WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 17, 610-617. Research Article ISSN 2277–7105

# EXTRACT AND EVALUATION OF GLEBIONIS CORONARIA: A NATURAL INDICATOR FOR ACID-BASE TITRATION

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Article Received on
12 July 2024,

Revised on 02 August 2024,
Accepted on 22 August 2024

DOI: 10.20959/wjpr202417-33686

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## ABSTRACT

The genus *Glebionis*, which belongs to the *Asteraceae* family, has about 600 species, and they are found all over the world. The current study focuses on the extraction and assessment of an acid-base indicator from a *Glebionis coronaria* species that is environmentally beneficial and native to the area. In the current investigation, acid-base titrations of four distinct types—strong acid against a strong base, strong acid against a weak base, weak acid against a strong base, and weak acid against a weak base—were conducted. Two bases (NaOH and NH4OH) and two acids (HCl and CH3COOH) were chosen for the acid-base titration. These bases and acids were utilized at a concentration of 0.1N. Natural indicators are promising when compared to commercially available synthetic acid-base indicators like methyl orange and phenolphthalein because they exhibit a sharp and dramatic colour change near the neutralizing point. It has also been found that using *Glebionis coronaria* flower extract as an indicator in various acid-base titrations is beneficial because of its low cost, environmental friendliness, availability, simplicity in preparation, lack of carcinogenicity, accuracy, and accuracy of results.

**KEYWORDS:** *Glebionis coronaria*, Ethanolic flower extract, Acid Base titration, Natural Indicator, Natural pigments.

## INTRODUCTION

*Glebionis coronaria*, also known as Chrysanthemum coronarium and belonging to the *Asteraceae* family, is a highly valued plant with uses in the culinary, medicinal, and

decorative fields. It is commonly referred to by several names such as garland chrysanthemum and crown daisy.[1] Across the globe, there are numerous plant species, with their distribution spanning various regions. Certain plants have been recognized for their therapeutic properties. These medicinal herbs are extensively utilized in numerous underdeveloped countries as a component of primary healthcare. They are commonly employed by people suffering from chronic ailments such as malignancies, liver illnesses, and asthma. These facts pertain to the bioactive chemicals present in medicinal plants and their accessibility to the local region.[2] According to the World Health Organization (2002), some 20,000 distinct plant species have been utilized medicinally in numerous nations. These therapeutic herbs are frequently made into a variety of dosage forms, including ointments, pills, tablets, powders, and infusions.[3]

**Fig. 1: Photograph of the selective plants i.e., *Glebionis coronaria.***

We also discover that Malta may be the area of origin based on references. The Greek words "chrysos," which means gold, and "anthemon," which means flower, are combined to form the species' name: gold flower.[4] Blood in the stool, or hemoptysis, can be treated with Glebionis coronaria. It also has a preventative impact on the development of lung cancer.[5] Owing to a multitude of its beneficial qualities, including its antimicrobial, antifungal, antioxidant, and immunomodulatory actions, this medicinal plant has been utilized for many years.[6]

## MATERIALS AND METHODS

### Plant material

Flowers petals of *Glebionis coronaria* were collected from Garden of Shri Ram Murti Smarak College of Engineering and Technology, Bareilly (U.P.). The plant material was identified and authenticated by Dr. Alok Srivastava, Associate professor Department of Plant Science/ Botany, M.J.P. Rohilkhand University, Bareilly U.P. (Ref. No.

GC/PS/Recognition/08, dated-17.05.2024). For future use, the Department received a voucher specimen of the plant sample that was gathered.

**Chemicals and Reagents**

We got our supplies from Central Drug House in New Delhi, India. We bought ethanol, sodium hydroxide, ammonium hydroxide, acetic acid, and hydrochloric acid. Analytical grade reagents were employed in the investigation, and the same set of glassware used for the extraction and titration process was used throughout the whole experimental process.

**Preparation of flower extract**

The flowers petals (*Glebionis coronaria*) were thoroughly washed with distilled water, cut in small pieces and crushing with the help of mortar-pestle and dissolved in 100 ml of ethanol and macerated for 24 hours and then extract was filtered. The extract was preserved in tightly closed container and stored away from direct sun light.

**Preparation of solutions**

0.1N HCl, 0.1N NaOH, 0.1N NH4OH and 0.1N $CH_3COOH$ solution were prepared according to Indian Pharmacopoeia (7). Phenolphthalein and methyl orange indicator were also prepared according to Indian Pharmacopoeia.

**Experimental procedure**

By using several chemical tests, a qualitative phyto-chemical examination of the floral extract of *Glebionis coronaria* was carried out. A strong acid (HCI) was used in the acid-base titrations against a strong base (NaOH), a weak base (NH4OH), a strong acid (HCI) against a weak base (NaOH), and a weak acid (CH3COOH) against a weak base (NH4OH). Before usage, every piece of equipment and tool needed for the current study endeavour was calibrated.

Before use, every piece of equipment and tool needed for the current research endeavour was calibrated.[8]

In order to conduct the titrations, 10 ml of the acid were placed in a conical flask, and the base were filled in a burette. Two drops of phenolphthalein and methyl orange indicators were used as indicators, and 1 ml of the extracted *Glebionis coronaria* natural indicator transfer was added to the conical flask before the titration. Four sets of the acid-base titration were carried out for each titration using the three sets of indicators: phenolphthalein, methyl

orange, and extract from *Glebionis coronaria*, an environmentally friendly acid-base indicator. Each's average volume was computed and displayed.[9]

## RESULT AND DISCUSSION

**Table 1: Qualitative phyto-chemical analysis of flower extract.**

| S. No. | Test | Ranunculus asiaticus |
|---|---|---|
| 1. | Flavonoid | ++ |
| 2. | Tannin | ++ |
| 3. | Terpenoid | ++ |
| 4. | Alkaloid | ++ |
| a) | Mayer' reagent | + |
| b) | Dragondorff's reagent | + |
| c) | Wagner's reagent | + |
| 5. | Phenolic compound | + |
| 6. | Lignin | ++ |
| 7. | Steroid | + |

**(++) Present (+) slightly present (-) absent**

The colours of the indicators in the acidic and basic media, as well as their colour at the end point, were provided in Table 2, which displayed contrast colour and was extremely simple to visualize.

**Table 2: Colour of indicators in solutions.**

| S. No. | Indicator | Colour of Indicator | Colour of Indicator acidic media | Colour of Indicator in basic media | Colour of Indicator at end point |
|---|---|---|---|---|---|
| 1. | *Glebionis coronaria* | Light Yellow | Colourless | Yellow | Golden |
| 2. | Phenolphthalein | Colourless | Colourless | Pink | Pink |
| 3. | Methyl Orange | Orange | Red | Yellow | Yellow |

**Fig. 2: Colour before end point (Colourless) *Glebionis coronaria.***

**Fig. 3: Colour at end point (Golden) *Glebionis coronaria.***

**Fig. 2 and Fig. 3: Represented the color of natural indicator before end Point and at end point respectively.**

In strong acid (HCI) against strong base (NaOH) Table.3 represented that natural flower extract with average volume of 9.3, base competes with methyl orange and Phenolphthalein with average volume of 11.5 ml and 12.0 ml respectively.

**Table 3: Titration results for strong acid (HCI) against strong base (NaOH).**

| Titration | Titre value | | |
|---|---|---|---|
| | ***Glebionis coronaria*** | **Methyl Orange** | **Phenolphthalein** |
| 1st | 9.3 | 11.4 | 12.2 |
| 2nd | 9.4 | 11.6 | 11.9 |
| 3rd | 9.3 | 11.5 | 12.0 |
| Average Vol. (ml) | 9.3 | 11.5 | 12.0 |

The results were supported by pH graph between strong acid and strong base in Fig.4

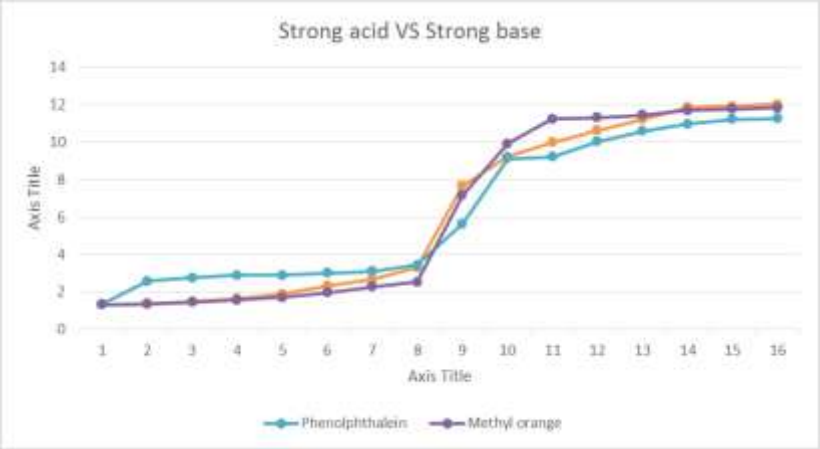


**Fig. 4: Titration curve between 0.1N HCl and 0.1N NaOH of *Glebionis coronaria*, Phenolphthalein and methyl orange.**

In **weak acid (CH3COOH) and strong base (NaOH)** Table.4 represented that natural flower extract with average volume of 11.9, base competes with methyl orange and Phenolphthalein with average volume of 11.5 ml and 12.0 ml respectively.

**Table 4: Titration results for weak acid (CH3COOH) and strong base (NaOH).**

| Titration | Titre value | | |
|---|---|---|---|
| | ***Glebionis coronaria*** | **Methyl Orange** | **Phenolphthalein** |
| 1st | 12.1 | 11.4 | 12.2 |
| 2nd | 11.9 | 11.6 | 11.9 |
| 3rd | 12.1 | 11.5 | 12.0 |
| Average Vol. (ml) | 11.9 | 11.5 | 12.0 |

The results were supported by pH graph between strong acid and strong base in Fig.5.

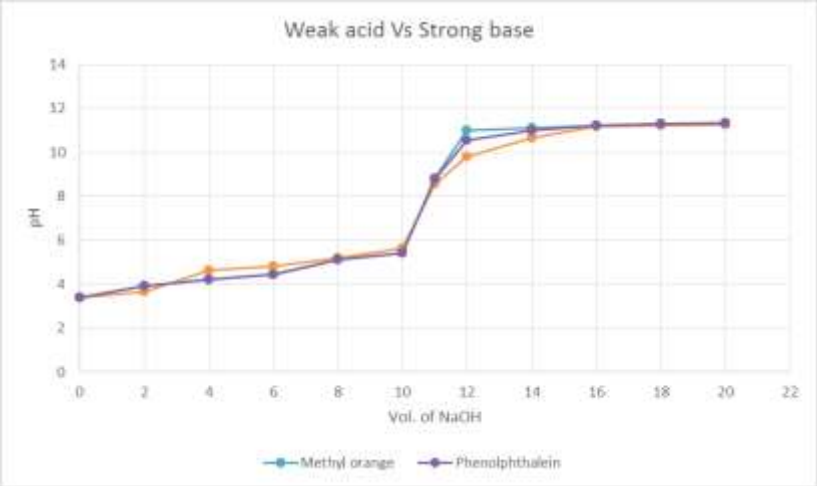


**Fig. 5: Titration curve between (CH3COOH) and (NaOH) of *Glebionis coronaria*, methyl orange and Phenolphthalein.**

The results of titration of weak base against strong acid as showed in table 5, that natural flower extract with average volume of 6.3, base competes with methyl orange with average volume of 6.4 ml.

| Titration | Titre value | |
|---|---|---|
| | ***Glebionis coronaria*** | **Methyl Orange** |
| 1st | 6.1 | 6.4 |
| 2nd | 6.3 | 6.5 |
| 3rd | 6.3 | 6.4 |
| Average Vol. (ml) | 6.3 | 6.4 |

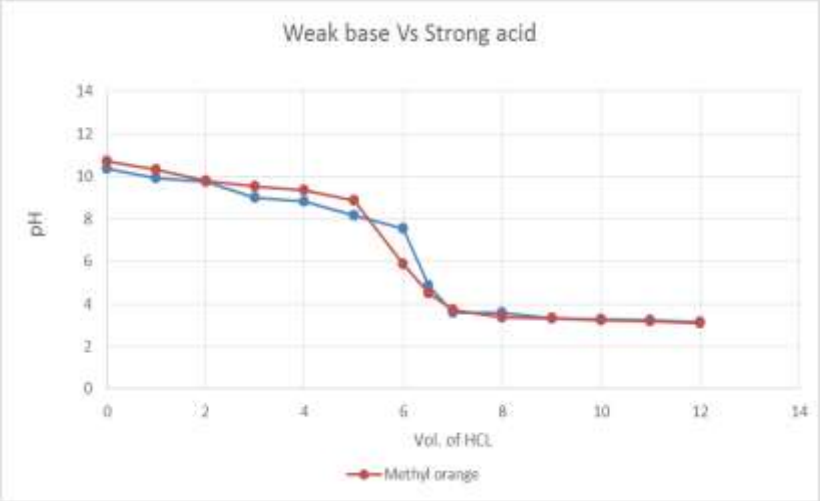


**Fig. 6: Titration curve between 0.1N NH4OH and 0.1N HCl of *Glebionis coronaria* and methyl orange.**

## CONCLUSION

The current study makes the recommendation that natural indicators be used to reduce user toxicity and environmental damage. By carrying out several acid-base titrations and plotting their pH graphs, the accuracy of the data has been assessed. According to the findings, eco-friendly natural floral extract made from *Glebionis coronaria* may be a quick and easy replacement for phenolphthalein and methyl orange. The results obtained sharp end point in [strong acid (HCI) against strong base (NaOH), weak acid (CH3COOH) and strong base (NaOH) and weak base (NH4OH) against strong acid (HCI)] acid base titrations and Do not give sharp end point in weak acid (CH3COOH) and weak base(NH4OH) titrations. Chemical and spectrophotometric analyses were performed to determine if anthocyanins and flavonoids were present in the plant extract as active ingredients. The authors came to the conclusion that because they are more readily available, less expensive, easier to use, and less harmful to the environment than synthetic indicators, natural acid-base indicators made from pure and acidified ethanol extracts of *Glebionis coronaria* flowers might be a good alternative.

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