Catalase and Oxidase Testing

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The Catalase Test

- Principle: Catalase is an enzyme that converts hydrogen peroxide into water and oxygen. The bacteria that contain this enzyme are usually aerobic (need oxygen) or facultative anaerobes (can live with or without oxygen). A positive reaction is indicated by a continuous bubble formation when the catalase is introduced to bacterial colonies.

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The Catalase Test

- Purpose: Differentiate *Staphylococcus* from *Streptococcus species* of bacteria.

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The Catalase Test

Procedure:

- Place a small amount of a bacterial colony (18 to 24 hours old) on a clean glass slide.
- Add one to two drops of 3% hydrogen peroxide.
- Record observations:
  - Positive: rapid bubble formation
  - Negative: no bubble formation
- Possible false positives
  - The order of the procedure is reversed.
  - Bacterial colonies are contaminated with red blood cells from the blood agar.

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The Oxidase Test

- Principle: *Micrococcus species* contain cytochrome C, a component of the cytochrome oxidase system. This test differentiates between *Micrococcus* and *Staphylococcus* species. Additional testing may need to be performed for positive identification. When the oxidase reagent is added to a colony of bacteria, a dark blue to purple color is formed.

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The Oxidase Test

- Purpose: Differentiation of *Micrococcus* from *Staphylococcus* species of bacteria.

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The Oxidase Test

Procedure:

- Place one drop of oxidase reagent on an 18 to 24 hour colony of bacteria grown on a TSA plate.
- Observe for color change:
  - Positive: blue to dark purple color
  - Negative: no color change

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