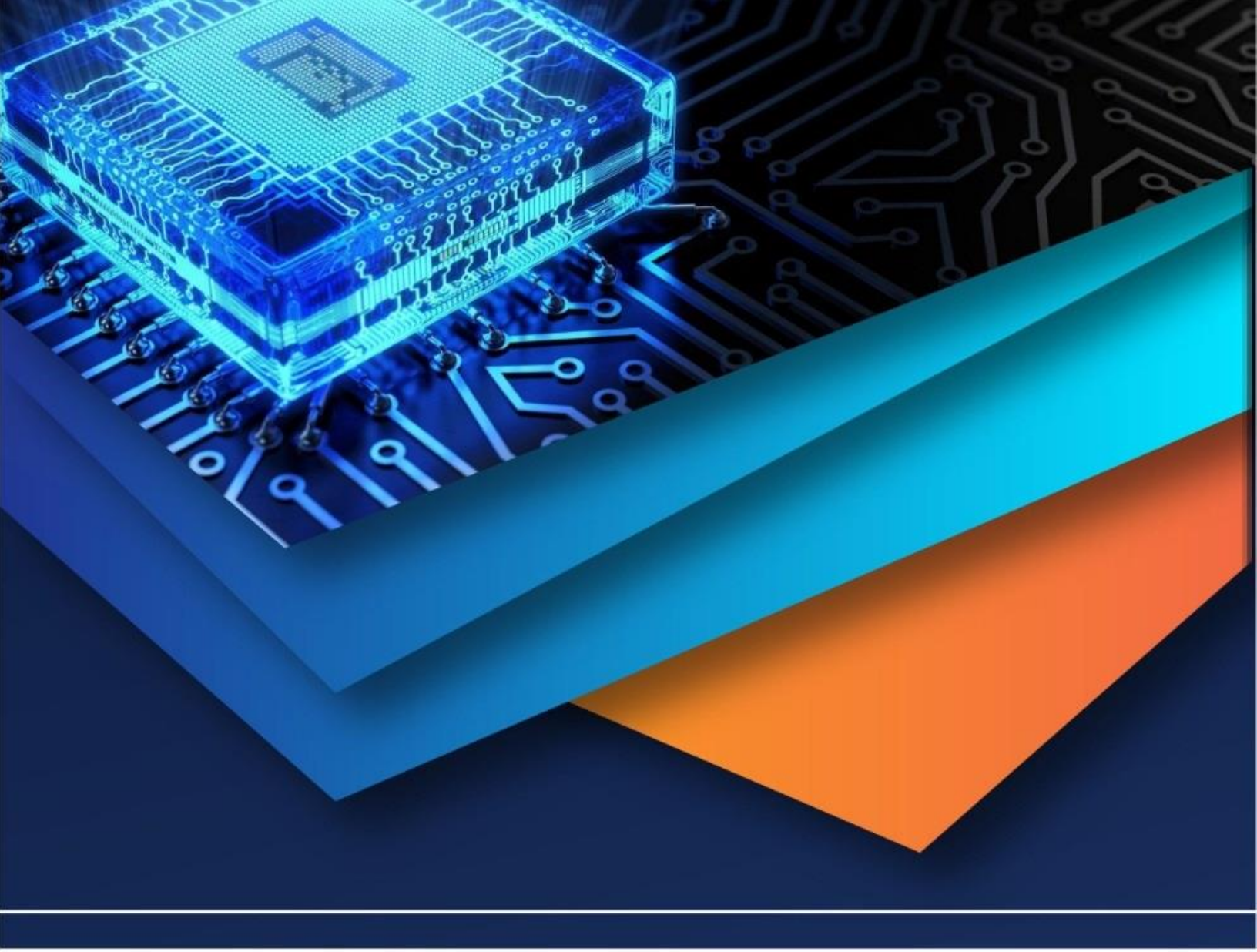
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