GCSE Biology required practical activity: Microbiology

Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.

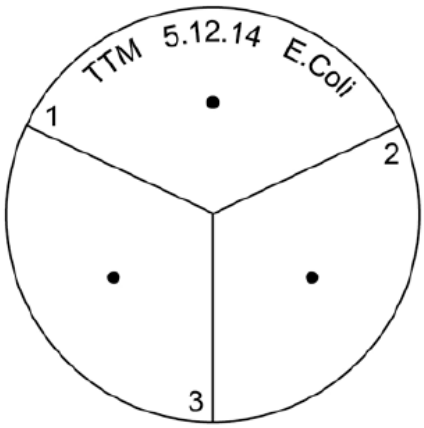
Apparatus

- a nutrient agar plate inoculated with bacteria
- filter paper discs
- three antiseptics (such as mouthwash, TCP, and antiseptic cream)
- disinfectant bench spray
- forceps
- clear tape
- antibacterial hand wash
- a wax pencil or permanent marker
- ruler.

Method

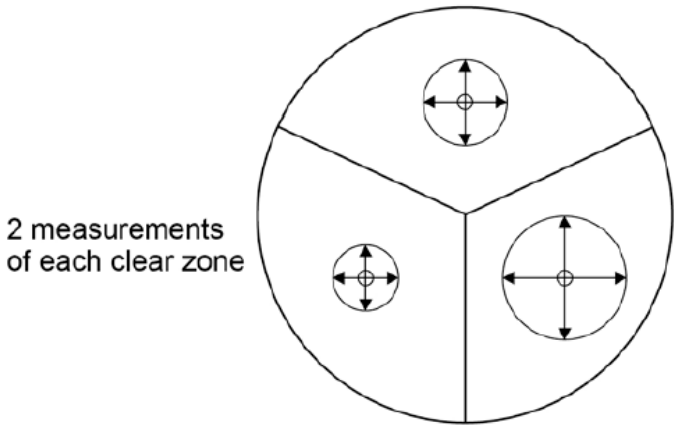
1. Make sure your hands and work space are thoroughly clean before and after the experiment.
2. Spray the bench where you are working with disinfectant spray. Then wipe with paper towels.
3. Use the wax pencil or permanent marker to mark the bottom of the nutrient agar plate (not the lid) as shown in the diagram below. Make sure that the lid stays in place to avoid contamination.
    - divide the plate into three equal sections and number them 1, 2 and 3 around the edge
    - put a dot into the middle of each section
    - add your initials, the date and the name of the bacteria.

Your plate will look like this:



4. Wash your hands with the antibacterial hand wash.
5. Put a different antiseptic onto each of the three filter paper discs, being careful to shake off excess liquid to avoid splashing.
6. Carefully lift the lid of the agar plate at an angle away from your face. Do not open it fully.
7. Use the forceps to carefully put each disc onto one of the dots you drew on with the wax pencil.
8. Make a note of which antiseptic is in each section.
9. Secure the lid of the agar plate in place using two small pieces of clear tape.

   Do **not** seal the lid all the way around as this creates anaerobic conditions. Anaerobic conditions will prevent the bacteria from growing and can encourage some other very nasty bacteria to grow.
10. Incubate the plate at 25 °C for 48 hours.
11. Measure the diameter of the clear zone around each disc. Measure again at 90° to your first measurement, then calculate the mean diameter.



12. Record your results in a table like this one:

Type of antiseptic	Diameter of clear zone in mm		
	1	2	Mean

Task

From the mean diameter measurements calculate the cross sectional area of the clear areas around the bacterial colonies.

Conclusion

What type of antibiotic was most effective on the bacterial growth?

Health and safety

Identify the main hazards in this investigation and suggest methods to reduce the risk of harm.