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R E S E A E C H A R T I C L E

Extraction and Evaluation of Natural Indicator from Almond Exocarp

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A B S T R A C T

In neutralization titrations indicators are used to show sharp color change at intervals of pH. Natural pigments in plants are highly colored substances and may show color changes with changes in pH. The present study highlights the use of exocarp of *Prunus amygdalus* family Rosaceae as indicator in neutralization titrations. Titration shows sharp color change at the equivalence point which coincides with the synthetic indicator. The extract was analyzed to confirm the presence of Anthocyanins. Prominent absorption peak at 500-550nm in the visible region confirmed the presence of Anthocyanins.

Keywords: Neutralization titration, Natural indicators, Anthocyanins, *Prunus amygdalus*

A R T I C L E I N F O

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C O N T E N T S

1. Introduction

In neutralization titration the concentration of acid or base is determined by exactly neutralizing the acid or base with an acid or base of known concentration. Almond is the name of the edible and widely cultivated seed. The fruit of the almond is drupe, consisting of an outer hull and a hard shell with the seed. The almond is a deciduous tree, growing 4-10m in height, with a trunk of up to 30cm in diameter .The almond fruit measures 3.5-6cm.The outer covering exocarp is a thick, leathery, grey green coat, when unripe called the hull inside the hull is a hard woody shell called the endocarp. Hull becomes pink color during ripening stage. Exocarp is rich in Anthocyanins which are responsible for indicator activity.

2. Materials and Methods

Fresh fruits of Almond were procured from Teegala Krishna Reddy College of Pharmacy, Medicinal garden.

Reagents of analytical grade were used. Sodium hydroxide, Ammonia,
Hydrochloric acid, Acetic acid, Phenolphthalein and Methyl red were procured from SD Fine Chemicals.

3. Experimental Procedure [3-8]

Almond exocarp was peeled. The peeled exocarp was cleaned by distilled water. The exocarp is taken in a beaker and macerated with Methanol overnight. The original pH of the indicator, color of the indicators in acid and base are recorded. The chemical tests for Anthocyanins are performed for the extract. The extract was scanned in the visible region from 400-600 nm.

3.1 Test for Anthocyanins:

To 2ml of the Almond exocarp extract solution add 2ml of aqueous Sodium hydroxide then 4ml of Hydrochloric acid the colour was observed and recorded.

3.2 Determination of visible light absorption spectra for Almond exocarp extract: Almond exocarp extract was scanned in the range of 400-600 nm.

3.3 Titration experiment:

3.3.1 Titration of strong base against strong acid

To 10 ml of 0.1M Sodium hydroxide solution in a conical flask 2 drops of Phenolphthalein solution was added. The solution is titrated with 0.1M Hydrochloric Acid. The experiment was repeated thrice and the results are recorded. The experiment was repeated thrice using Almond exocarp extract in place of synthetic indicator.

3.3.2 Titration of weak base against strong acid

To 10 ml of 0.1M Ammonia solution in a conical flask 2 drops of Methyl red solution was added. The solution is titrated with 0.1M Hydrochloric Acid. The experiment was repeated thrice and the results are recorded. The experiment was repeated thrice using Almond exocarp extract in place of synthetic indicator.

3.3.3Titration of strong base against weak acid

To 10 ml of 0.1M Acetic acid solution in a conical flask 2 drops of Methyl red solution was added. The solution is titrated with 0.1M Sodium hydroxide. The experiment was repeated thrice and the results are recorded. The experiment was repeated thrice using Almond exocarp extract in place of synthetic indicator.

Table 1: P^H of the Indicator and Color Change of Almond extract

S.No	Parameters	Almond exocarp extract
1	pH	7.05
2	color of the indicator	Deep red colour
3	Color in acid	Pink
4	Color in base	Green

Table 2: Color Changes in Neutralization Titrations

Indicator	Titrant	Color	Titrate	Color
Almond exocarp extract	HCl	Pink	NaOH	Green
Almond exocarp extract	CH_3COOH	Pink	NaOH	Green
Almond exocarp extract	HCl	Pink	NH3	Green

Table 3: Comparisons with Synthetic Indicator

Titrant	Titrate	Standard indicator	Almond Exocarp Extract
HCl	NaOH	7.7±0.2	7.4±0.1
CH3COOH	NaOH	9.7±0.35	9.5±0.3
HCl	NH3	8.1± 0.1	8.1±0.1

3. Results and Discussion

The color of natural indicators, P^H, color changes in acid and base are indicated in Table no 1 figure 1&2. The extract was scanned in the visible region from 400-600 nm. The spectra was given in figure.3 .The color changes obtained in neutralization titrations with different Titrants and titrates of 0.1M are given in Table no-2. The titer values in comparison with synthetic indicator are given in Table no-3. For all types of titrations, equivalence point obtained by the Methanolic extract of Almond exocarp extract are very close with equivalence point obtained by standard indicator .This represents the usefulness of the extract as an indicator in acid-base titrations. The use of Almond exocarp extract in strong acid- strong base and weak acid – strong base titrations was found to be more significant as it gives sharp color change at equivalence point.

Figure 1: Almond Exocarp Extract

Figure 2: Extract in acidic and basic media

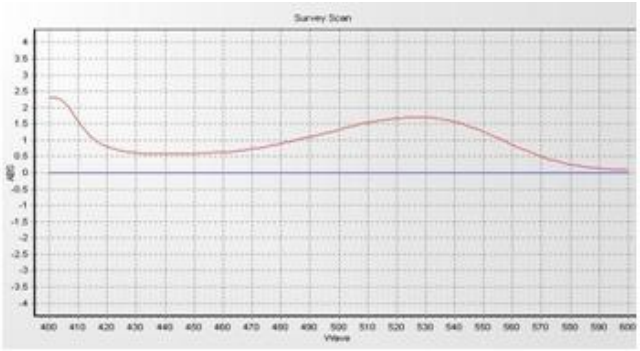

Figure 3: Visible Spectra of Almond Extract

4. Conclusion

In this study natural indicator is prepared from Almond exocarp extract by simple procedure and the analytical applications were recorded. The presences of coloring pigments anthocyanins in almond exocarp extract are responsible for the indicator action. The results obtained prove that the routinely used indicators can be replaced successfully by almond exocarp extract as it is simple, accurate and economical.

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