

# Role of automated methods in Microbiology Laboratory

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# Goals of microbiology lab

- Decrease TATs of results
- Improve sensitivity of isolating organisms or detect specific immune responses or antigens
- Provide id & susceptibility to significant pathogenic isolates

AUTOMATION

# How does automation help?

- Streamlines workflow
- Brings uniformity in the processes
- Reduces TAT
- Reduces risk of contamination
- Reduces transcription errors – bidirectional interface
- Improves storage of results

# Challenges

- Automation in Microbiology has been delayed
- Complex processing methods
- Variety of samples
- Different specimen processing methods – maceration, sonication, digestion , concentration etc
- Complexity of media as per nutritional requirements of organisms

# Drivers for automation in Microbiology

- Increasing volumes
- Personnel shortages
- The need for faster TAT
- Need for standardised processing, repeatability & reproducibility
- Need for traceability of test results



# Types of automation in Microbiology



# Blood culture systems

- Principle – Fluorometric /colorimetric

Manual	Automated
Media to be prepared	Ready made media
Often any one type of medium used	Multiple types are available
SPS added to adsorb antimicrobials	SPS + charcoal + resins
Regular subculture → pseudobacteremias,contamination	Avoid subcultures
No shaking action for intracellular organisms	Inbuilt shaker present
Manual monitoring & record keeping	Continuous monitoring, stores data, interfacing to LIS



# Automated ID/DST systems

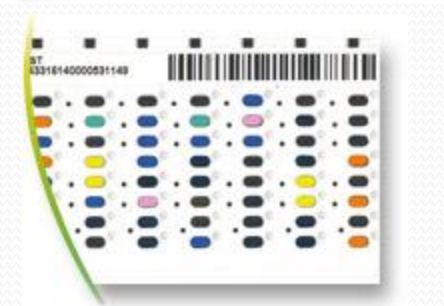
- API
- Vitek
- Phoenix

## Advantages:

- Simple
- Fast
- Most aerobic and anaerobic bacteria & yeasts
- Interfacing

## Disadvantages:

- expensive
- pure cultures needed



# Automated TB culture systems

- MGIT/ BacTAlert
- 24X7 systems
- Fast TAT
- Can be linked to the LIS
- Storage & retrieval of data is easy
- Allows DST
- Disadvantage – expensive, contamination



# Automated PCR

- Single chamber systems – random access
- Single/batch processing offered
- Minimal expertise
- Rapid TAT
- Minimal risk of contamination

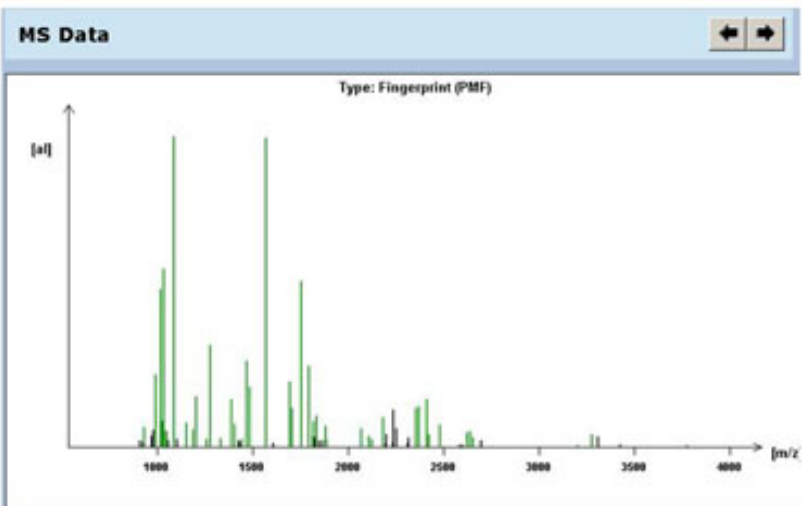
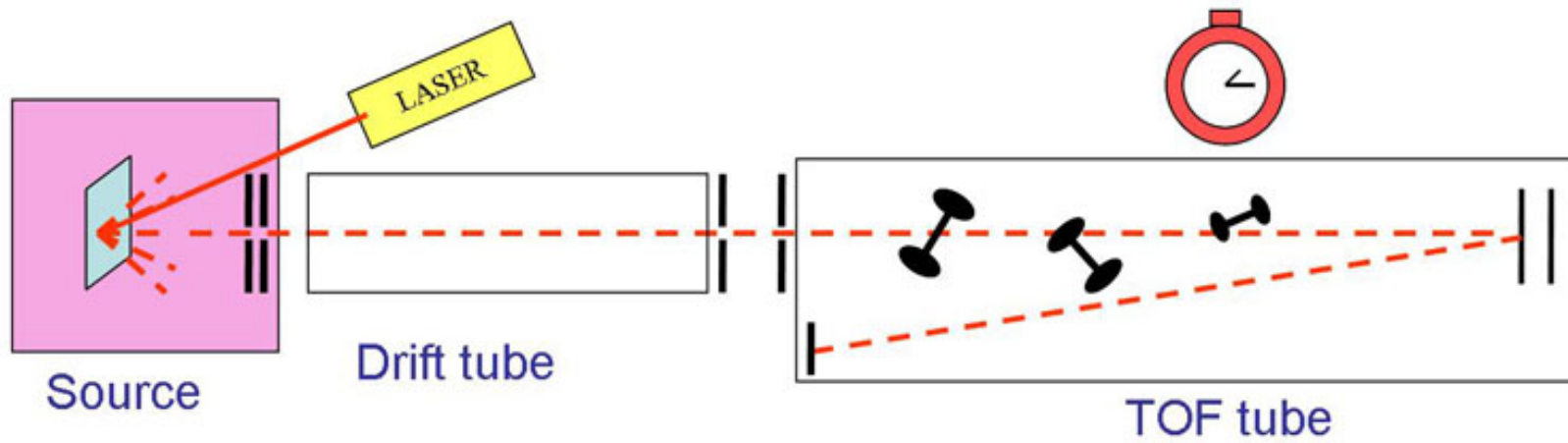


# MALDI-TOF

- Protein based spectral identification of bacteria
- Identifications available in literally minutes – not hours
- Tiny amount of bacterial growth needed – not affected by media or incubation conditions
- Minimal cost per test, virtually no consumables
- Suppliers : BD/Bruker, BioMerieux



# MALDI – TOF



# ELISA systems

- Single test / batch testing methods available
- Advantage : Fast, easy, user friendly interface
- Disadvantage : expensive
- Batch testing useful for large volumes
- Risk of contamination with batch testing



# Automated streaking

- Rapid
  - Uniform streaking
  - Better isolation
  - Reduced hands on time (54% )
  - Cost savings
- 
- Disadvantage
- Expensive  
Large vol labs



Previa Isola

## Automated stainers



- Rapid
- Easy
- Useful for large volumes
- Less manpower
- uniformity
  
- Expensive
- Risk of contamination

## Automated media pourers



- Uniformity
- Large volumes
- Validated & calibrated



# To conclude

- Complex processes are getting automated
- Streamlines workflow
- Reduces errors

**Automation in microbiology has become a way of life!**

**NEVER FORGET YOUR BASICS!**

THANK YOU!!