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Bacterial motility in solidified agar medium for an Apple and Rosogolla

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Abstract

Bacterial Motility test is used for checking whether the bacteria motile or not, there are numerous media to identify the motile bacteria. This paper gives a basic overview that from solidified agar medium motility can be detected easily and an overview of the shape of bacteria that depends how much they can survive on the motile test.

Keywords: Motility test, Rod bacteria, Solidified agar, Violet red bile agar

Introduction

A bacterium has their flagella which has thread like locomotor appendages extending outward from the plasma membrane and cell wall either single flagellum or multiple flagella used to move or spread forward on any agar medium. Agar medium maybe the liquid in the form of broth, or semi solid or maybe solidified form. If a bacterium is towards any direction, it is considered as motile bacterium, if there is no movement then it is considered as non-motile bacterium. Some Bacillus, cocci or some coliforms are motile in nature, and the motility test which we have done that is completely based upon these bacteria. But in case of other bacteria which are motile in nature they can be easily identified by the same methodology which was discussed. So, the motility test is performed directly without any smear form or any stain induced in it, and this is the principal criteria when motility was tested. In semi-solid agar media, motile bacteria 'swarm' and give a diffuse spreading growth that is easily recognized by the naked eye; In solid media like in agar medium motile bacteria gives a structure of a spreader which can also be detected by naked eye, and the spreader may be bacillus, cocci or a coliform. In case of broth media, it is a distinctive media to move the bacterium very swiftly, in the microscopic test broth media gives always a better swim effect as compared to other media. For this study "Hanging Drop Method" for motility test was performed.

Materials and Method

In terms of materials required for solidified media were cover slips, cavity slides, inoculating loops, Bunsen burner, compound microscope, Sample and Sticky item like Vaseline for adherence of cover slips to cavity slides. The Motile test from solidified agar medium only can be done when the bacteria are in log or in stationary phase. The bacteria should be active and the test was undertaken after taking out the petri-plates from the incubator. The samples used were an apple, water, and rosogolla (Sweetmeat Product), where the motile *bacillus* as well motile coliform and motile *cocci* were observed. In the laminar air flow system, the Vaseline/gelly should be given on the four-corner side of the cover slips as well as cavity slide so that the cover slip can adhere to the cavity slide (Fig. 1). Inoculating loop should be red heated in the Bunsen burner and then one loop taken from a dilution blank (0.9% saline solution) one to two drops was taken to the cover slips. Then loop should be further red heated and a loop of culture from the spreader into the petri-plates is taken out (i.e. taken from Nutrient Agar & Violet Red Bile Agar plates spreader bacteria). A loop of culture can be taken out in any solidified agar medium. A clean cavity slide is taken and placed it over the cover slip i.e. concavity facing the drop, gently over the cover slip (Fig. 2). After placing it, a drop of immersion oil is given and observed under 100X Microscope as quick as possible.

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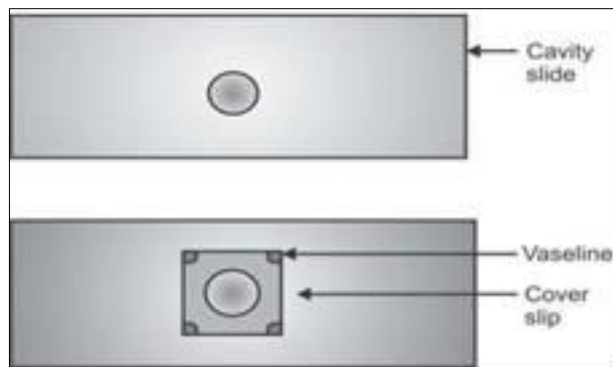


Fig 1: Top View of Cavity Slide

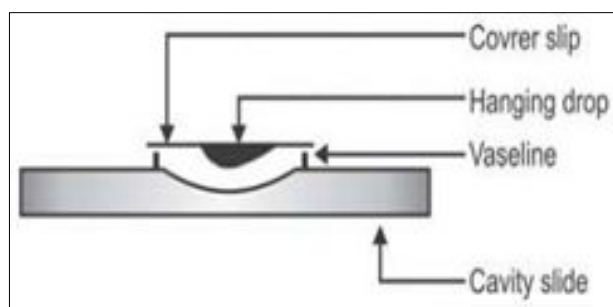


Fig 2: Side View of Cavity Slide

Results

On 100X Microscopic view the motile bacteria were certainly seen, which were rapidly moving towards either direction. If the bacteria are non-motile in nature there is no movement is observed under the microscope and seen as immobile, clustered or non-clustered form of bacteria. In case of rosogolla sample (sweetmeat product), from standard plate count (Nutrient agar) and from coliform count (Violet red bile agar) some bacteria are motile whether it was rods or cocci. In Apple sample the bacterial motility is massively seen. In water sample motility was less observed. Although motility of bacteria can only be seen either live in microscope or recorded video format, but some figures which are attached below (Fig.3, Fig.4) that identify the motile bacterium, where maximum bacteria are motile in nature and for better understanding red arrow marked bacterium is specifically identified as a distinctive motile bacterium.

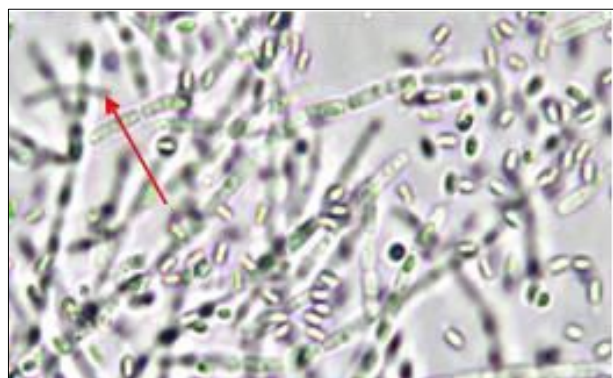


Fig 3: Rosogolla (Sweetmeat Product) Sample, Motile Bacteria.

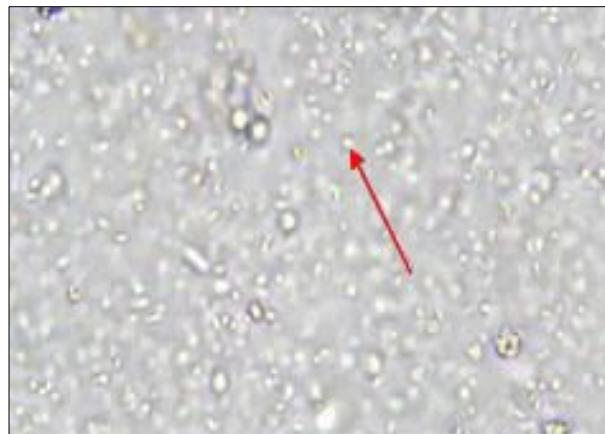


Fig 4: Apple Sample, Motile Bacteria.

Discussion

The motility test was mainly required in terms of application whether it has pathogenicity or not, because some coliforms which are motile in nature they may produce pathogen inside the human body, for example, *Escherichia Coli*, Strain O157:H7 which expresses somatic (O) antigen 157 and flagella (H) antigen 7. In our study, the cocci shaped bacteria are motile in nature but not stable for long time as compared to rod shaped bacteria, observed mainly in standard plate count plates. In case of the motility test there is no specific direction of movement of the bacteria, they can move from any of the portion amongst the dip surface of the cavity slides. In the cavity slide the bacteria were not moving rapidly as compared to broth or semisolid agar medium. The movement time is very less on either direction. Under compound microscope the bacteria movement rapidly decreased with respect to time, i.e. 5-6 minutes the cocci shaped bacteria losses their survivability and rod-shaped bacteria can survive more 2 to 3 minutes than cocci on an average. Since motility increases the occurrence of host- pathogen interactions hence the role of motility can be a virulence factor in bacteria which can be further investigated.

References

1. Tille PM, Forbes BA. *Bailey & Scott's diagnostic microbiology*. 13th ed. St. Louis (MO): Elsevier; 2014.
2. Cappuccino JG, Sherman N. *Microbiology: a laboratory manual*. 8th ed. San Francisco (CA): Pearson Benjamin Cummings; 2008.
3. Amrita Virtual Lab. Bacterial motility test. Available from: <https://vlab.amrita.edu/?sub=3&brch=73&sim=697&cnt=1>
4. American Society for Microbiology. Motility test protocol. Available from: <https://www.asmscience.org/content/education/protocol/protocol.3658>
5. Truckee Meadows Community College. Motility test lab protocol. Available from: <https://www.tmcc.edu/microbiology-resource-center/lab-protocols/motility>
6. SpringerLink. Motility test protocol. Available from: https://link.springer.com/protocol/10.1007/978-1-4939-9861-6_34
7. Hardy Diagnostics. Motility test medium. Available from: https://catalog.hardydiagnostics.com/cp_prod/Content/hugo/MotilityTestMedia.htm