Bacteria: Experiment With The Growth Of Bacteria From Different Places

Introduction (What bacteria is, how bacteria grows) – add transmission

Bacteria are incredibly small microorganisms that have various effects on humans and the environment. Microorganisms that impact on the function of the host are pathogens. Most known forms of bacteria are single-celled organisms. Pathogens can be transmitted through a variety of methods, these include direct contact (touching the person), Airborne droplets (sneezing or coughing), a vector (an organism that carries the disease without being infected themselves, mosquitoes, rats, fleas), contaminated objects (touching a contaminated surface) and contaminated water (pathogens that live and a carried in water). Bacteria reproduce through a process called binary fission, this is where one cell splits into two identical cells. Bacteria can reproduce rapidly eventually forming colonies which can be studied.

Aim

To observe the growth of bacteria from an experimenter's hands, an experimenter's nose, the mouth of a chicken and the tap of a toilet sink.

Hypothesis

- Experimenter's nose – It is believed that 40% of the agar dish will be covered in bacteria.
- Washed hands (sterile) – It is believed that 4% of the agar dish will be covered in bacteria.
- Inside of a chicken's mouth – It is believed that 90% of the agar dish will be covered in bacteria.
- Tap of a toilet – It is believed that 95% of the agar dish will be covered in bacteria.

Materials

- 4 pre prepared agar nutrient dishes
- 4 sterile cotton buds
- Sticky tape
- 4 labels
- A pen
- Soap

Method

1. A bacteria sample was taken from one of the a previously chosen area.
2. A hypothesis regarding the percentage of bacteria growth was written.

3. The sterile agar nutrient plate was collected and kept sealed whenever possible.
4. One experimenter used a cotton bud to swab the selected surface.
5. The contaminated cotton bud was gently wiped over the agar surface in a zigzag pattern.
6. The lid was placed on the dish and was sealed using sticky tape.
7. The sealed dish was labeled.
8. The above steps were repeated for the remaining areas.
9. All four dishes were placed in an incubator for a consistent amount of time.
10. All four dishes were taken out of the incubator and photos were taken.

Results

Discussion

Most bacteria thrive in warm temperatures (30°C), especially those close to body temperature. Bacteria requires a nutrient-rich environment to grow. Bacteria need water to grow and die without a water source. Moist areas are particularly prone to bacterial growth.

Nutrient Agar is a nutrient rich medium used for the cultivation of bacteria. Nutrient agar contains many nutrients needed for bacterial growth. The solid medium allows bacterial colonies to be more easily defined and studied.

During the experiment, bacteria was found inside an experimenter’s nose. Bacteria can be found in nasal hairs as filter airborne pathogens during the action of breathing. Does the nose hair catch those pathogens from entering the body?

There are two types of nose hair, the first type are cilia, which are found deep within our noses. These tiny hairs constantly wave back and forth, catching the dangerous particles in mucus. Cilia then move the particle-filled mucus toward our throat. There, it is either coughed up or swallowed.

The second type is nasal hair, these longer hairs catch large particles so they can’t even get to our cilia. Instead, they stay trapped in our nose hairs until they can be expelled from the body through the action of sneezing or blowing them out.

The agar plate containing the sterile sample (Washed hands) experienced bacteria growth (approximately 16%). The sample was attained after an experimenter thoroughly washed their hands with soap and water, then the hands were dried with a paper towel. There are two main areas that could have allowed the presence of bacteria in the sample. The first area is the soap, they clearly state that they don’t have a 100% effectiveness, this could allow bacteria To remain on the hands after they were washed. The second is the paper towel, it is constantly used to dry washed hands. This could potentially have bacteria on the surface that could have be transferred when the hands were dried.

Pathogens can be spread through a variety of methods, these include physical contact, vectors and airborne particles. Pathogens can be transmitted through physical contact, some pathogens are transmitted through infected skin, mucous and body fluids. Pathogens can also be spread by indirect contact when an infected person touches a surface leaving behind pathogens that

are then transferred to another person.

Vectors or separate creatures can transmit the pathogen from one person to another without being infected. Common vectors are fleas, mice, ticks and mosquitos.

Airborne particles can also transmit pathogens, these could be evaporated droplets or dust particles containing microorganisms in the air for a long period of time. Droplets spread by sneezes, coughing and talking can transmit the pathogen.

A systematic error that may have occurred during the experiment was the temperature of the incubator during the days of growth. If the temperature was not 30°C (this is the optimal temperature to grow bacteria) the entire duration then the growth wold be effected. This could be rectified in future experiments by ensuring the temperature of the incubator is 30°C before leaving the bacteria samples to grow. Another potential systematic error was the amount of the agar in each dish. The amount of agar in the dish is important as it provides the nutrients the bacteria requires to grow. If there isn't enough agar in the dish than the bacteria growth will be effected. This could be rectified in future experiments by weighting each petri dish whilst adding the agar. This will ensure that the ideal amount of agar is inside the dish (approximately 12mL).

A random error that occurred during the experiment was prematurely opening the agar dish. The open dish could have been contaminated by airborne particles in addition to the desired sample. This could be rectified by ensuring the agar dish was closed at all possible moments and only opened when transferring the sample to the agar surface.

Conclusion

The aim of the experiment was to observe the growth of bacteria from washed hands, an experimenter's nose, the mouth of a chicken and the tap of a toilet sink. It was hypothesised that the bacteria sample from an Experimenter's nose would cover 40% of the agar dish, the sample from washed hands would cover 4%, the sample from a chickens mouth would cover 90% and the sample from a toilet tap would cover 95%. Although these estimates were inaccurate the experiment gave evidence to support each hypothesis as bacteria growth was present.