

Microscopic identification of microorganisms (prepared slides) : Bacterial, fungal strains

AIM OF THE EXPERIMENT:

To identify different types of micro organisms.

THEORY:

Microbes are tiny living things that are found all around us and are too small to be seen by the naked eye. They live in water, soil, and in the air. The human body is home to millions of these microbes too, also called microorganisms.

Some microbes make us sick, others are important for our health. The most common types are bacteria, viruses and fungi. There are also microbes called protozoa. These are tiny living things that are responsible for diseases such as toxoplasmosis and malaria.

BACTERIA:

Bacteria are single-cell organisms. Some bacteria need oxygen to survive and others do not. Some love the heat, while others prefer a cold environment. Well-known examples of bacteria include salmonella and staphylococcus bacteria.

Most bacteria aren't dangerous for humans. Many of them even live on or in our body and help us to stay healthy. For instance, lactic acid bacteria in the bowel help us to digest food. Other bacteria help the immune system by fighting

germs. Some bacteria are also needed in order to produce certain types of food, like yogurt, sauerkraut or cheese.

Less than 1% of all bacteria are responsible for diseases – but this is just a rough estimate because there are no exact numbers. Tuberculosis, for instance, is caused by bacteria. Bacterial infections can be treated with antibiotics. These are medicines that kill the bacteria or at least stop them from multiplying.

Many other infections – including diarrhea, colds or tonsillitis – can also be caused by bacteria, but viruses are usually responsible for them. Antibiotics aren't effective against viruses. So it's not a good idea to start using them too soon if it's only suspected that bacteria are causing the infection.

Bacteria are classified into five groups according to their basic **shapes**: spherical (cocci), rod (bacilli), spiral (spirilla), comma (vibrios) or corkscrew (spirochaetes).

They can exist as single cells, in pairs, chains or clusters.

ENDOSPORE

A differentiated cell formed within cells of certain Gram-positive bacteria that are extremely resistant to heat and other harmful conditions and agents.

Endospore are the resting stage during the life cycle of some bacteria, formed in response to adverse conditions. The bacterial cell changes into a partially dehydrated core,

enclosed in a multilayered protein coat. On return to favourable conditions the spore germinates and reverts back to the normal vegetative form of the organism and continues its life cycle.

FUNGI:

Fungi can live in lots of different environments. The best-known fungi include yeast, mold and edible fungi like mushrooms. Just like bacteria, some fungi occur naturally on the skin or in the body. But fungi can also cause diseases.

Diseases caused by fungi are called mycoses. Common examples include athlete's foot or fungal infections of the nails. Fungal infections can sometimes also cause inflammations of the lungs, or of mucous membranes in the mouth or on the reproductive organs, and become life-threatening for people who have a weakened immune system.

But humans have also benefited from the helpful qualities of some fungi. We owe the discovery of penicillin to a type of mold that is used to produce this antibiotic.

MATERIALS REQUIRED:

1. Prepared slides of different strains of bacteria and fungi.
2. Microscope with different magnification.

PROCEDURE:

- 1. Place your slide on your microscope.** The slide will sit directly under the objective lens of the microscope. This clip will hold the slide in place while you view your sample.
- 2. Look through the lens at your sample.** The microscope should be set to the lowest power objective, which is usually 10X. On the side of the microscope, there is a knob called the coarse adjustment knob. This knob will allow you to move the lens up and down to focus.
- 3. Adjust the sample to the center of your view.** If your sample is not in the center of the viewing field, you can use your fingers to gently move the slide.
- 4. Adjust the magnification on your microscope.** Once you have your sample in focus with the low-powered objective lens, you can use the high powered lens to get a closer look. Change to the high powered lens, but be careful not to let it touch the slide. You may have to refocus slightly when you change lenses. Some microscopes have a fine adjustment knob on the side that is ideal for this.
- 5. Record what you see.** You can use a diary or journal to write down what you see in the microscope. Drawing of sample is necessary. Be sure to include any structures that you notice in your microorganisms.

OBSERVATION:

Bacteria

Name of Bacteria	Observable characters
<i>Staphylococcus aureus</i>	group of coccus shaped cells are observed. Looks likes bunches of grapes.
Bacillus subtilis	long rod shaped cells are observed.
Streptococcus sp.	chains of coccus cells are observed.
Escherichia coli	short rod shaped cells are observed
Endospore of Bacillus sp.	endospores are observed inside long rod shaped cells.

Fungi

Name of fungi	observable characters
<i>Aspergillus niger</i>	conidiophores, hyphae and mycelium are observed.
<i>Penicillium notatum</i>	conidiophores, hyphae and mycelium are observed.
<i>Saccharomyces cereviseae</i>	round or oval cells are observed. Some cells are showing buds.

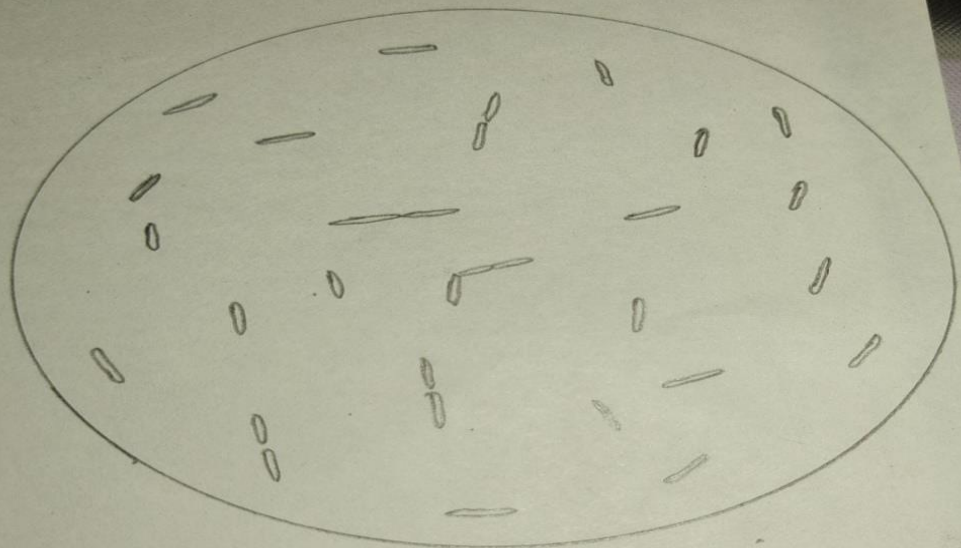


Fig: Bacillus subtilis
viewed under 40X magnification

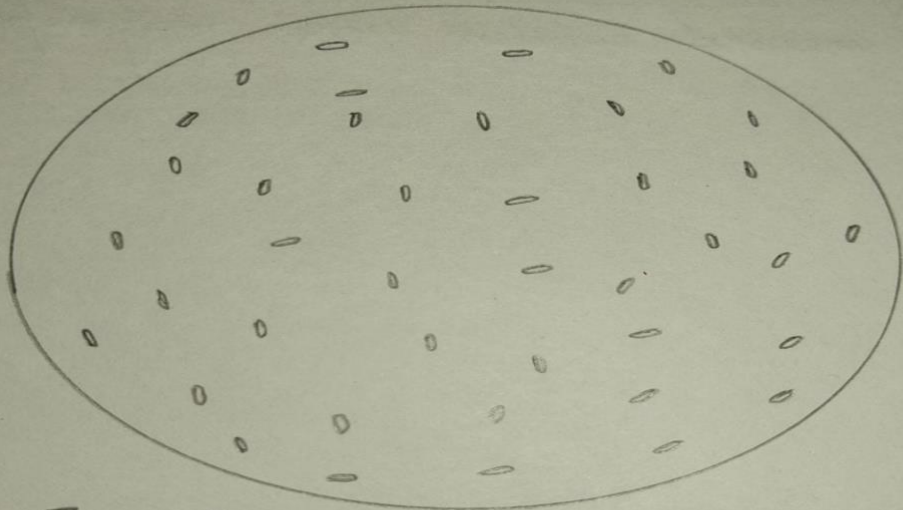


Fig: Escherichia coli
viewed under 40X magnification

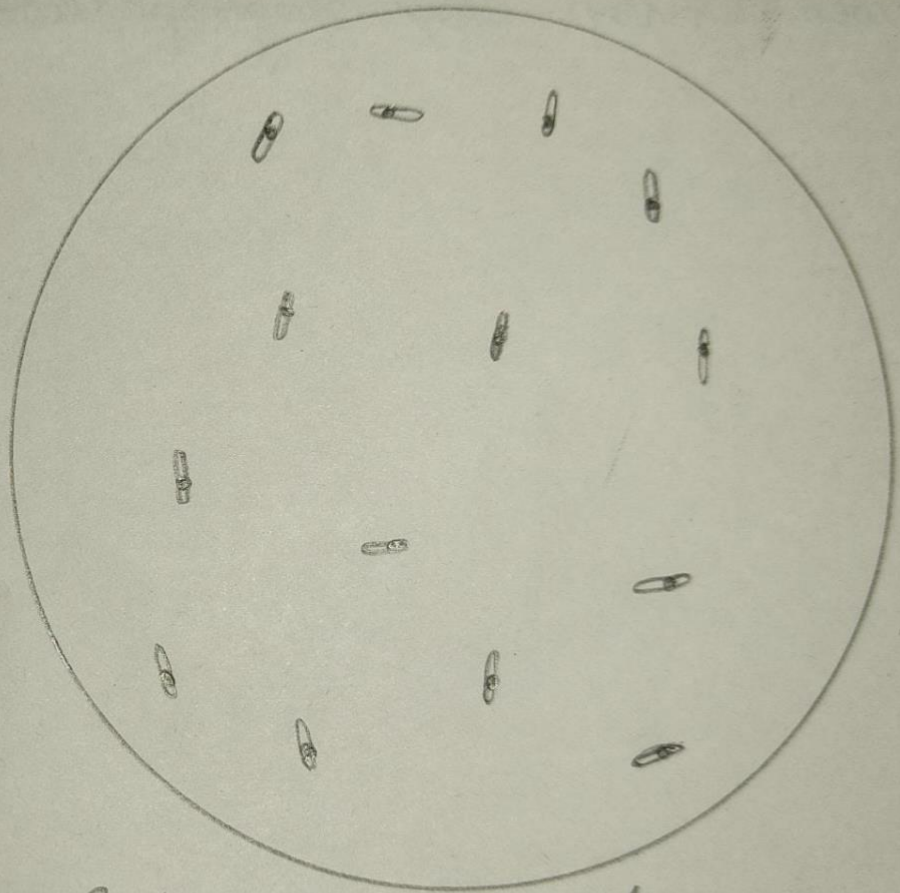


Fig: Endospore of Bacillus sp.
viewed under 40X magnification

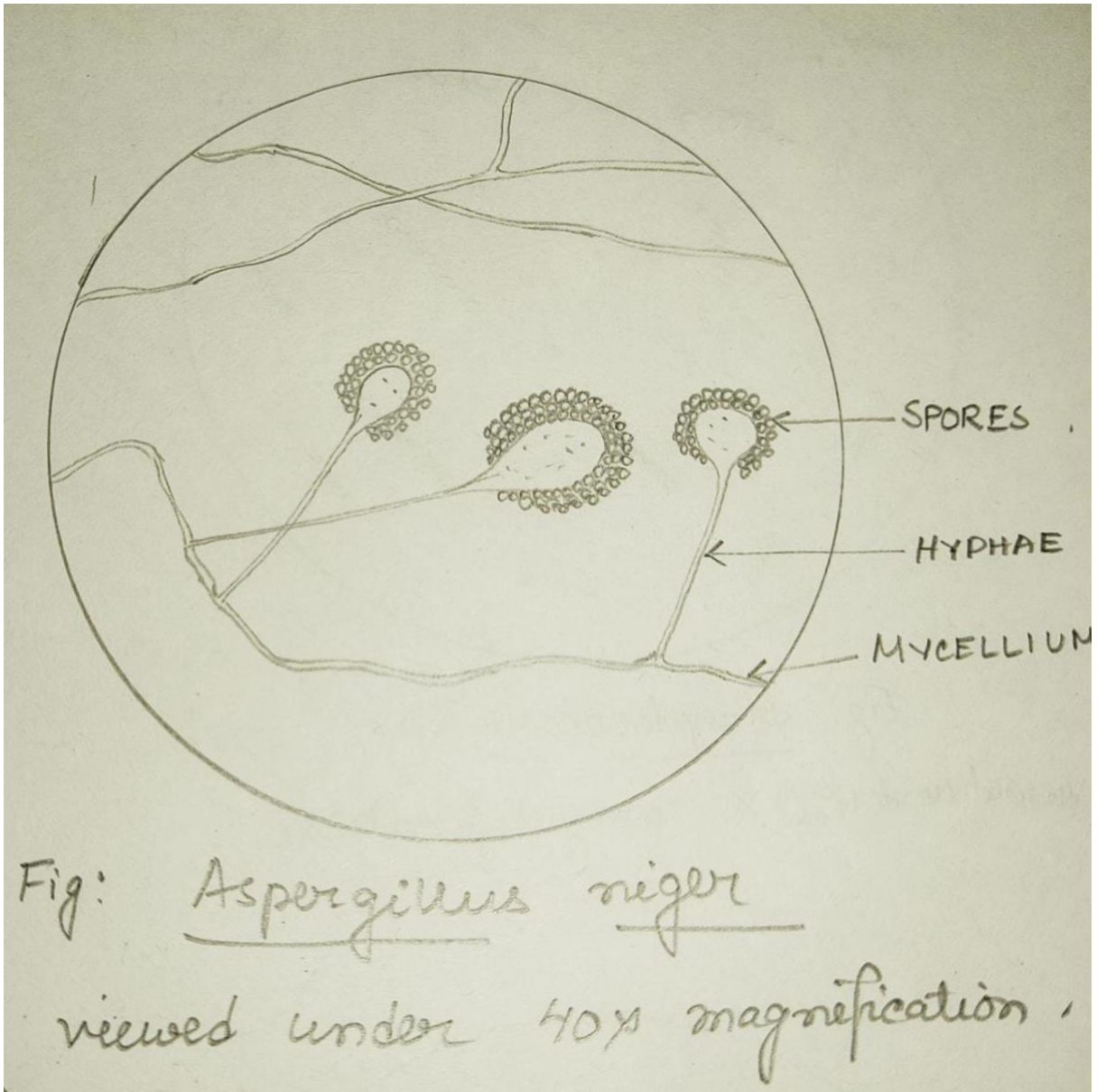


Fig: Aspergillus niger
viewed under 40x magnification.

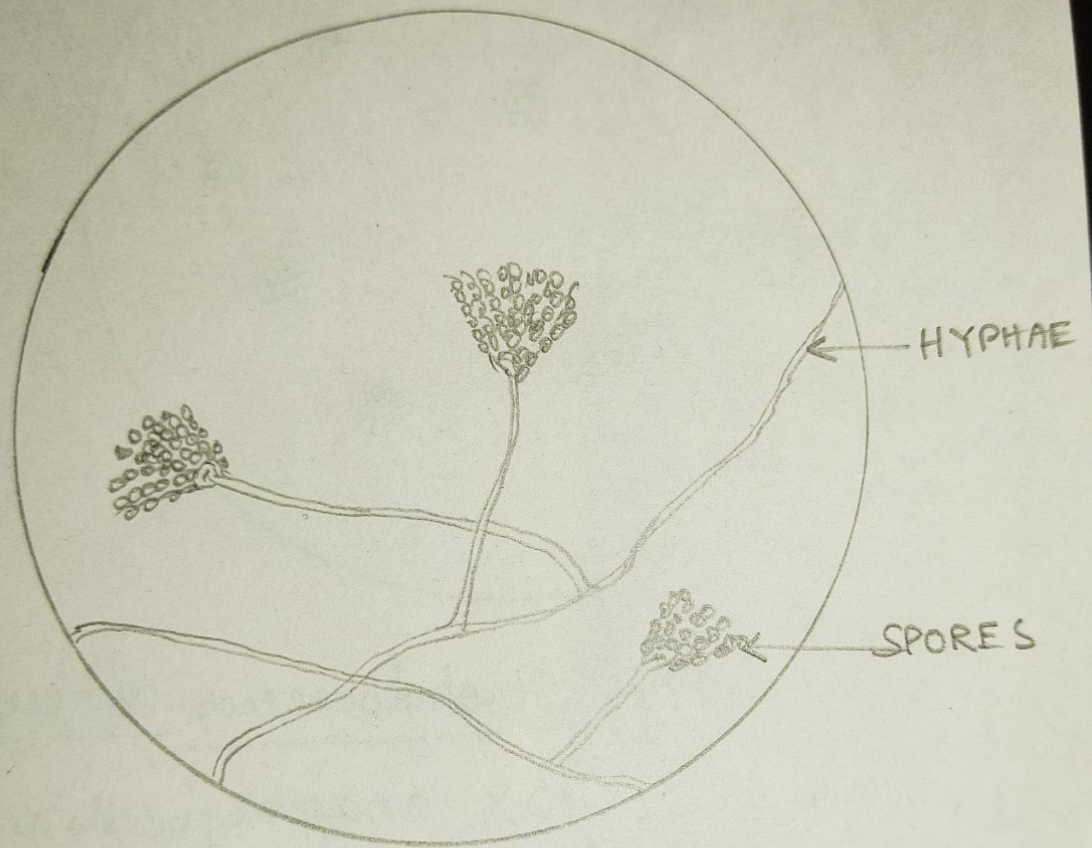


Fig: Penicillium notatum.
viewed under 40x magnification.

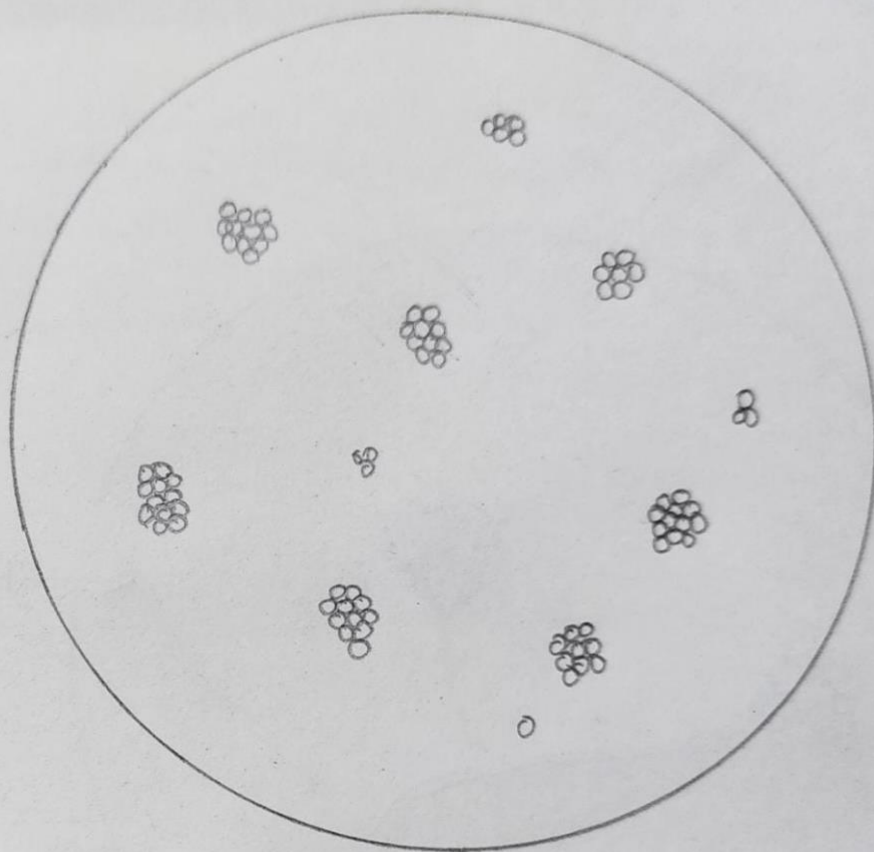
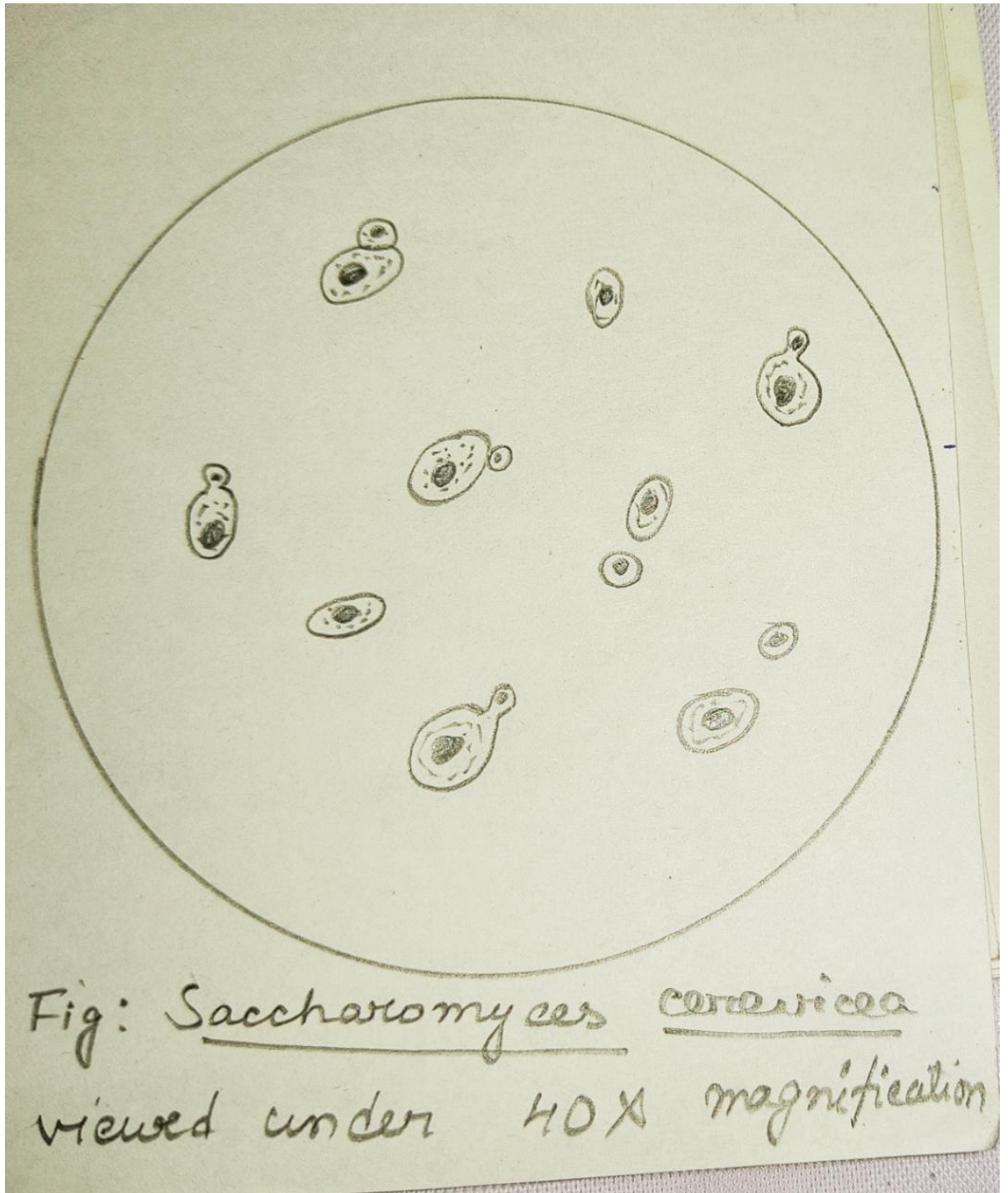


Fig: Staphylococcus aureus
viewed under 40X magnification.



Fig: Streptococcus sp.
viewed under 40X magnification



PRECAUTION:

1. prepared slides were properly prepared.
2. under microscope the slides are properly placed to have clear view of the field.