

Biochemical Assay of *Eryngium Foetidum* and *Ricinus Communis*

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Abstract— The manuscript is about two medicinal plants that have been in use since ages in the traditional regions. The objective of this work is to enlighten the biochemical properties of these two plants by analyzing the samples of their leaves in qualitative as well as quantitative ways. The name of the chosen medicinal plant samples are *Eryngium Foetidum* and *Ricinus Communis*. *Eryngium foetidum* is commonly known as Ban dhaniya and *Ricinus Communis* as Castor plant in India. The introduction of the project mentions a detailed review of both plants and their specified benefits that have been observed in the past research. Both the species are abundantly found in the hilly regions of India. The materials and methods portion specifies the procedure of experiments carried out for the purpose of analyzing the biochemical properties of the plant sample. The qualitative analysis of the plants showed the test results for benedicts test, ethanol test and the iodine test. Benedicts test determines the sugar content in the sample, ethanol test is for lipid analysis and the iodine test checks for the presence of starch in the plant leaves. As the leaves were dried before the test was done, the results for qualitative analysis came negative. On the other hand, there was conducted a test regarding pH identification, amino acid content and the polysaccharide content determination. The last two tests had been measured by determining the absorbance of the sample in the UV-spectrophotometer.

Keywords—Biochemical attributes; Plant extracts; Dietary habits; Medicinal plants

I. INTRODUCTION

Medicinal plants are regarded as a source for curing a number of diseases. This project is about the use and characteristics of two such medicinal plants that have many benefits with regards to curing a number of problems that otherwise require a lot of money in their allopathic treatment (Sisodiya and Shrivastava, 2017; Prabhavathi *et al.*, 2016). There are certain biochemical tests done for both the samples. Qualitative and quantitative analysis of *Eryngium foetidum* and *Ricinus communis* were carried out in this work.

II. MATERIALS AND METHODS

Preparation of the extracts

□ *Eryngium foetidum*

For sample preparation, 2 gm of the sample was added in 20 ml of water to make stock solution.

□ *Ricinus communis*

For sample preparation, 2 gm of the sample was added in 20 ml of water to make stock solution.

Procedure

1. Qualitative analysis

A. *Benedict's test*

Aim: Determination of presence of sugars in samples.

Materials required: Sample, Benedict's solution, Pipette, Test tubes and Beaker

Procedure:

- 1 ml of each sample was placed into clean test tubes.
- 2 ml of Benedict's reagent (CuSO₄) was added to each of the test tubes.
- The solution in the test tubes was then heated in a boiling water bath for 5 minutes.

B. *Ethanol test*

Aim: determination of presence of lipid samples.

Materials required: Sample, ethanol, pipette, test tubes, beaker and distilled water.

Procedure:

- 2ml of ethanol was added to each of the plant samples and the mixture was shaken well.
- It was allowed to settle in a test tube rack for 2 minutes for the solution to dissolve in ethanol (Pradeepa *et al.*, 2016).
- Any clear liquid was emptied into a test tube containing 2 ml of distilled water.

C. *Iodine test*

Aim: Determination of presence of starch in samples.

Materials required: Sample, Ethanol, Pipette, Test tubes, Beaker, Distilled water

Procedure:

- The samples were taken in test tubes and placed in a boiling water bath.
- They were heated for 5 minutes.
- The solutions were filtered from one test tube to other using filter papers.
- The filtrate was taken in clean test tubes.
- A few drops of iodine solution were added to the test tubes and color change was observed.

2. Quantitative analysis

A. pH test

Aim: Determination of pH of samples

Materials required: Sample, Test tubes, Beaker, Distilled water and pH electrode

Procedure:

- The pH electrode was immersed in pH 7 buffer and then in pH 4 buffer to calibrate the pH meter.
- The pH electrode was then immersed into the sample and pH value was noted down for each sample.

B. Amino Acid Test

Aim: Determination of free amino acid content in the sample.

Materials required: Sample, Ethanol, Pipette, Test tubes, Beaker, Distilled water, Ninhydrin and Glycine

Procedure:

- In 100 µl of extract, 100 µl of ninhydrin and 100 µl of 50% ethanol was added and mixed well (Mi *et al.*, 2018).
- The samples were then kept in a water bath (80°C) for 15 minutes.
- The samples were taken out of the water bath and 2 ml of distilled water was added to each of the tubes.
- The absorbance was measured at 570 nm.
- The calibration curve was prepared by using glycine as a standard.

C. Polysaccharide test

Aim: determination of the polysaccharide content

Materials required: Sample, Phosphate buffer, and pipette, test tubes, Beaker, Dextrose, Phenol, Sulphuric acid, distilled water

Procedure:

- In 30 µl of extract, 470 µl of phosphate buffer was added followed by addition of 500 µl of 5% phenol and 2.5 ml of sulphuric acid.
- The solution was then incubated for 30 minutes, after which the absorbance was measured at 488 nm.
- The calibration curve was prepared by using dextrose as a standard (Prabhavathi *et al.*, 2016).

III. FINDINGS

A. Qualitative analysis

- I. Benedict's test: Colour change was observed from blue to green in each of the test tubes. The observed data were collected.
- II. Ethanol test: The mixture remained clear; it indicated that no fats are present in the sample.
- III. Iodine test: No colour change was observed

B. Quantitative analysis

- I. pH test: The pH test was conducted to test the acidity or basicity of the sample and the results confirmed the results of both the samples to be above 7.
- II. Amino Acid test: The absorbance of both the samples was reflected to be 0.896 and 1.631. A bluish-black colour change was observed after the experiment.
- III. Polysaccharide test: The polysaccharide test confirmed the presence of carbohydrates in the sample and the absorbance calculated was 1.054 and 1.188. The solution turned into a golden colour after the test (Santhi and Sengottuvel, 2018).

TABLES

1. pH test

| SAMPLE | PH VALUE |
|--------------------------|----------|
| <i>Eryngium foetidum</i> | 7.02 |
| <i>Ricinus communis</i> | 7.23 |

Table 1: Result of pH test

2. Amino acid test

| SAMPLE | ABSORBANCE (nm) |
|------------------------------|-----------------|
| 1.) <i>Eryngium foetidum</i> | 0.896 |
| 2.) <i>Ricinus communis</i> | 1.631 |

Table 2: Observation of amino acid test

3. Polysaccharide test

| SAMPLE | ABSORBANCE (nm) |
|------------------------------|-----------------|
| 1.) <i>Eryngium foetidum</i> | 1.054 |
| 2.) <i>Ricinus communis</i> | 1.188 |

Table 3: Absorbance taken in the polysaccharide test

FIGURES

Qualitative analysis

1. Benedicts test



Figure 1: Green color observed

2. Ethanol test

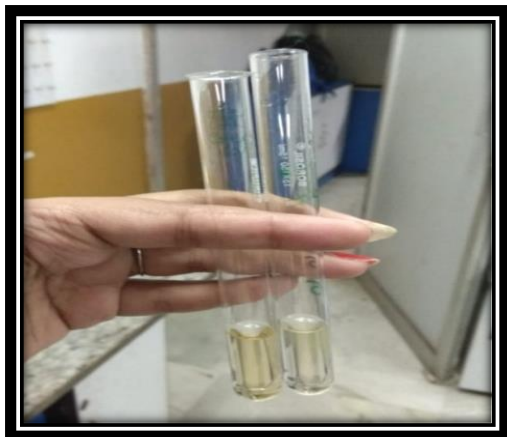


Figure 2: The mixture of ethanol treatment remained clear

3. Iodine test



Figure 3: No color change was observed in Iodine test

Quantitative analysis

1. Amino acid test



Figure 4: Blue-Black coloration of amino acid test

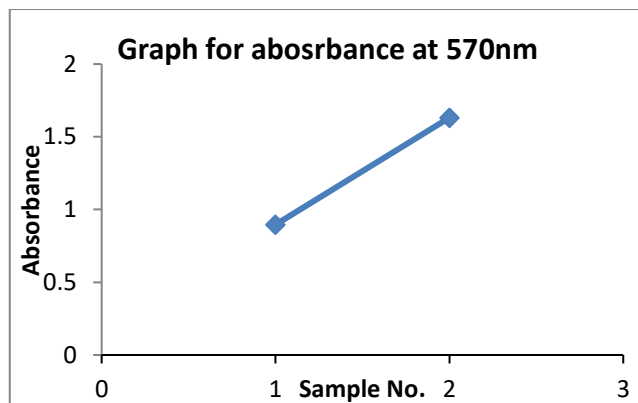


Figure 5: Absorbance curve for amino acid test

2. Polysaccharide test

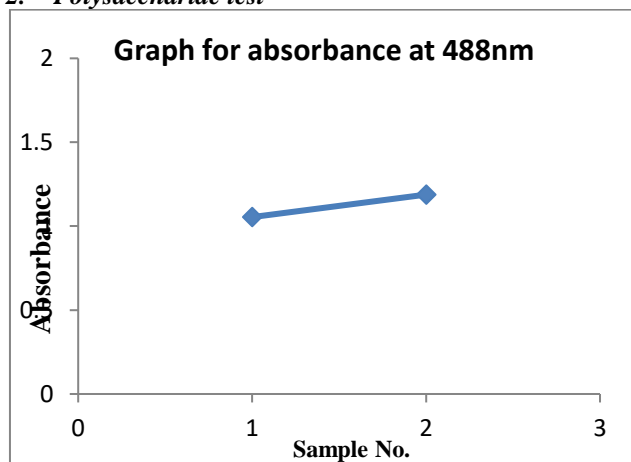


Figure 6: Absorbance curve for Polysaccharide test

IV. DISCUSSION

Benedict's test was used to test for simple carbohydrates. The Benedict's test identifies reducing sugars (monosaccharide's and disaccharides), which have free ketone or aldehyde functional groups. The Polysaccharide and iodine test were done to test the presence of carbohydrates into the sample. Since the sample was sun-dried the starch test came negative whereas the polysaccharide test confirmed the presence of aldehyde and ketone group into the plant samples. The pH value was just above the neutral level and that showed the basic nature of the medicinal plants. The amino acid test also confirmed the presence of protein content within the plant samples. On the other hand, the ethanol test denied the presence of lipid in the leaves of the plants (Sisodiya and Shrivastava, 2017).

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REFERENCES

- [1] Mi, J., Jia, K.P., Wang, J.Y. and Al-Babili, S. A rapid LC-MS method for qualitative and quantitative profiling of plant apocarotenoids. *Analytica chimica acta*; 2018, **1035**, 87-95.
- [2] Prabhavathi, R.M., Prasad, M.P. and Jayaramu, M. Studies on qualitative and quantitative phytochemical analysis of *Cissus quadrangularis*. *Pelagia Res Libr Adv Appl Sci Res*; 2016, **7(4)**, 11-17.
- [3] Pradeepa, M., Kalidas, V. and Geetha, N. Qualitative and quantitative phytochemical analysis and bactericidal activity of *Pelargonium graveolens* L'Her. *Int J Appl Pharm*; 2016, **8(3)**, 7-11.
- [4] Santhi, K. and Sengottuvel, R. Qualitative and quantitative phytochemical analysis of *Moringa concanensis* Nimmo. *Int J Curr Microbiol App Sci*; 2016, **5(1)**, 633-640.
- [5] Sisodiya, D. and Shrivastava, P. Qualitative and quantitative estimation of Bioactive compounds of *Euphorbia thymifolia* L. *Asian Journal of Pharmaceutical Education and Research*; 2017, **6(3)**, 34-43.