INSTRUMENTATION AND VARIOUS METHOD OF FOOD TESTING

An Industrial Training Report submitted

for the partial fulfillment of the Degree of Master of Science

By

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[M.Sc. (Microbiology), Semester IV]

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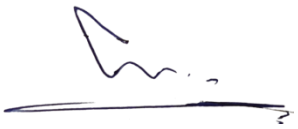
2019-20

C E R T I F I C A T E

This is to certify that this training report entitled "**INSTRUMENTATION AND VARIOUS METHOD OF FOOD TESTING**" was successfully carried out by **Mr. HIMANSHU MORJARIYA** (name of student) towards the partial fulfillment of requirements for the degree of Master of Science in Biotechnology/Microbiology of Atmiya University Rajkot. It is an authentic record of his/her own work, carried out by him/her under the guidance of **MR. DIVYESH MARVIYA** (Name of Supervisor) for a period of **3 MONTHS** during the academic year of **2020-21** The content of this report, in full or in parts, has not been submitted for the award of any other degree or certificate in this or any other University.



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D E C L A R A T I O N

I hereby declare that the work incorporated in the present dissertation report entitled **"Instrumentation and Various Methods of Food Testing"** is my own work and is original. This work (in part or in full) has not been submitted to any University for the award of any Degree or a Diploma.

Date: 04/05/2021 Morjariya Himanshu J.

ACKNOWLEDGEMENT

It is a matter of great pleasure and pride to present this report in front of all the concerned authorities. I would like to thank all those who have helped me for preparing this report and I would like to thank all the members of unit who helped me in guiding and collecting necessary information.

I am feeling happy that I have pursued M.Sc. microbiology course because it is different from other courses. I express my deepest sense of gratitude towards Mr. Divyesh Maraviya and Hardika Ukani in preparing the report and I am sure without their guidance and support it would be very difficult for me to complete a report with adequate information.

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ABSTRACT

The report presents all the work that has been done by me at the Envitro laboratories during my training. I worked at microbiology department. I learned various types of tests and general microbiology and working principal of instruments. And also know about detection of various bacteria in various food products.

INTRODUCTION

Instrumentation and various method of food testing

❖ **Introduction of instruments:**

Autoclave

Laminar air flow

Incubator

Microscope

Biosafety Cabinets

UV Cabinet

Colony counter

❖ Methods :

1. **Total plate count (TPC):**

   Aim: enumeration of total plate count (TPC)

2. **Swab sampling:**

   Aim: for maintaining sterilization of respective area

3. **Detection of *E.coli* and *coliforms***

   Aim: Detection of *E.coli* and *coli*forms bacteria by membrane Filtration method.

4. **Detection of Shigella**

   Aim: Detection of Shigella in various food

5. **Listeria Monocytogenes**

   Aim: Detection of Listeria Monocytogenes

❖ Company Factsheet :

- **Nature of Business :** Analytical, Research, Training & Consultancy Services Provider
- **Company Directors :** (1) Sunil R. Sangani
  (2) Paresh R. Sangani
  (3) Ranchhodbhai J. Sangani
- **Total number of Employees :** 21
- **Year of Establishment :** 2007
- **Company changeover Partnership to Pvt. Ltd. :** 2011

❖ **Standards & Quality Certifications:**

- **SSI Registration Number:** EM22400922004676
- **ISO 9001 Certificate No.** 0913616A
- **NABL Certificate No.** TC 7622
- **Legal Status of Firm :** Private Limited Company
- **Annual Turnover :** Rs. 1 to 2 Crore
- **Building Infrastructure :** Permanent
- **Location Type :** Urban
- **Size of Premises :** 5000 Square feet
- **Banker:** HDFC Bank Ltd.
- **DGFT / IE Code** 2412001219
- **GST No.** 24AACCE8978Q1ZQ
- **CIN No.** U85110GJ2011PTC067933

MATERIALS AND METHODS

1. Total plate count (TPC)

❖ **Principle:**

- The total plate count is intended to indicate the level of microorganism in any product.
- The total plate count is the enumeration of aerobic, mesospheric organisms that grow in aerobic condition under moderate temperatures of 20-45˚C.
- This method is also known as standard plate count or total viable count.
- This method gives a quantitative estimate of the concentration of microorganism.

❖ **Requirements**

- Plate count agar
- Weighing balance
- Petri plates
- autoclave
- Pipettes
- Colony counter
- Incubator

❖ **Methods:**

➢ **Spread plate method:**

➢ Thoroughly mix the component

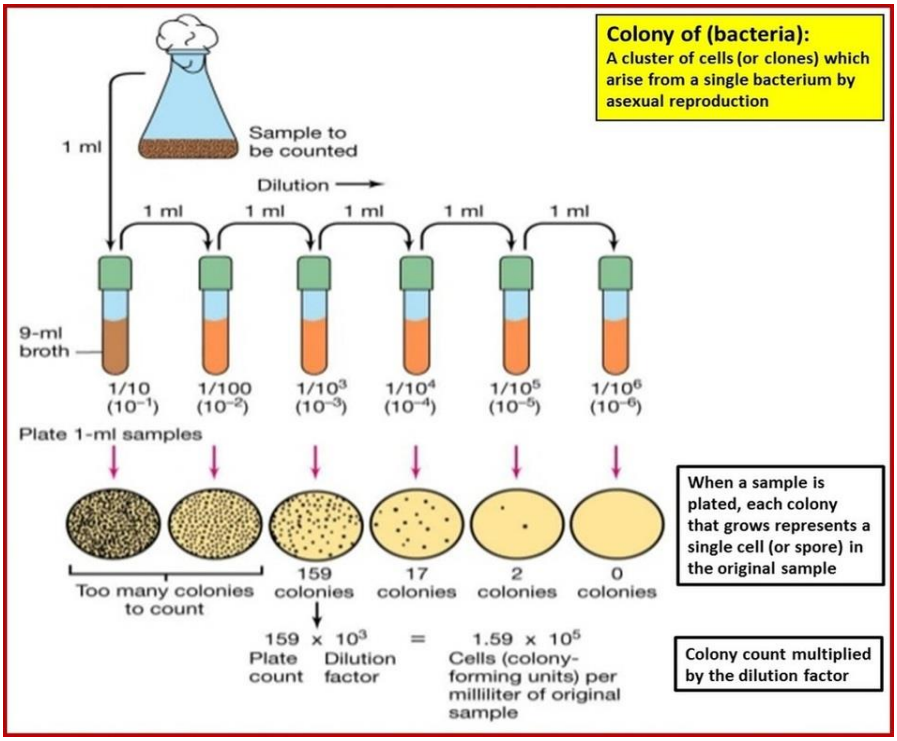
➢ Prepare 10 fold serial dilution

➢ Take 0.1ml solution of each tube & spread on plate count agar respectively.

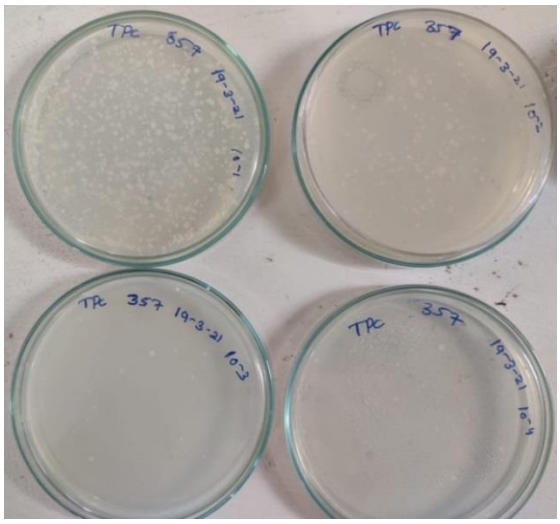
➢ Incubate at 25˚C for 72 hrs

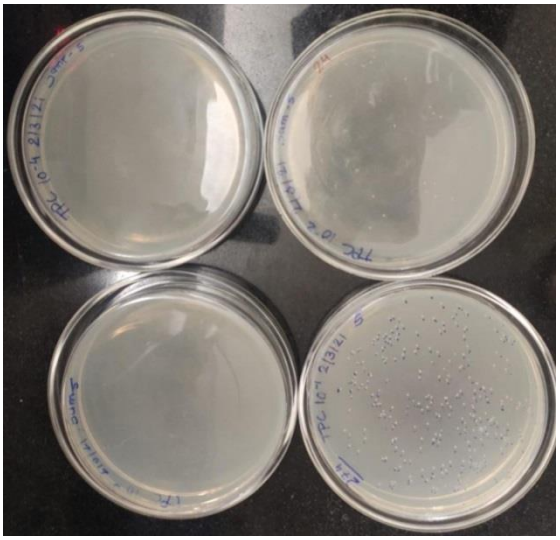
➢ **Pour plate method:**

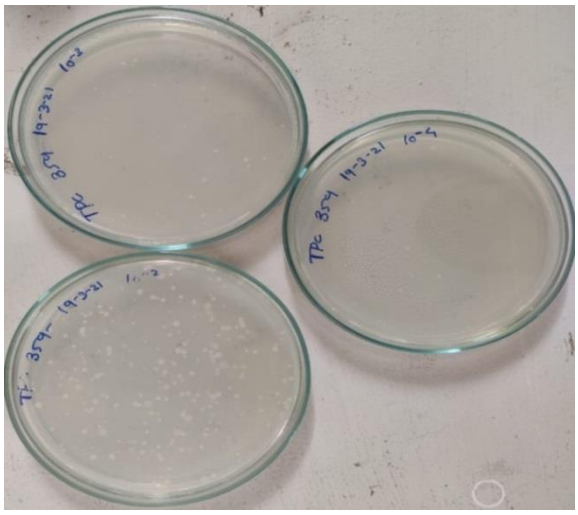
- ❖ Thoroughly mix the component
- ❖ Prepare 10 fold serial dilution
- ❖ Take 1ml of sample into sterile petriplate
- ❖ Pour 12 to 15ml of plate count agar into each plate & allow to solidify
- ❖ Again pour 4 ml of plate count agar over layer & allow to solidify
- ❖ Incubate at 25˚C for 72 hours.

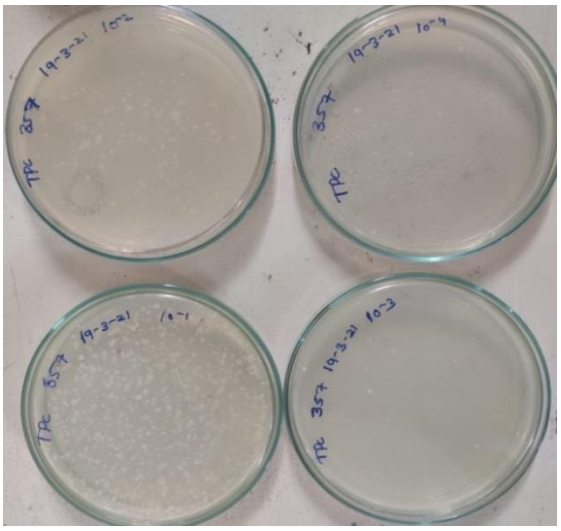


❖ Result of TPC



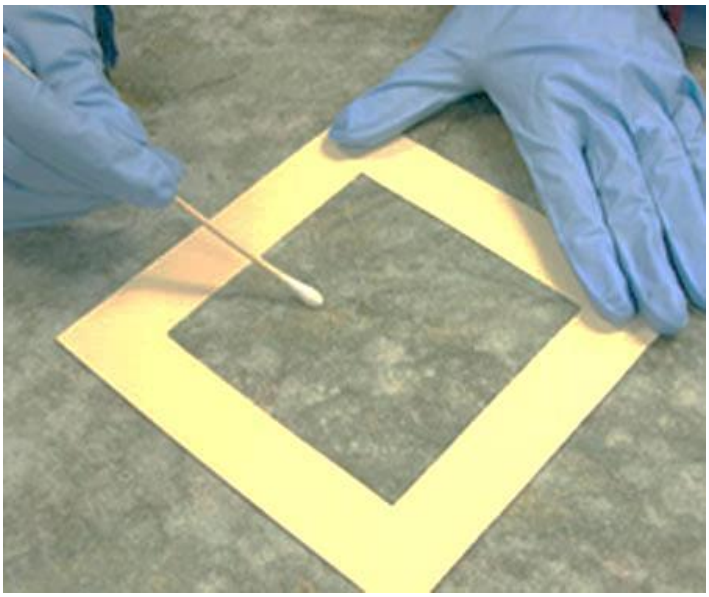


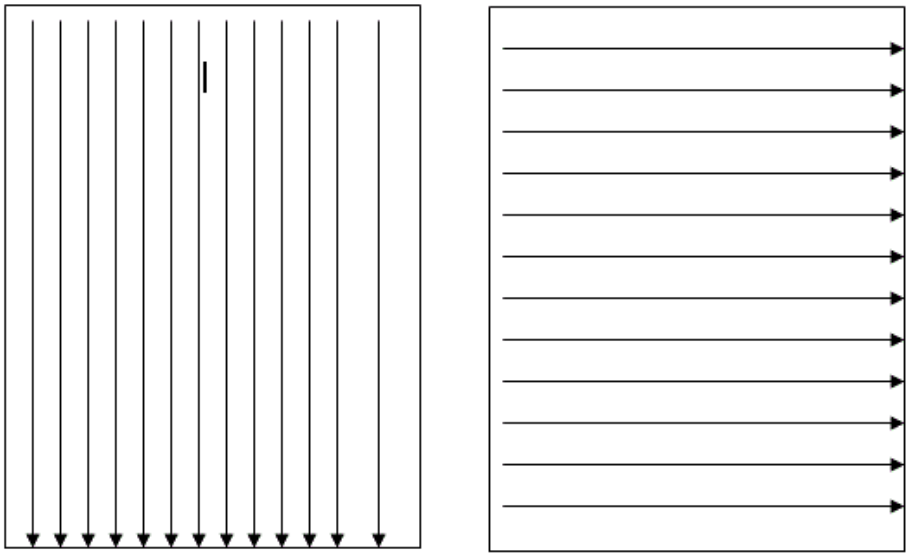




2. Swab sampling

- Take swab sampling tube filled with 1ml peptone water in it.
- Make 10cm x 10cm square on the surface from which we have to collect.
- Spread swab vertically and horizontally.
- Put the swab in peptone water containing tube and perform TPC from peptone water.





3. Detection of *E.coli* and *coliforms*

- To enumerate E.coli and coliforms present in sample.
- Coliform are found in the soil, surface water & human and animal waste whereas E.coli are found in human intestine.

❖ **Requirements:**

- VRBL Agar
- EMB Agar
- Membrane filter [0.45μm]
- Membrane filtration Assembly
- Vaccum Pump
- Sterile Forcep
- Water Sample

Membrane filtration method for detection of *E.coli* and *coliforms*

Prepare medias (EMB & VRBL) for *E -coli* and coliform respectively

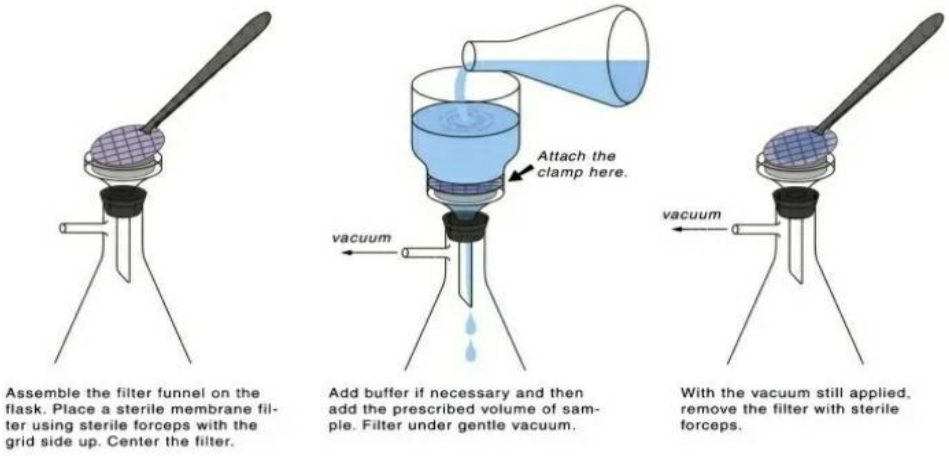
Take sterile water assembly

Put 0.45µm pore size filter

Prepare medias (EMB & VRBL) for *E.coli* and coliform respectively

Pass 100ml water through it

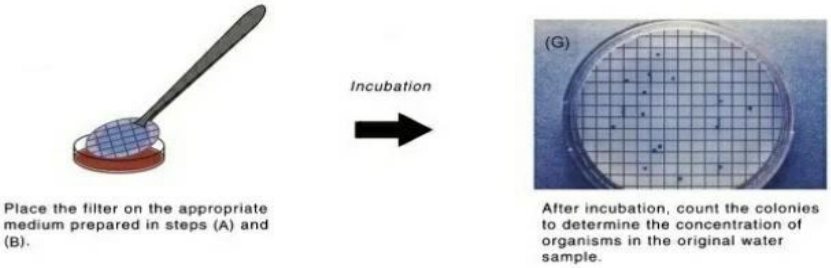
Incubate at 37 ℃ for 24hrs



Assemble the filter funnel on the flask. Place a sterile membrane filter using sterile forceps with the grid side up. Center the filter.

Add buffer if necessary and then add the prescribed volume of sample. Filter under gentle vacuum.

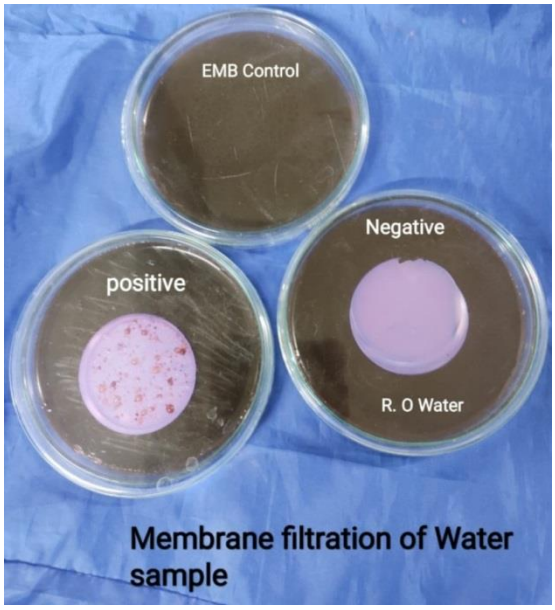
With the vacuum still applied, remove the filter with sterile forceps.

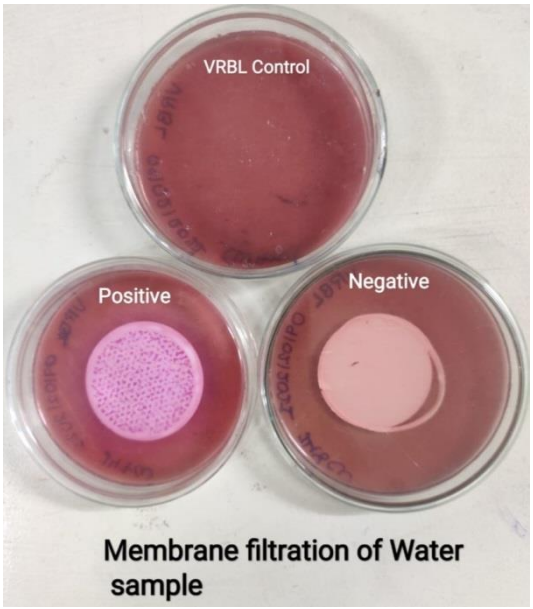


Place the filter on the appropriate medium prepared in steps (A) and (B).

After incubation, count the colonies to determine the concentration of organisms in the original water sample.

❖ Result of *E.coli* and *coliforms*

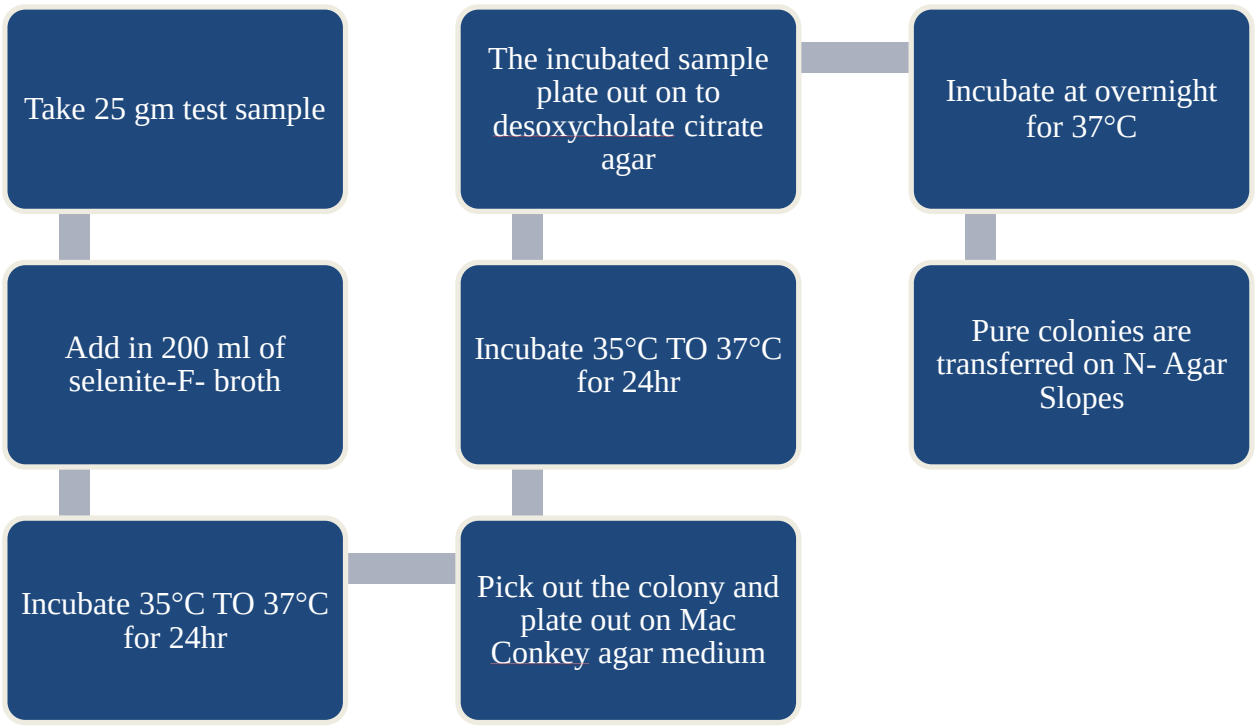


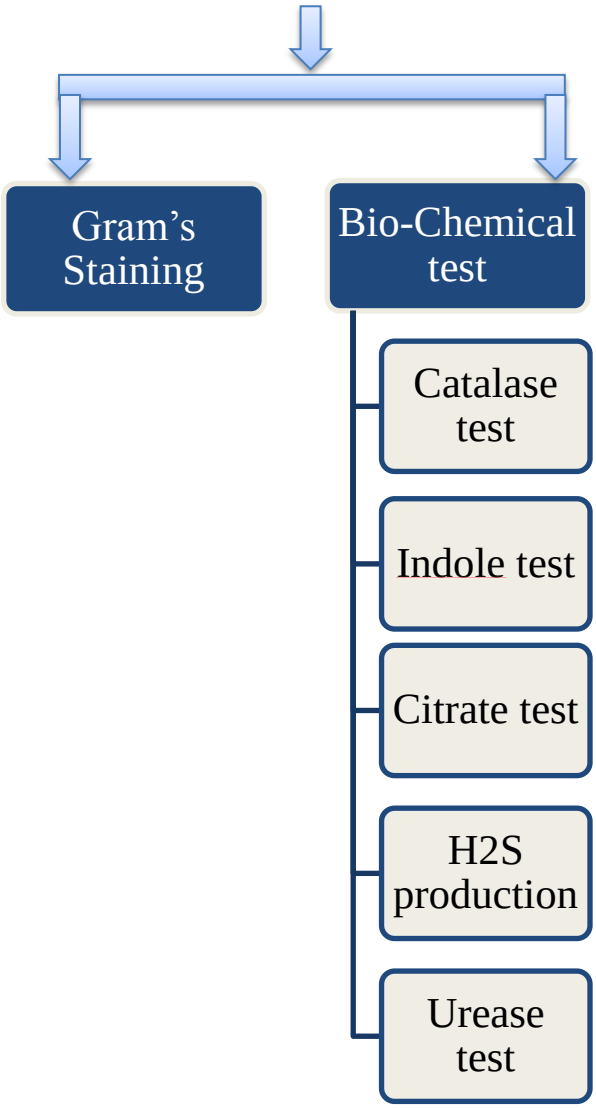


4. Detection of Shigella

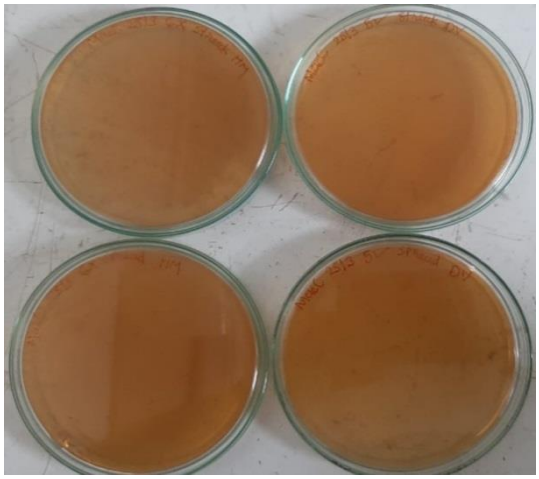
❖ **Requirement:**

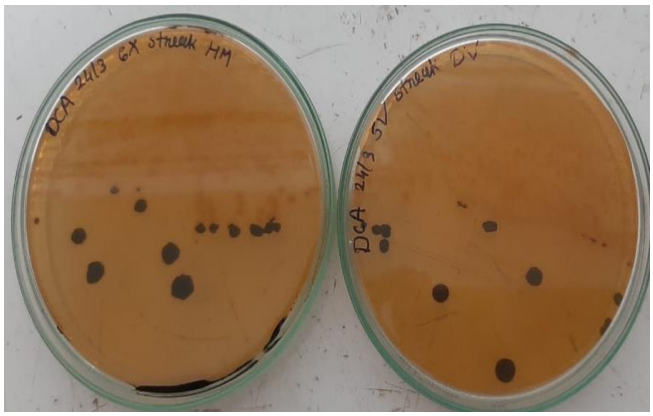
- Selenite F broth
- DCA
- Mac Conkey Agar
- N agar
- Petri plate
- Spreader




Gram's Staining
Bio-Chemical test
Catalase test
Indole test
Citrate test
H2S production
Urease test

❖ Result of Shigella





5. Detection of Listeria Monocytogenes

❖ **Principle:**

- This method is use to detect the listeria monocytogenes present or absent in the test sample.
- Listeria monocytogenes commonly found in raw milk, contaminated vegetables, water, soil, feces meats, unpasteurized dairy products.

❖ **Characteristics:**

- Gram positive
- Rod shaped

❖ **Requirements:**

- Half fraser broth
- Fraser broth
- Oxford agar
- PALCAM agar
- Tryptone soya yeast extract agar

❖ Procedure:

Primary enrichment

Take 1g of test sample and add in to 9 ml half fraser broth than incubate at 37° C for 24 h

↓

Secondary enrichment

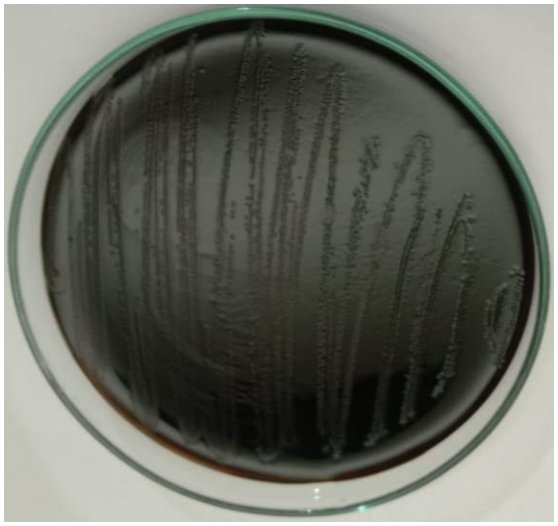
After incubation transfer 0.1 ml of half fraser broth in to 10 ml of fraser broth and incubate at 37° C for 24 h

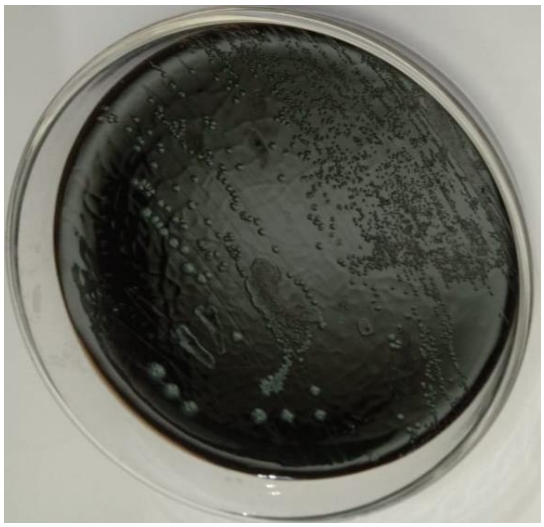
↓

Presumptive test

After incubation inoculate loop on oxford agar and PALCAM agar from primary and secondary enrichment and incubate at 37° c for 24 h

❖ Result of Listeria Monocytogenes





CONCLUSION

- I learn many things at Envitro laboratories…
- Like general microbiology and working principal of instruments. And detection of various bacteria in various food product.
- I conclude that an Envitro laboratory is good lab and also co-ordinator.
- I hope whatever I learn will be helpful me for future goals.

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