

Hello students.

I welcome you all for this session.

The subject is microbiology.

Semester one.

The code of the paper is MIG101. And the title of the paper is introduction and scope of Microbiology.

The title of this particular unit is sterilization and the name of the module is tyndallization.

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The outline includes.

Tyndallization .

The principle of Tyndallization.

And this particular word tyndallization is a process of sterilization. Another Process of sterilization.

Coming to the learning outcomes, the student will be able to define the term tyndallization and explain the working of this particular method tyndallization.

Coming to the term

tyndallization. As the term stands Tyndal.

Is the scientist John Tyndal, who discovered this particular method. That is why the name of this method is tyndallization. This Particular method usually includes live steam instead of free steam, which is usually applied in a loosely covered container that will hold steam without pressure.

Now some media solutions cannot be heated above 100 degrees centigrade.

As in the earlier modules of sterilization we have studied.

Keeping at 121.6 degrees centigrade using moist heat, OK where we can sterilize many solutions. OK, as well as certain equipments. Where is the dry heat process.

Sterilization using dry heat where a temperature of 160, to 180 degrees centigrade is employed OK, in that method we have studied, we can sterilize a lot of Glassware.

But how do we sterilize media solutions? So they are basically sterilized using this method. Therefore this method is also termed as fractional distillation method.

This method.

Of fractional distillation is also termed as tyndallization.

As the name stands, this particular method was discovered
by the scientist John Tyndall.

He devised this process of sterilization by steaming for
few minutes at 100 degrees centigrade in three to four
successive occasions.

And separated by a 24 hours interval at room temperature.

Now what does this mean?

In this process, there is sterilization by steaming for
few minutes at 100 degrees
centigrade. OK, and then you keep this solution again for
24 hours. OK, cool, cool it and then resterilize again at
100 degrees centigrade. So like this you do for three to
four successive occasions. Now While we do that I will come
to that later.

So this is done.

100 degrees centigrade in three to four successive occasions,
separated by 24 hours interval at room temperature.

This process is also termed as intermittent sterilization,
intermittent because you give a
break. An interval in the middle for 24 hours and then you re
sterilize the same substance again. Now why this is done? OK,

now this particular interval permits the dormant resistant.

Suppose there are some bacteria which can sporulate OK and these are called as the spore formers.

So during this time this cooling period, what happens is the dormant resistance spore

OK would it germinate to form a new vegetative cell or a new bacterial cell? OK.

So earlier you cannot make out when you're hitting it at 100 degrees centigrade. But when you cool it for 24 hours, you see that this pose, which have remained in that particular medium, will germinate to form a new vegetative cell. That means the sterilization is not yet done, means the microorganisms are not yet killed. OK, so then, that is why you do it again for a second time, three to four times you can do it OK?

No, this process involves boiling for a period, typically 20 minutes at atmospheric pressure.

So you boil it for 20 minutes at 100 degrees centigrade.

Any material which is to be sterilized then.

You cool it for 24 hours, that is, by incubating it outside at room temperature for a day, and then you do boiling again.

At 100 degrees centigrade, cool at once more. OK, now

why this cooling period is required is so that.

The Spores which are formed.

OK, this spore which is formed will be formed only during the cooling period. OK, so once

The medium is cool this spore.

Will be formed. These spores will germinate OK and give rise to a new vegetative cell which will be killed in the second phase of heating and like this you repeat this cooling and boiling.

Phases OK, you repeat this for three to four times.

OK, so cooling again incubating for a day and finally boiling again. Now why do we do this? You Can see in that particular diagram, which is shown OK now a normal vegetative cell would form a spore. OK, now this is resistant to 100 degrees centigrade. So when we boil at 100 degrees centigrade the Spores will not be killed. Who Will get killed is only the vegetative cell OK so?

Once this spore remain in the solution, no OK, what will happen is these spore when you're cooling, they will germinate to form a new bacterial cell now. So in the second phase of boiling, what you do, you will kill that vegetative cell. So again, if any spores are remaining in the second phase, you can cool it, which will germinate to form a new

vegetative cell. OK, and in the third phase finally.

It will die, so you reheat it and reheat it so that no more spores remain.

So the three incubation period now are to allow the Heat resistance spore, which has survived the previous boiling period to germinate to form the heat sensitive vegetative cell, which will be killed easily by heat at 100 degrees centigrade.

OK. Which can be killed again by the 2nd boiling step.

This particular method tyndallization is used for sterilizing sugars, and Gelatin which is a protein. OK, now if we use a temperature of 121.6degrees centigrade, like what is employed in an autoclave, the sugars will get charged OK and the gelatin being a protein, it will get denatured. So that is why in autoclave or.

Dry heat, we cannot use sugars or gelatin. OK, so that is why tyndallization can be used. Employed to sterilize sugars and Gelatin because the maximum temperature it reaches is 100 degrees centigrade. Even though you do it for three to four rounds, OK now this may fail to destroy the thermophiles and certain anaerobics pose.

Coming to the references.

These are the references which you can refer to.

Thank you.