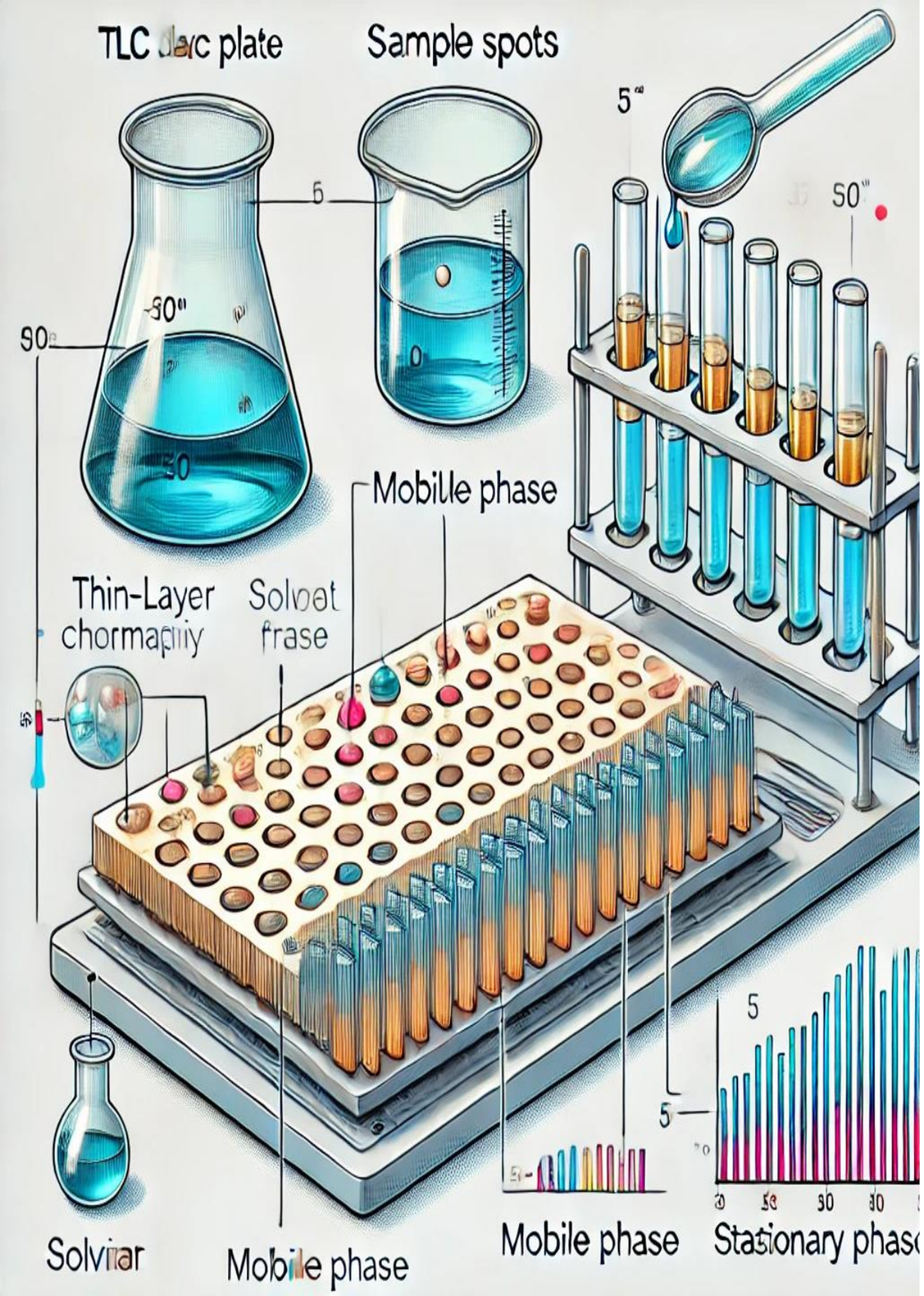


Paper Chromatography and TLC

Exploring the application of chromatographic techniques in the identification and analysis of natural products.

By: Hawraa kareem

Introduction to Chromatography

What is Chromatography?

- Chromatography is used to separate mixtures. It identifies and quantifies the components.
- The word "chromatography" is derived from the Greek words for "color" and "write," meaning "to write with color.
- Chromatography is a qualitative and quantitative analytical technique used to separate a mixture based on intermolecular forces.

Plant extract

Plants contain diverse compounds.
Chromatography isolates these for study and use.
use.

Introduction to Chromatography

Key Terms

- Affinity: Attraction of a component to either phase.
- Adsorption: The attachment of a component to the stationary phase.
- Desorption: The release of a component from the stationary phase into the mobile phase.

The "Like with Like" Rule

Substances are more attracted to phases with similar properties. For example, polar molecules interact more with a polar mobile phase, while nonpolar molecules prefer a nonpolar stationary phase.

Principles of Chromatography Chromatography

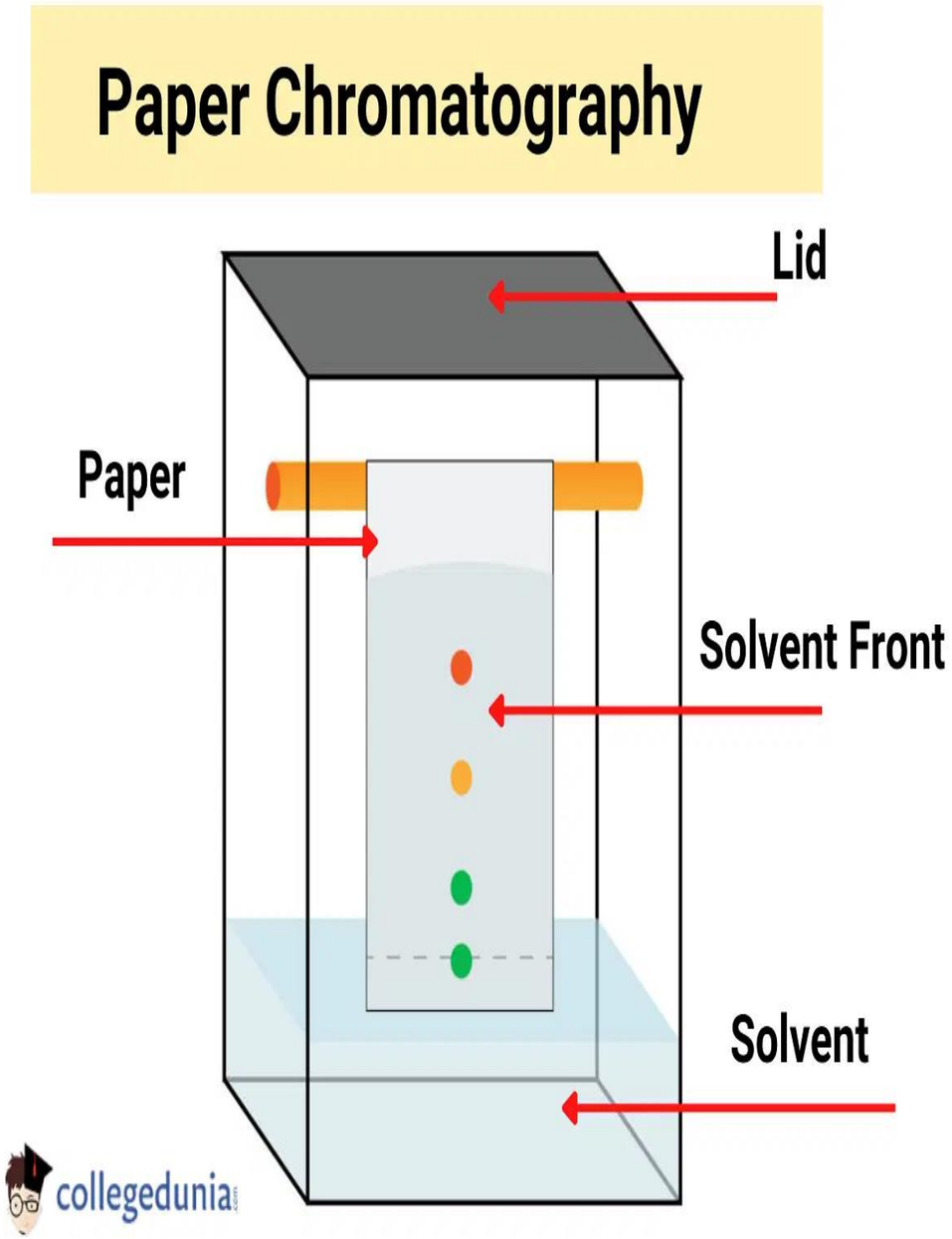
1 **Mobile Phase**

A solvent that moves through the system, carrying the sample components.

2 **Stationary Phase**

A solid or liquid that remains in place and interacts with the components.

3 **Sample**



Principles of Paper Chromatography

1 **Stationary Phase**

Paper acts as the stationary phase. Compounds interact differently.

2 **Mobile Phase**

Solvent carries compounds up up the paper. Separation based based on solubility.

3 **sample**

The sample spot is placed on the origin, and different substances travel varying distances.

Paper Chromatography: Methodology and Techniques Techniques

Sample Prep

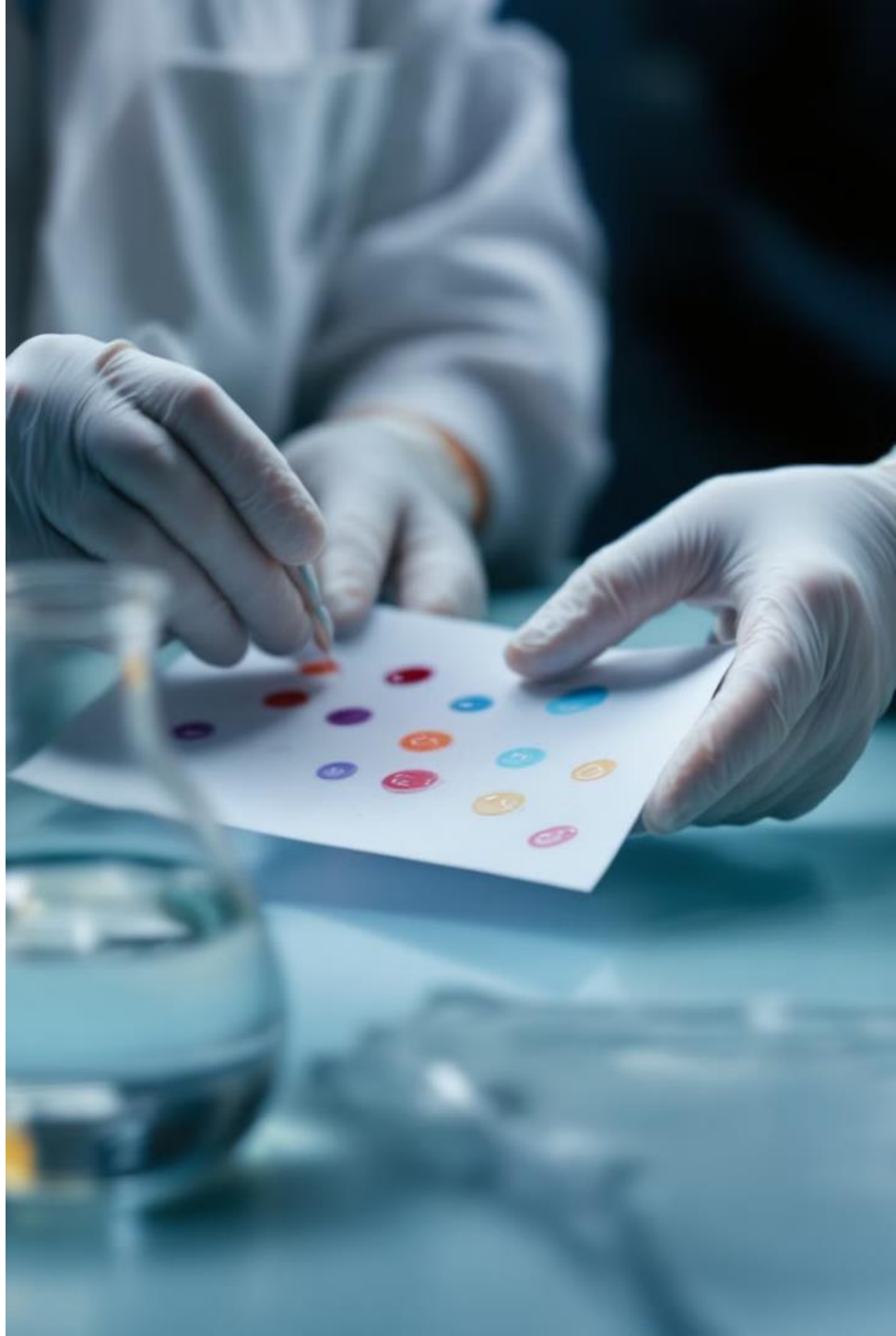
Dissolve sample in solvent. Ensure good solubility.

Application

Spot sample on chromatography paper. paper. Keep spots small. small.

Development

Place paper in solvent. Let solvent migrate upwards.



Thin Layer Chromatography (TLC): Principles and Advantages

1

Thin Layer

Thin layer of adsorbent. Usually silica gel or alumina.

2

Faster

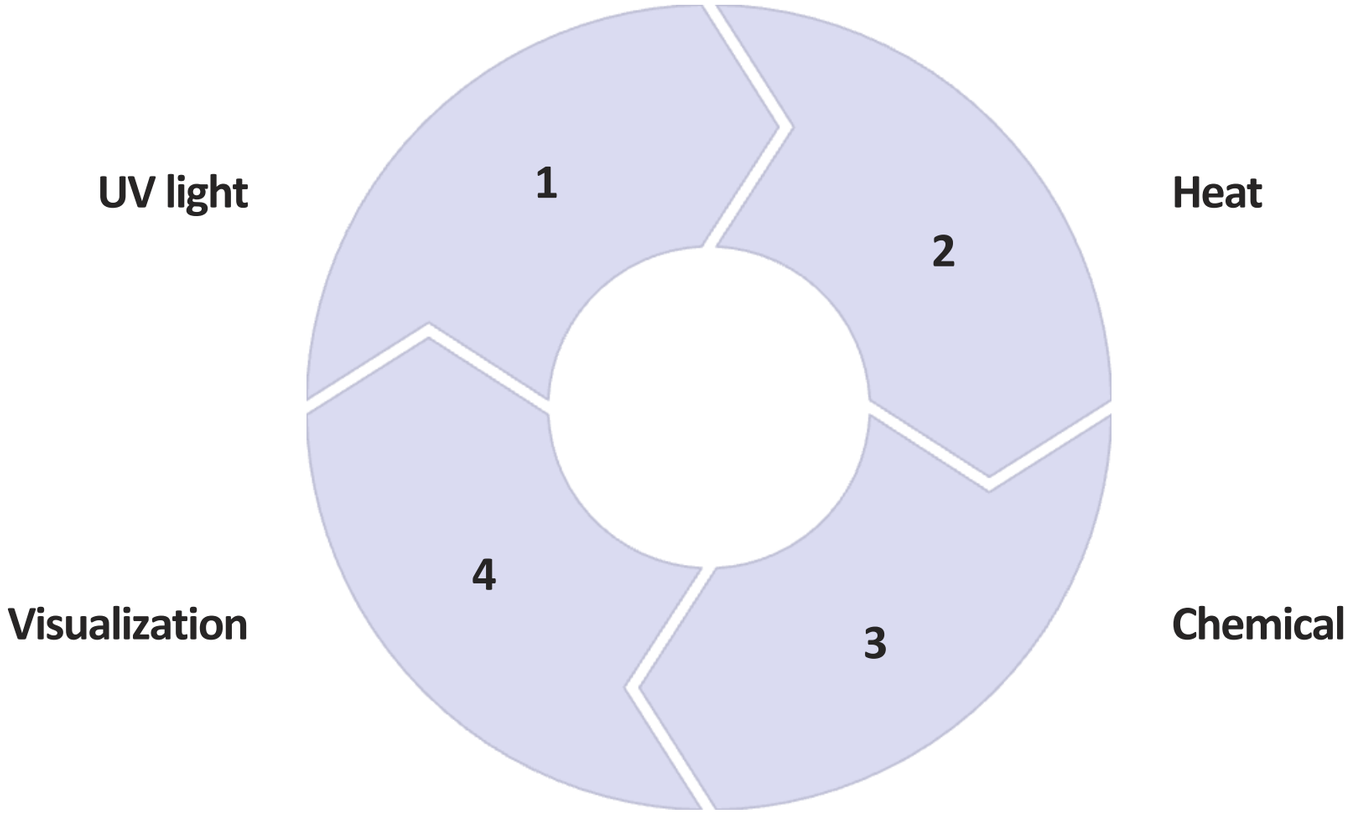
TLC is faster than paper chromatography. Results obtained

3

Versatile

Wider range of solvents. Better separation options.

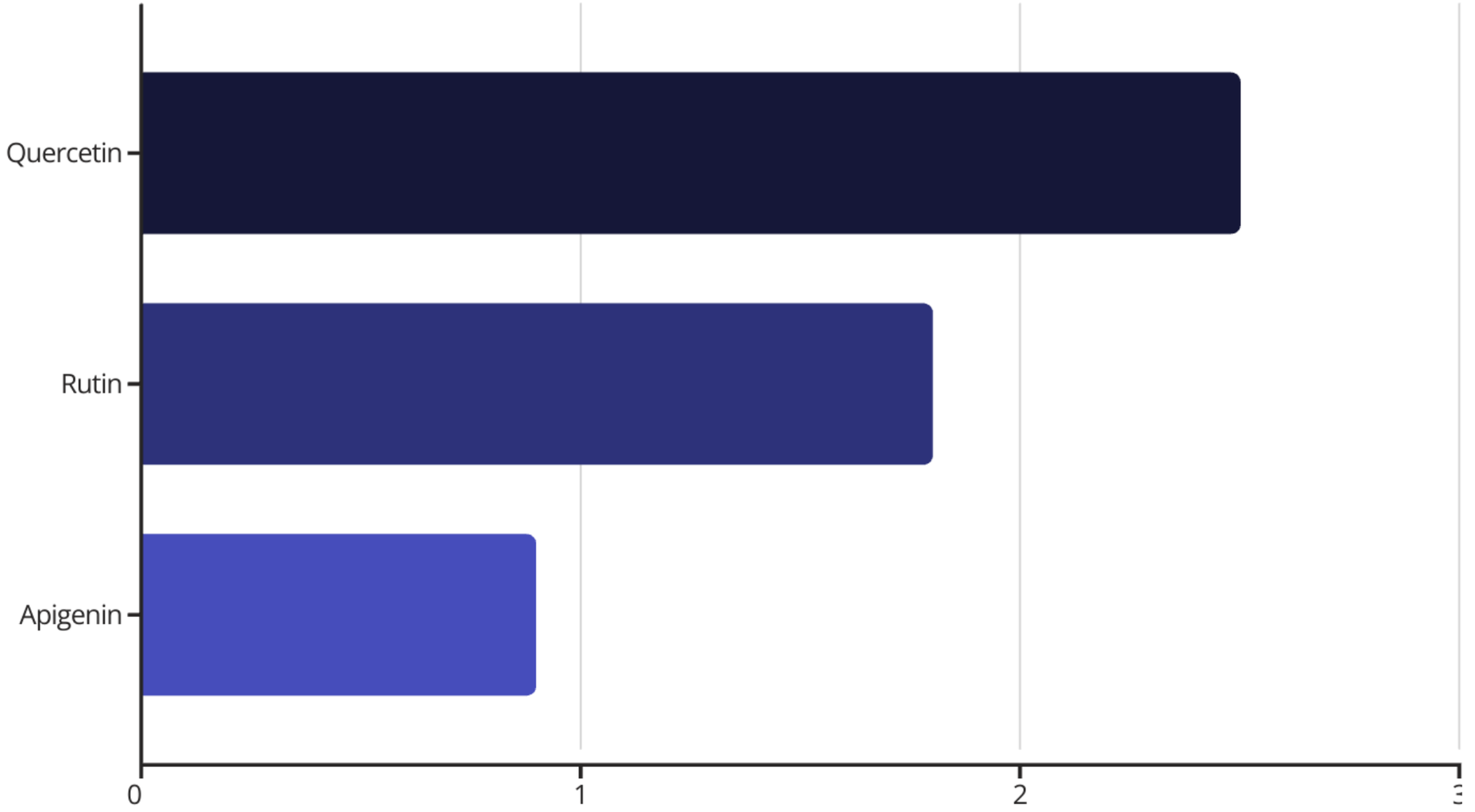
TLC: Methodology and Visualization Techniques

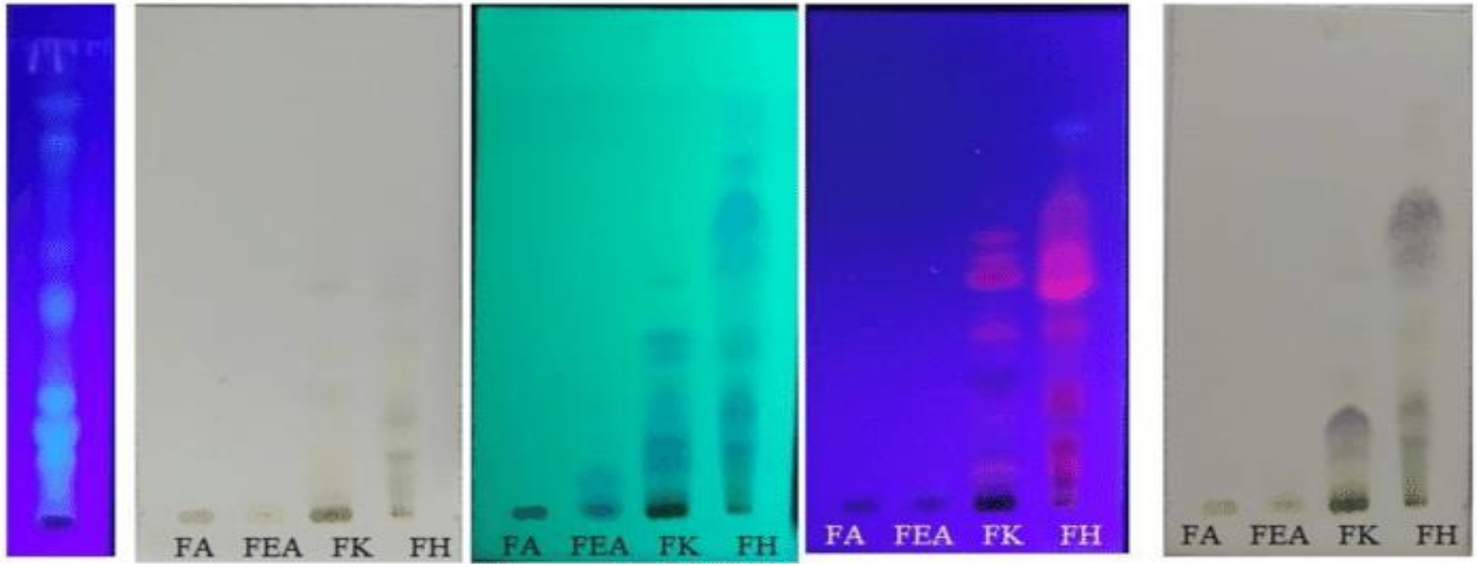


Comparison Between TLC and Paper Chromatography

Feature	Thin-Layer Chromatography (TLC)	Paper Chromatography
Stationary Phase	Thin layer of silica gel or aluminum oxide on glass/plastic	Absorbent paper
Mobile Phase	Liquid solvent	Liquid solvent
Separation Speed	Faster	Slower
Sensitivity	Higher (can detect smaller amounts)	Lower
Visualization	UV light or chemical staining	Limited to colored substances
Reusability	Not reusable	Single-use

Case Study : Analysis of phenolic compound

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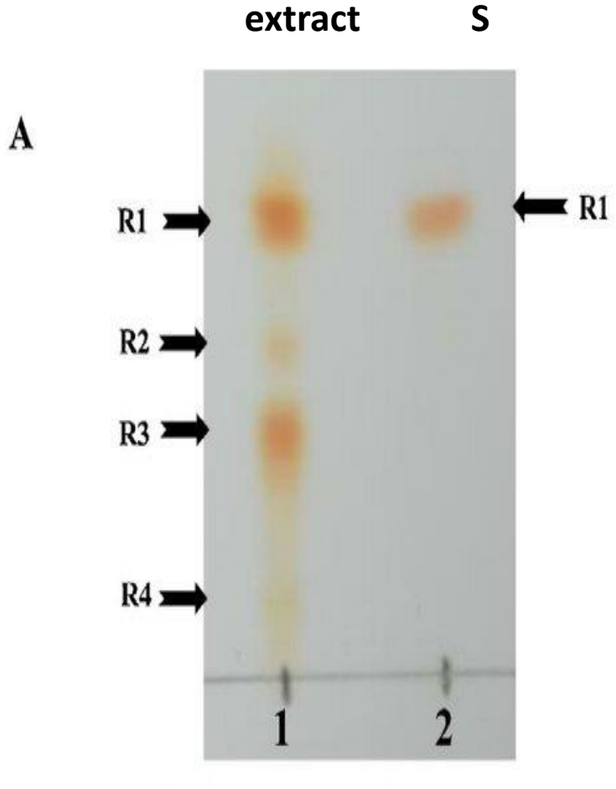
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A
R1
R2
R3
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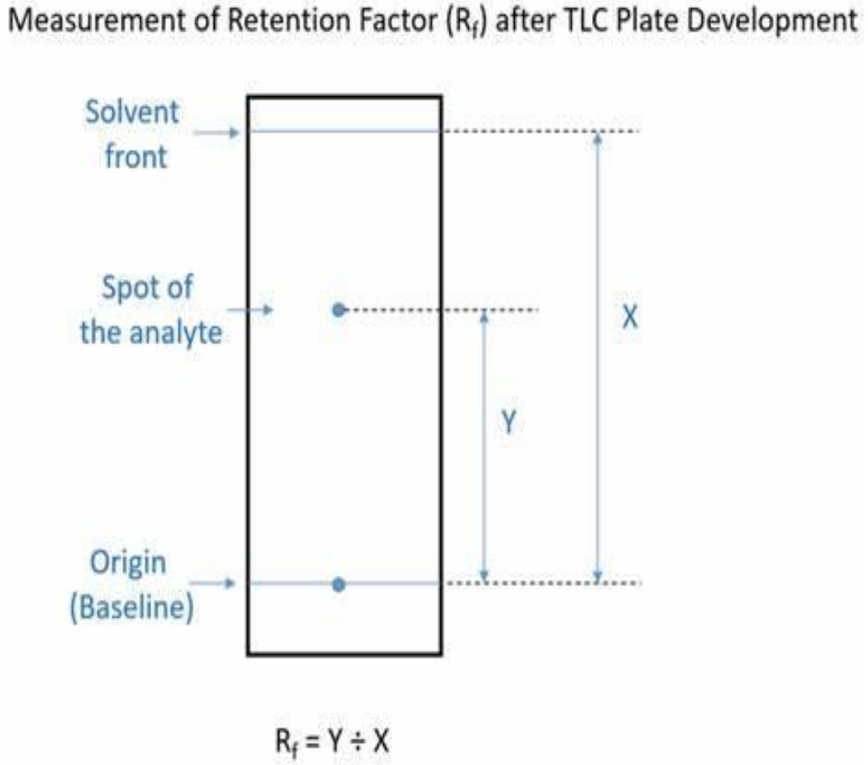
R1
1
2


Measurement of Retention Factor (R_f) after TLC Plate Development
Solvent front
Spot of the analyte
Origin (Baseline)
X
Y
$R_f = Y \div X$

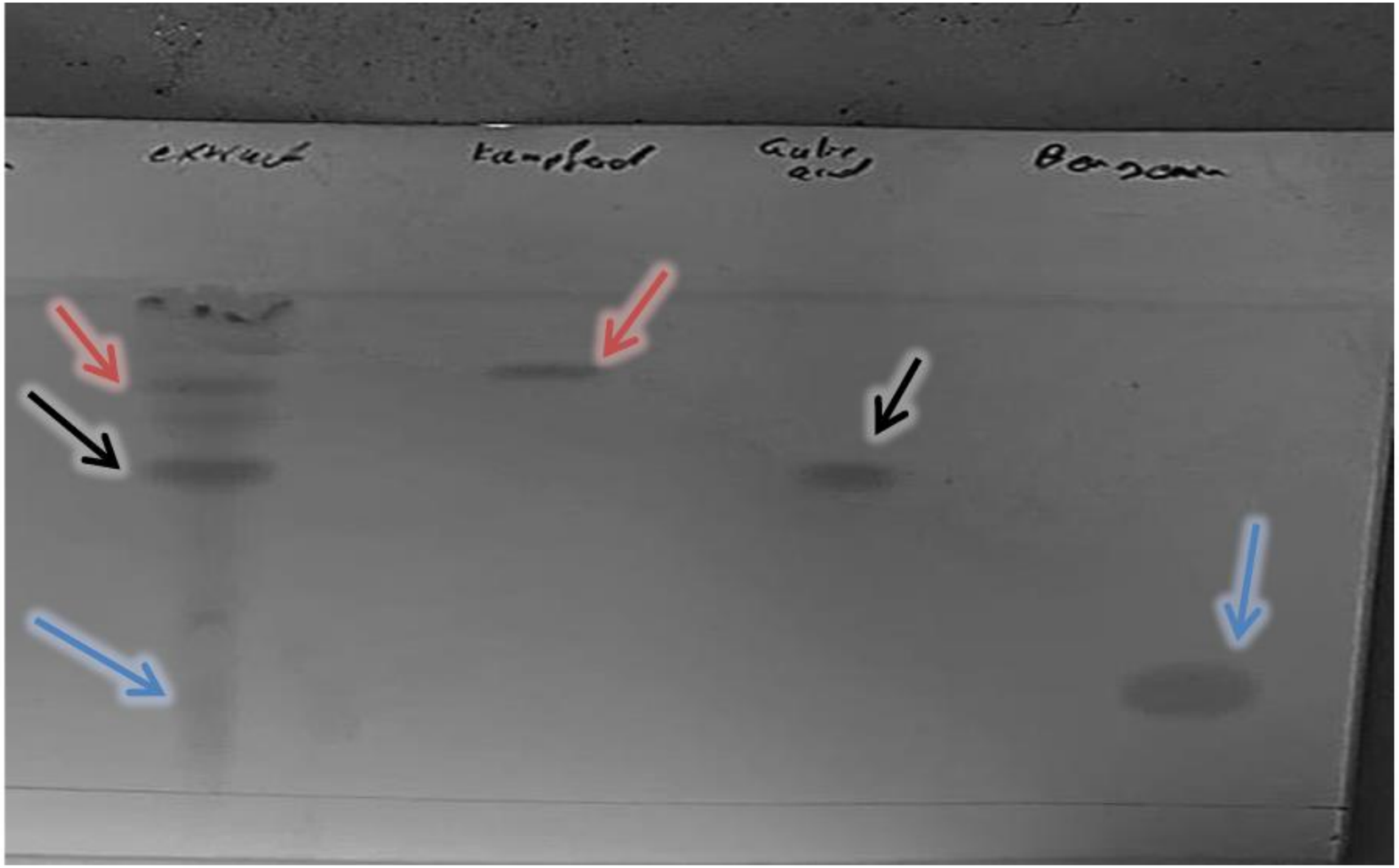
Result

Retardation Factor (Rf) Calculation

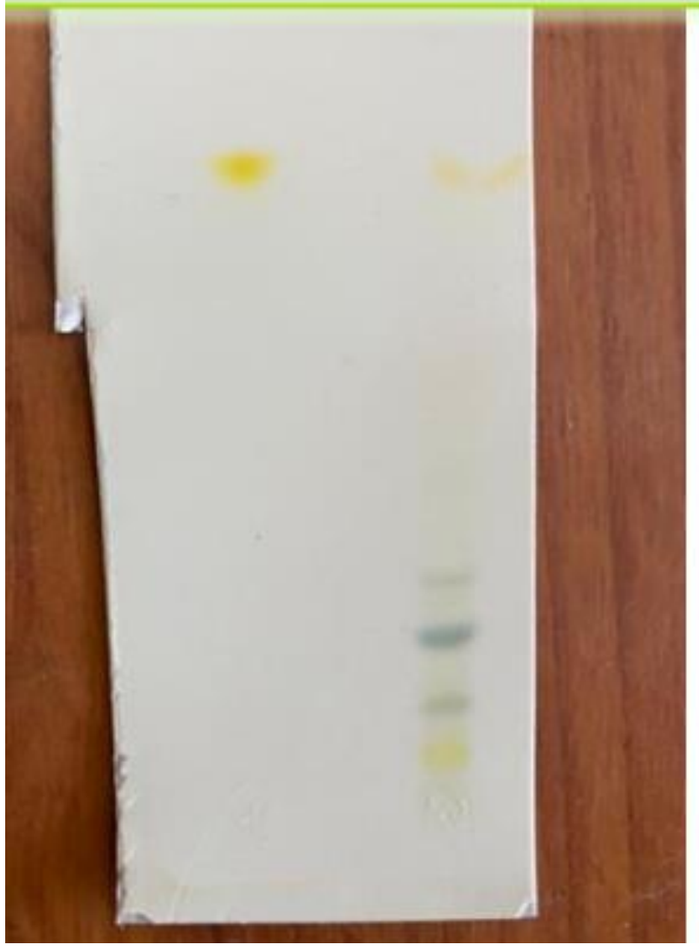
Once a chromatogram forms, Rf values determine the identity of components:

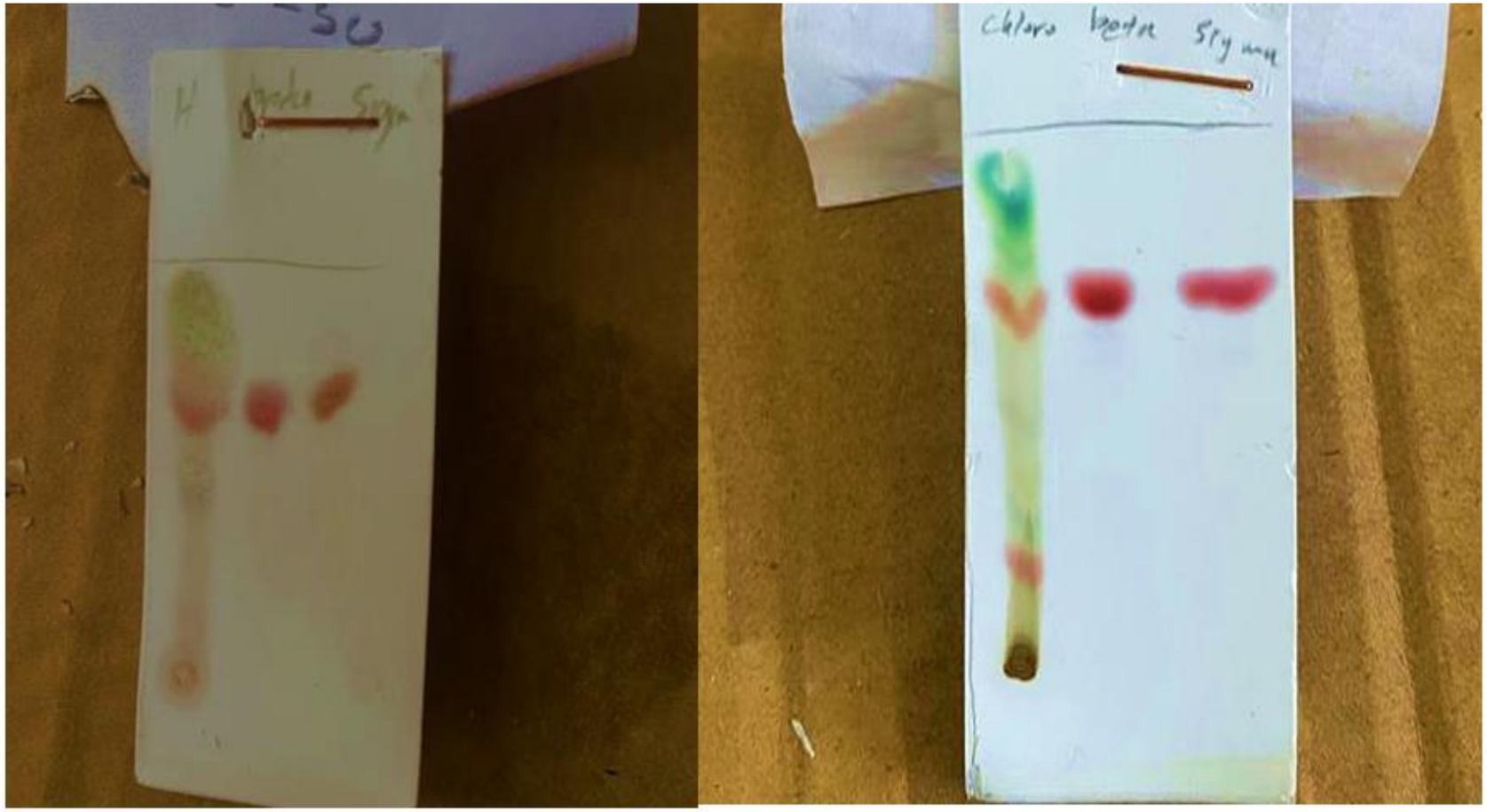
$$R_f = \frac{\text{Distance moved by substance}}{\text{Distance moved by solvent}}$$

Rf values range from 0 to 1. An Rf value of 1 means no separation occurred.



Leutin - hexane fraction






A
B
C


Thank You