Hello students, this lecture series

is for Bachelor of Science second year

students subject microbiology semester

4 paper codeMIS 102 paper title,

Instrumentation and biotechniques.

 Unit 1
 : Microscopy
 Module Name
 : Micrometry

 Module Number
 : 06

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So the outline of the series is that

Introduction and definition of micrometry Definition and principle of micrometer Instruments used in micrometry Procedure of micrometry with example Applications of Micrometry

In the learning outcomes The student will be able to:

- define and describe micrometry.
- explain ocular and stage micrometer.
- write a short note on procedure with example.
- state applications of Micrometry.

Introduction to Micrometry

When an ocular micrometer is set correctly inside the eyepiece, it enables visualisation of a sample. A micrometer scale is simultaneously seen through a microscope. By determining the single pitch length of a micrometer scale, one can measure the actual sample size.

Definition of Micrometry

Technique used to measure the size of microscopic objects.

Principle

The ocular micrometer is calibrated using the stage micrometer.

Instruments used in Micrometry

There are usually two types of micrometers.

- Ocular meter or ocular micrometer.
- Stage micrometer

Ocular Micrometer

It is a glass disc with microscopic graduations etched on its surface. It fits into the circular shelf inside the eyepiece of the microscope. It has 100 equally spaced divisions marked 0- 10. Depending on the objective used the distance between these graduations vary to determine the size of the field.

Stage micrometer

It is used to calibrate the ocular micrometer. This micrometer is of a microscope slide's shape and size. At its centre it has a standard scale etched into it of known 1mm distance into 100 equally spaced divisions making each division 0.01 mm or 10 μ m.

0.01 mm = 1 division 1 mm=100 division 1 mm=1000 mu

Since each divisions of the stage micrometer measures 10 μ m, and since we know how many ocular divisions are equivalent to one stage division, we can calculate the number of micrometers in each space of the ocular scale.

Example

To measure the size of any bacterial cell by micrometry the following steps are carried out:

- i. Calibration of ocular micrometer
- ii. Measurement of bacterial cell

Procedure

1. Calibration of ocular micrometer by stage micrometer

- I. Replace the ocular with ocular micrometer in the microscope eyepiece.
- II. Mount the stage micrometer slide.
- III. Observe the etched graduations on the slide
- IV. Count the no. of ocular divisions within one stage division of the micrometer.

6 ocular divisions = 1 stage division

Since 1 stage division = $10 \ \mu m$

8 ocular division = 10 μ m

1 ocular division = $10/8 = 1.25 \ \mu m$

2. Measurement of dimensions of microbial cells

- i. Replace the micrometer slide with a bacterial mount
- ii. Move the slide to observe the bacterial cell within the ocular divisions
- iii. Measure the cell size by counting the no. of divisions

Calculations: 1 bacterial cell = 3 ocular divisions 1 ocular division = $1.25 \ \mu m$ 3 ocular division = $3.75 \ \mu m$ Length of cell = $3.75 \ \mu m$

Application of Micrometry

✓ This method is more important in microbiological laboratory.

✓ The main purpose of this method is to identify the length of the organism such as bacteria, virus, human RBC cells, yeast cell etc.

References

According to

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Thank you