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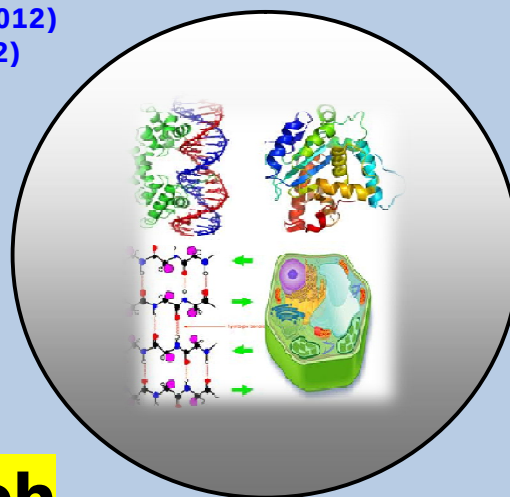
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RESEARCH PAPER

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**Isolation of Natural Acid Base Indicator from
Bougainvillea spectabilis [Wild] Flower Bracts.**

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ABSTRACT

Indicator change the color of solution with change in pH by adding acid or alkali. The present work acid base titration has been performed by using natural indicator.

*The ethanolic and aqueous extract of *Bougainvillea spectabilis* flowers bracts were used as a natural indicator. A comparative study of *Bougainvillea spectabilis* flowers bracts extracts as a natural indicator, with synthetic indicator viz. phenolphthalein and methyl orange, were carried out to evaluate the accuracy of *Bougainvillea S. flower*s bracts extract as an acid-base indicator. Their color properties are also observed in different pH regions. Water and ethanol extract contain a large number of color pigment which are too much sensitive towards different pH range. 0.1N strength of two acids (HCl and CH_3COOH) and two bases (NaOH and Na_2CO_3) were prepared and used for acid - base titration. The result obtained by natural indicator is almost similar to the results given by synthetic indicator using aqueous extract of *Bougainvillea spectabilis* flowers bracts as an indicator is more economical and with same accuracy of result as that given by synthetic indicators.*

Key Words: *Natural Indicator, Synthetic Indicator, Acid Base Titration, Ph and Eco friendly.*

INTRODUCTION

In spite of the numerous instrumental techniques currently available for the chemical analysis, conventional methods of analysis are still relevant and applicable such as gravimetric and titrimetry.

In titrimetry, the equivalence point is usually determined by the color change at the end point in the titration.

The end point is determined by using a chemical, which is added into analyte solution to show the color change immediately after the equivalence point has been attained, chemicals are referred as indicators, several types of indicators are available for different types of titrimetric analysis.

For acid-base titrations commonly used synthetic indicators are phenolphthalein, methyl red and phenol red etc. for different pH regions (Thomson et al. 1986). The purpose of this experiment is use of natural indicator in acid base titration and design a procedure to investigate their color change properties at different pH range between 1-12 and compare it with the synthetic indicators like phenolphthalein, methyl red and phenol (Gupta et al. 2012) (Singh M.P et al. 1982).

For this study *Bougainvillea spectabilis* wild [Family, Nyctaginaceae] flower bract were used, *Bougainvillea spectabilis* is popular for its long lasting, and appears periodically throughout the year (A. Umamaheshwari et al. 2008). It contains colorful bract like pink, red, orange, white, purple such a wide variety of color indicates presence of Anthocyanin. Anthocyanin is very sensitive pigments towards pH change (Sachin Kumar et al. 2011). The great Bougainvillea is popular with local Indian names like Booganbel, paper-flower plant & Boganbilas (N.P. Singh et al.).

MATERIAL AND METHODS

Identification, collection and method of extraction.

The *Bougainvillea spectabilis* flower bracts (white and pink) were collected during winter season for the purpose to study their natural indicator properties. The *Bougainvillea spectabilis* flower bract's were separated & cleaned by distilled water. Then these bracts were soaked in 50 ml water and 50 ml ethyl alcohol for 5 min. in two different beakers separately (Gupta et al. 2011).

After 5 min. ethyl alcohol beaker was kept in water bath at constant temperature 60°C for 5 to 10 minutes, while water beaker was kept in water bath at constant temperature 100 °C for 5 to 10 minutes. After 10 minutes the resulting solution was filtered and used as natural indicator in different acid base titration (Gupta et al. 2012).

Freshly prepared extract was used for titration. Analytical grade HCl, NaOH, CH₃ COOH & Na₂CO₃, phenolphthalein, methyl red, and phenol red chemicals were used (Finar L.L. et al. 1988). Reagent and volumetric solution were prepared as per standard. Digital pH meter were used to measure pH of different buffer solution, which are prepared as per standard. Flower extract was not calibrated. The titration was carried by using same set of glass ware. The experimental work was carried out in **ASC college Saikheda, Tal. Niphad, Dist. Nashik at the chemistry Department**

RESULTS AND DISCUSSION

In this experiment pH and color of two solvent, extract of pink and white flower bracts, two type of acids and two type of bases are used in titration are found out and are listed in table no.1.

The color changes of synthetic indicator in acidic and basic medium are reported in table no. 2.

The Bougainvillea S. Flower bract's was screened and used as an indicator in acid base titration the results were compared with the results obtained by standard indicators phenolphthalein, methyl red and phenol red. The results for strong acid strong base (H_2SO_4 & NaOH), strong acid- weak base (H_2SO_4 & Na_2CO_3), weak acid-strong base (CH_3COOH & NaOH) And weak acid-weak base (CH_3COOH & Na_2CO_3) are listed in table no.3.

The Strength of all acids and bases used was 0.1N\.. The titrant vs. titrand were HCl/NaOH, HCl/ Na_2CO_3 , CH_3COOH / NaOH and CH_3COOH / Na_2CO_3 . The experimental result show that for HCl vs NaOH the end point obtained by using aqueous. and ethanolic extract of flower bracts are comparable with end point obtained by using synthetic indicator like phenolphthalein, except the aqueous extract of the Bougainvillea S. flower white bracts. While the end point obtained for CH_3COOH vs NaOH titration are fairly comparable with ethanolic extrat of Bougainvillea S.flower.pink bracts and aqueous extract of Bougainvella S. flower. white bracts. For CH_3COOH / Na_2CO_3 titration only ethanolic extract of ethanolic extract of Bougainvillea S.flower.white bracts show comparable results. By using buffer solution the pH transition range of natural and synthetic indicator are listed in table no.4.

Table 1. pH and starting color of solvent and Bougainvella S.flower bracts extract:

Name of the solvent and chemicals which are used	pH	Color
H_2O	7.51	colorless
$\text{C}_2\text{H}_5\text{OH}$	7.01	colorless
0.1 N HCl	1.64	colorless
0.1 N NaOH	11.86	colorless
0.1 N CH_3COOH	3.30	colorless
0.1 N Na_2CO_3	10.26	colorless
Ethanolic extract of Bougainvillea S.flower.pink bracts.	5.57	Reddish brown
Aqueous extract of Bougainvillea S.flower.pink bracts	6.67	Dark red
Ethanolic extract of Bougainvella S.flower.white bracts.	6.04	Green
Aquoes extract of Bougainvella S.flower.white bracts	6.45	colorless

Table. 2 Color change natural and synthetic indicator in acidic and basic medium:

Synthtic indicator and natural indicator from flower bracts extract	Acidic medium	Basic medium
Phenolphthalein	Colorless	Pink
Methyl red	Red	Yellow
Phenol red	Yellow	Red
Ethanolic extract of Bougainvillea S.flower.pink bracts	colorless	Green
Aqueous extract of Bougainvillea S.flower.pink bracts	pink	Green
Ethanolic extract of Bougainvillea S.flower.white bracts	Faint green	Green
Aqueous extract of Bougainvillea S.flower.white bracts	colorless	Yellowish green

Table. 3 Titrations and there end point by using synthetic indicator and natural indicator from Bougainvillea flower bracts extract. (10.00 ml. of 0.1N acid titrated against 0.1N Base.)

Indicator	HCl /NaOH	HCl / Na ₂ CO ₃	CH ₃ COOH/ NaOH	CH ₃ COOH / Na ₂ CO ₃
pH	10.2	-	9.6	-
MR	-	12.5	-	-
PR	-	-	-	9.9
E.E.B.S.P.bracts	10.5	9.9	9.5	11
A.E.B.S.P.bracts	10.3	12.1	10.6	16.4
E.E.B.S.W.bracts	10.3	12.2	10.5	10.3
A.E.B.S.W.bracts	13.5	13.1	9.1	11

PH: phenolphthalein ,**MR:** Methyl red ,**PR:**Phenol red,

E.E.B.S.P bracts:: Ethanolic extract of Bougainvella spectabilis flower pink bracts,
A.E.B.S.P. bracts: : Aqueous extract of Bougainvella spectabilis flower pink bracts,
E.E.B.S.W.bracts: : Ethanolic extract of Bougainvella spectabilis flower white bracts,
A.E.B.S.W.bracts: : Aqueous extract of Bougainvella spectabilis flower white bracts.

Table 4. The pH transition range and color change of fresh extract of Bougainvillea S. flower bracts (White & pink) is given as follows.

Indicator/extract	pH in transition range	Color in acid solution	Color in basic solution
Phenolphthalein	8.3 -10	colorless	pink
Methyl red	4.2 -6.3	Red	yellow
Phenol red	6.8 -8.4	yellow	Red
E.E.B.S.P.F.bracts	9 - 11.5	Faint yellow	Green
A.E.B.S.P.F.bracts	9.5 -11.5	Pink	Green
E.E.B.S.F.W.bracts	8.5-10	Faint green	Dark green
A.E.B.S.F.W.bracts	8-10	colorless	Green

E.E.B.S.P.F.bracts: Ethanolic extract of Bougainvella spectabilis flower pink bracts,
A.E.B.S.P.F.bracts: Aqueous extract of Bougainvella spectabilis flower pink bracts.
E.E.B.S.W.F.bracts: Ethanolic extract of Bougainvella spectabilis flower white.
A.E.B.S.W.bracts: Aqueous extract of Bougainvella spectabilis flower white bracts.

CONCLUSION

The synthetic indicators are very hazardous to health and cause pollution therefore to solve this problem floral extract has been selected as a source of indicator for acid base titration. The accuracy of results has been judged by performing a variety of acid base titration. The results were obtained by ethanolic and aqueous extract of Bougainvillea spectabilis flower white and pink bracts match with standard indicator results. *Bougainvillea spectabilis* (Wild) are easily available everywhere so it is eco-friendly and economics to use as a natural indicator. Student also too much enjoy this work and realized the importance of natural resources.

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