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Environmental-Friendly Herbal Indicators as a Substituent to Synthetic Indicators

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ABSTRACT:

In acid – base titrations indicators are used to show sharp colour change at intervals of pH. Natural pigments in plants are highly coloured substances which show colour changes with variation of pH. Due to certain disadvantages of synthetic indicators such as chemical pollution, availability problems and high cost an effort has been made to analyse the indicator activity of different extract of flower pigments. Natural pigments in plants are highly coloured substances and may show colour change with variation of pH. Many flowers, fruits and vegetables contain chemical substances called anthocyanins which are pigments that react in a different way to acids and bases that change colour in solutions of different pH values. Pisum sativum from family Fabaceae, Catharanthus roseus from Apocyanaceae, Euphorbia ligularia from Euphorbiaceae, Antirrhinum majus from Scrophular, Dianthus Plumaris from Caryophyllaceae, Punica granatum from Punicaceae, Euphorbia varigata from Fabaceae, Euphorbia mili from Euphorbiaceae, Nelumbo nucifera from Nelumbonaceae, Erythrina varigata from Fabaceae, Nerium odoratu from Apocynaceae, Rosa indica from rosaceae, Ipomoea biloba from Convolvulaceae give sharp and intense colour change. Herbal indicators are evaluated by using strong acid-strong base, strong acid –weak base and weak acid-strong base, weak acid-weak base. In all these titrations the extract was found to be accurate and useful for indicating equivalence point (neutralization point).

KEY WORDS: Herbal indicators, Extraction, Titrations, Acids and Bases, End point.

INTRODUCTION

At particular interval of pH, indicators show sharp colour changes. Natural pigments in plants are highly coloured substances which show colour change at different pH Indicator is a substance in an acid or a base. Many flowers, fruits and vegetables contain chemical substances called anthocyanin's which are pigments that react in a different way to acids and bases that change colour in solutions of different pH values. All pH indicators change colours depending on whether they donate or accept protons, (acids are proton donors and bases are proton acceptors). Therefore, pH indicators are themselves acids or bases. [2]

Sr. No.	HERBAL DRUGS	
1	BOTANICAL NAME: <i>Pisum sativum</i> ⁽³⁾ COMMON NAME: garden or field pea FAMILY: Fabaceae PART USE: Flowers	
2	BOTANICAL NAME : <i>Catharanthus roseus</i> COMMON NAME: Madagascar periwinkle rosy periwinkle FAMILY: Apocynaceae PART USE: Flower	
3	BOTANICAL NAME: <i>Euphorbia ligularia</i> COMMON NAME: Indian Spurge Tree FAMILY: Euphorbiaceae PART USE: Flower	
4	BOTANICALNAME: <i>Antirrhinum majus</i> ^[2,(4)] COMMON NAME: dog flower, snapdragon FAMILY: Scrophulariaceae PART USE: flower	
5	BOTANICAL NAME: <i>Dianthus plumaris</i> COMMON NAME: garden pink, wild pink FAMILY: Caryophyllaceae PART USE: flower	
6	BOTANICAL NAME: <i>Punica granatum</i> ⁽⁵⁾ COMMON NAME: pomegranate FAMILY: Punicaceae PART USE: flower	
7	BOTANICAL NAME: <i>Euphorbia mili</i> ⁽⁶⁾ COMMON NAME: crown of thorns, christ plant, and Christ thorn FAMILY: Euphorbiaceae PART USE: flower	

8	BOTANICAL NAME: <i>Nelumbo nucifera</i> ^[6] COMMON NAME: Indian lotus, simply lotus FAMILY: Nelumbonaceae PART USE: flower	
9	BOTANICAL NAME: <i>Erythrina variegata</i> ^[6,(7)] COMMON NAME: Indian coral tree, <i>Erythrina indica</i> FAMILY: Fabaceae PART USE: flower	
10	BOTANICAL NAME: <i>Nerium odoratu</i> ^[8] COMMON NAME: Nerium oleander Linnaeus FAMILY: Apocynaceae – Dogbane PART USE: petals	
11	BOTANICAL NAME: <i>Rosa indica</i> ^[9] COMMON NAME: Roses, Rosa. FAMILY: Rosaceae PART USE: petals	
12	BOTANICAL NAME: <i>Ipomoea biloba</i> ^[10, 11] COMMON NAME: Ipomoea maritime, <i>Ipomoea crassifolia</i> FAMILY: Convolvulaceae PART USE: fresh flowers	

MATERIAL AND METHODS

Plant materials

Fresh flowers of *Catharanthus roseus* (Apocynaceae), *Pisum sativum* (Fabaceae) and *Euphorbia ligularia* (Euphorbiaceae) were collected from the gardens of Pathanamthitta.

Dianthus plumarius and *Antirrhinum majus* were collected from the campus of M.M University Mullana, Ambala and authenticated from the NISCAIR, Delhi. The fresh flower and fruit of *Punica granatum* L. (Punicaceae) were

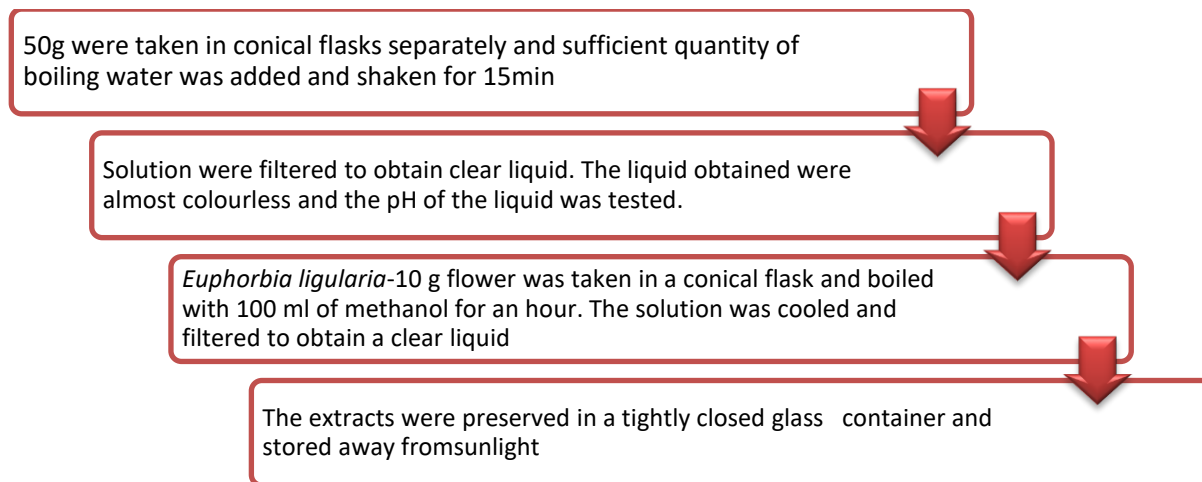
purchased from a local market and were authenticated by National Botanical Research Institute, Lucknow, collection of fresh flowers of *Ipomoea biloba* was done from the sea shores of Padne region of Kerala state, India. Then authenticated at Department of Botany, Centre of Environmental Studies, Kannur University, Kerala.

Reagents

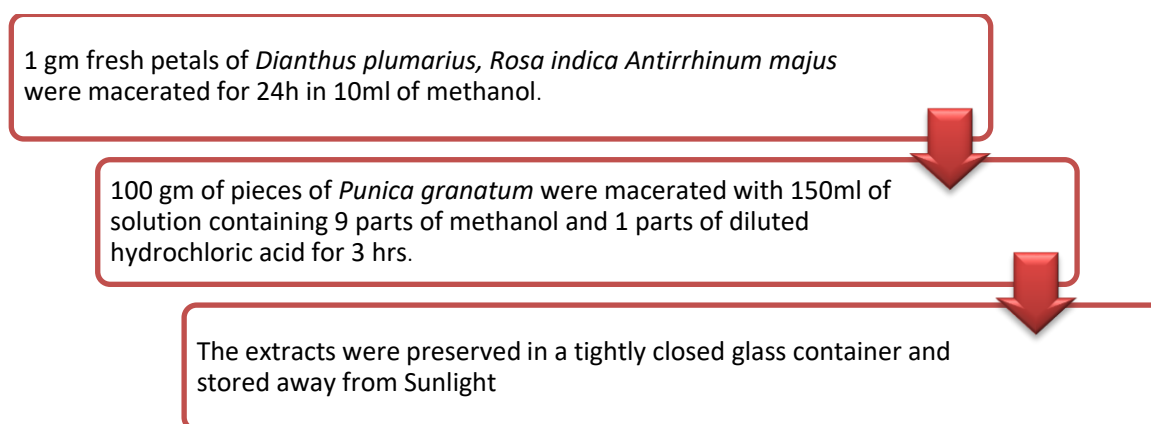
Analytical grade reagents like hydrochloric acid, sodium hydroxide, acetic acid, ammonia, ethanol, methyl red, methyl orange and phenolphthalein. The reagents and volumetric solutions were prepared as per Indian Pharmacopoeia (IP 1996).

Preparation of the extracts

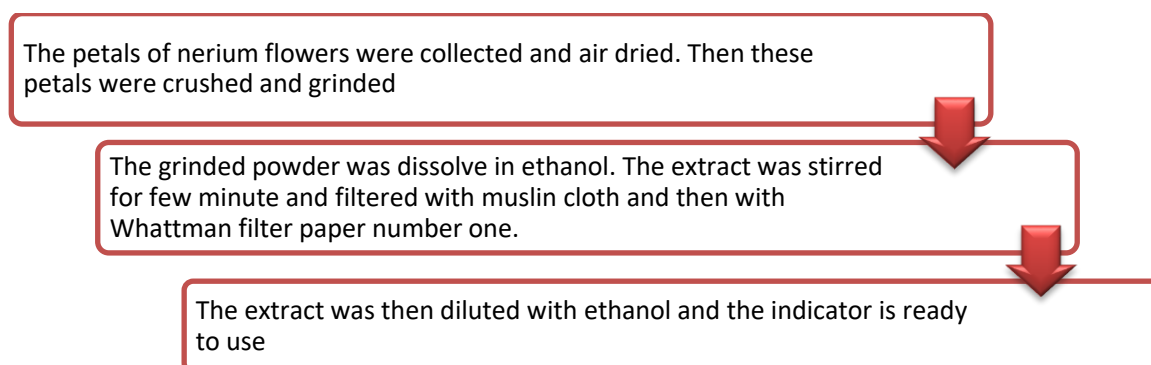
1. *Catharanthus roseus*, *Pisum sativum* and *Euphorbia ligularia*. ^[3]



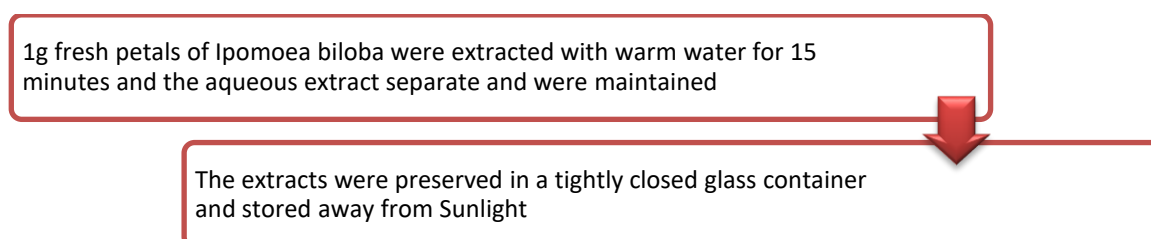
3. *Euphorbia mili*, *Nelumbo nucifera*, *Erythrina varigata* and *Nerium odoratum*. [5]



4. *Nerium Odoratum*. [6]



5. *Ipomoea biloba*. [7]



RESULT

DRUG	Colour in Acidic condition	Colour in Basic condition
<i>Pisum sativum</i>	Pink	Green
<i>Catharanthus roseus</i>	Pink	Green
<i>Euphorbia ligularia</i>	Pink	Green
<i>Antirrhinum majus</i>	Pink	Colourless
<i>Dianthus Plumaris</i>	violet	Colourless
<i>Punica granatum</i>	pink	Colourless
<i>Euphorbia mili</i>	Pink	Green
<i>Nelumbo nucifera</i>	Colourless	Green
<i>Erythrina varigata</i>	Pink	Green
<i>Nerium odoratum</i>	Pink	Yellow
<i>Rosa indica</i>	Colourless	Pink
<i>Ipomoea biloba</i>	Colourless	Green

We only reviewed about the petals and flower and still other parts of plants like fruits vegetables, stems leaves etc. still remaining. So, there is a great source with us like India to identify and use the same for prevention of pollution and proper utilization of natural resources.

Along with this, we will also very much conscious about planting were plants so if will again beneficial for the earth.

CONCLUSION

Thus the study helped to realize that the flower pigment of *Pisum sativum*, *Catharanthus roseus*, *Euphorbia ligularia*, *Antirrhinum majus*, *Dianthus Plumaris*, *Punica granatum*, *Euphorbia mili*, *Nelumbo nucifera*, *Erythrina varigata*, *Nerium odoratum*, *Rosa indica*, *Ipomoea biloba* could be effectively used as a substitute to the presently existing indicators. 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 decided by performing various acid base titration by various scientist. The results were obtained by different Extract Thus the use of natural indicators in acid base titration is more beneficial because of their economy, easy to prepare, simplicity, easy availability, eco-friendly, inert and accurate results.

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