National Department of Health

Title: Catalase Test

ID: G_90_T_7_A

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Changes to the last authorized version:

Version	Date issued	Changes

1. Purpose and Scope

This document describes the Catalase test procedure.
This test is used as an aid in distinguishing between Staphylococci and Streptococci.

This test detects the catalase enzyme present in most cytochrome-containing aerobic and facultative anaerobic bacteria.
Streptococcus and Enterococcus species are exceptions. Yeast such as Cryptococcus neoformans is catalase positive.

2. Principle/Clinical application

The catalase test is used to detect the presence of catalase enzyme by the decomposition of hydrogen peroxide to release oxygen and water as shown by the following reaction:

$$2\,H_2O_2 \rightarrow 2H_2O + O_2$$

The catalase reaction is evident by the rapid formation of bubbles.

All members of the genus *Staphylococcus* are catalase positive, whereas members of the genus *Streptococcus* are catalase negative.

Listeria monocytogenes (catalase positive) can be distinguished from beta-hemolytic *Streptococcus* (catalase negative).

Catalase can also help distinguish *Bacillus* sp. (catalase positive) from aerotolerant *Clostridium* sp. (catalase negative).

The superoxol catalase test used for the presumptive speciation of certain Neisseria organisms requires a different concentration of H_2O_2.

3. Responsibilities

- Staff performing Catalase require specific training and demonstrate competency.
- Staff performing Catalase are responsible for the setup, reading and recording of the Catalase result.
- Staff are required to test and record Catalase Positive and negative controls daily

4. Specimen

- Test isolated colonies from a 18-24hr culture – taking care not to touch agar containing red cells as carry over of red cells may give a false positive result.
- Organisms older than 24hrs may give a false negative result.

5. Safety

For safety aspects, please review this document G_10_Info_3 Laboratory Biosafety.

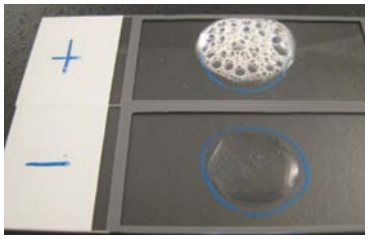
6. Equipment and Materials

- 3% hydrogen peroxide H_2O_2 (from stock bottle). Store 2°C – 25°C. Do not freeze or overheat. Light sensitive, store in brown bottle.
- Clean microscope slide or glass test tube
- Wooden applicator stick
- Quality Control organisms: *S. aureus* ATCC 29213 & *E. faecalis* ATCC 29212
- Plastic disposable pipettes
- Marking pen
- Gloves

7. Procedures

Slide Method

7.1 Carefully remove colony(s) from agar with wooden applicator stick and smear them on a clean labelled microscope slide.
7.2 Place a few drops of 3% hydrogen peroxide onto the smear, and immediately observe for the release of oxygen (bubbles).



Tube Method

7.3 Place a few drops of 3% hydrogen peroxide into a labelled glass test tube.

7.4 Carefully remove colony(s) from agar with wooded applicator stick and submerge into the test tube of hydrogen peroxide, and immediately observe for the release of oxygen (bubbles).

Tube Catalase Positive

8. Results Recording

- Record all results onto paper worksheet with registered lab number and patient identification.
- Record results into LIMS

9. Interpretation

- A positive catalase will be demonstrated by the formation of bubbles.
- No bubbling indicates the absence of catalase.

10. Quality Control

- S. aureus ATCC 29213- Catalase Positive
- E. faecalis ATCC 29212 – Catalase Negative
- Record the QC results on the Bench Reagent QC Worksheet G_90_WS_1

11. Related Documents

- Bench Reagent QC Worksheet G_90_WS_1
- Laboratory Biosafety Info Sheet G_10_Info_3

12. Reference

- UK Standards for Microbiology Investigations https://www.gov.uk/uk-standards-for-microbiology-investigations-smi-quality-and-consistency-in-clinical-laboratories
- ASM Microbe Library