

## EXPERIMENT 11 : CHROMATOGRAPHY

### Course Learning Outcome:

Solve problems related to transport system processes, mechanisms for adaptations in living things, ecological and environmental issues in biology.

(C4, PLO 2, MQF LOC ii)

### Learning Outcomes:

At the end of this lesson, students should be able to:

- i. Explain the concept of chromatography technique.
- ii. Calculate the  $R_f$  values

### Student Learning Time:

Face-to-face	Non face-to-face
1 hour	1 hour

Direction: Read over the lab manual and then answer the following questions.



### Check this out:

Each object in our surrounding has their own colour. Let's have a look at this green marker. Have you ever wonder why it is green?

Let's spare a few minutes to watch this short video about Dr. Brian Mahon asks a graduate student Venecia Valdez why his marker is green. Neither one can answer, but luckily, graduate student Abby Stanton has designed an experiment to help.

Click the URL below for more details.

<https://youtu.be/uahUzob29go>

Now, can you explain why most leaves are green?



### Introduction

**Give it a try!!** Click the URL below for virtual paper chromatography practice. Try select types of plant pigment extract and types of solvent and get your own result.



<http://www.amrita.olabs.edu.in/?sub=79&brch=17&sim=124&cnt=4>



1. What are photosynthetic pigments?

---



---

2. State the main photosynthetic pigments in photosynthesis.

---

3. Where are the photosynthetic pigments located in the chloroplast?

---

4. What is paper chromatography technique?

---

---

5. State **TWO** factors that cause different pigments to move at different rates.

---

---

**Experiment**

1. State the variables for this experiment:

a. Manipulative : \_\_\_\_\_

b. Responding : \_\_\_\_\_

c. Constant : \_\_\_\_\_

2. Why do you need to grind the leaves with acetone?

---

3. What is the function of solvent?

---

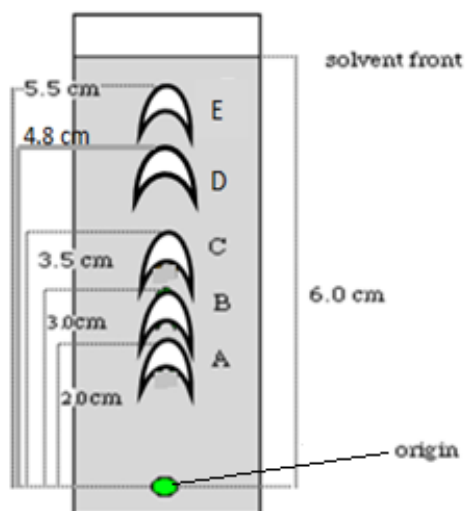
4. Why do we use the pencil instead of pen to mark the pigmented areas?

---

5. What is meant by  $R_f$  value?

---

Answer questions 6-9 using the information in **FIGURE 1**:



**FIGURE 1**

6. What is the distance from the origin to the final point of the solvent travelled?

\_\_\_\_\_

7. Calculate the  $R_f$  value for pigment A-E.

Pigment	Calculation	$R_f$ value
A		
B		
C		
D		
E		

8. Based on the  $R_f$  value, determine which pigments:

i. Has the highest molecular weight : \_\_\_\_\_

ii. Has the lowest molecular weight : \_\_\_\_\_

9. What is the relationship between  $R_f$  value and different molecular weight of photosynthetic pigments?

---

---

10. How do you make sure that the pigment spot (point of origin) is not immersed in the solvent?

---

---