

# HPTLC

## Chromatography



- ✓ Basic Introduction
- ✓ Principle
- ✓ Procedure
- ✓ Application
- ✓ Advantages

Chromatography  
Instrumental Analysis

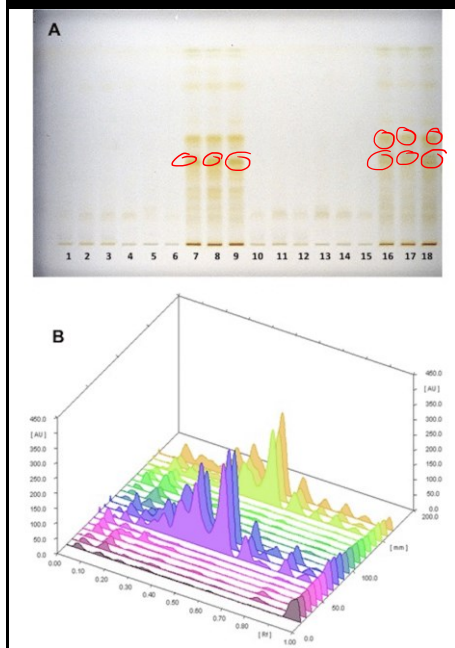
## HPTLC



### Introduction:

- 💡 **High-performance thin-layer chromatography (HPTLC)** is an enhanced form of thin-layer chromatography (TLC).
- 💡 A number of enhancements can be made to the basic method of thin-layer chromatography to automate the different steps, to increase the "resolution" achieved, and to allow more "accurate" quantitative measurements.
- 💡 HPTLC helps in better resolution of compounds "with lower limits" of detection and quantifies separated components with the use of an integrated software platform.

## HPTLC

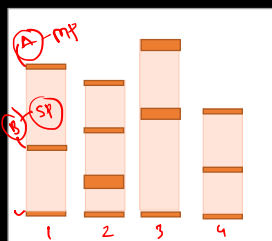


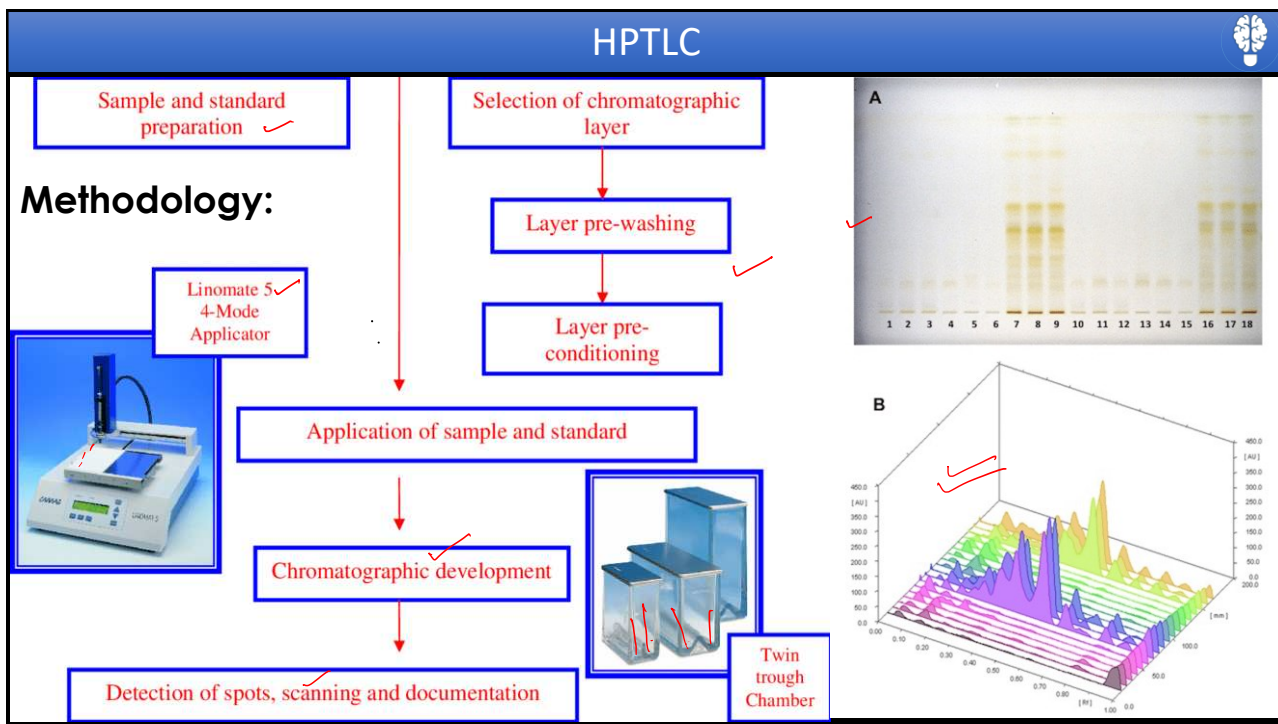
## HPTLC



## Principles:

💡 The principle of separation is 'adsorption' similar as TLC





## HPTLC

**Methodology:**

- Stationary Phase:**
  - Precoated plate (Silica Gel GF254)
  - Particle size- 7  $\mu\text{m}$ ,
  - Thickness- 100  $\mu\text{m}$
  - Used to separate- Amino acid, alkaloids, fatty acids, lipids, steroids, terpenoids, etc.
- Mobile Phase:**
  - Similar as TLC
  - Depends on the polarity of analyte

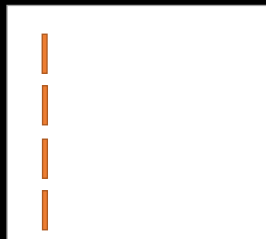
## HPTLC



## Methodology:

### Sample applicator

- Linomate 5 applicator with 100  $\mu$ l of micro syringe is used
- Nitrogen gas is used to spray, dry or apply the sample on plate with fixed pressure (>100 psi)
- Software based system for sampling (2-5  $\mu$ l) with calculated distance, number, etc.



practical Tutorials: <https://youtu.be/8WwbC32b1Ww> ✓  
<https://youtu.be/KO16ndWHcpk> ✓

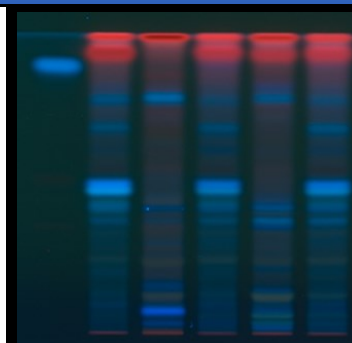
## HPTLC



## Methodology:

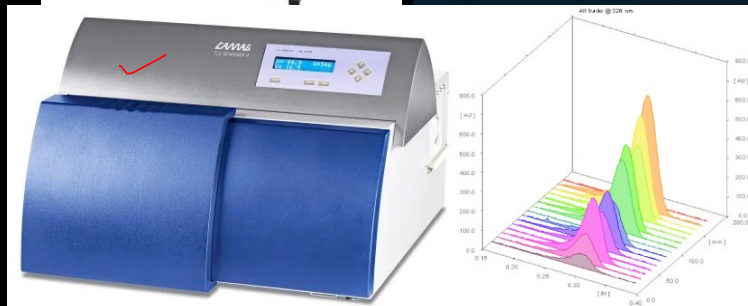
### Visualizer (254 & 366 nm)

<https://youtu.be/HdcpeUQRGkw>



### Scanner

<https://youtu.be/l6g7UXr4i-k>



## HPTLC



### Application:

- 1 **Forensic Analysis:** A challenge in forensic toxicology is the identification of unknown "poisonous substances" in intoxication cases. HPTLC offers rapid identification as well as qualitative and quantitative analysis for toxic substances.
- 1 **Herbal Applications:** HPTLC fingerprint technology can be used in the identification of botanical materials that are very complex in nature.
- 1 **Food Industry:** To evaluate nutrients, beverages, vitamins, and pesticides in fruit, vegetables, and other foodstuffs.
- 1 **Pharmaceutical Industry:** Used in post-production quality control. analysis of forced degradation studies, stability testing, and to check the presence of impurities in the drug.

## HPTLC



### Application:

- 1 **Cosmetic Industry:** HPTLC technique can be employed for the detection of UV filters used in the formulation of cosmetic products. The identified filter can be further confirmed using Mass Spectrometer.

### Advantages

- 1 Most effective separation techniques employed in the discovery, development, and analysis of new drugs.
- 1 More than one analyst can work on the system at a time.
- 1 Shorter developing and analysis time.
- 1 Fresh stationary and mobile phase is used for each analysis so no interference or contamination comes in the analytical process.
- 1 It can be used alone or in combination with other techniques like MS, FTIR, Densitometry.



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