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Section: Technical Manual	Subject Title: SIM (Sulfide-Indole-Motility)	
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SIM (SULFIDE-INDOLE-MOTILITY)

Principle

1. To determine the ability of an organism to liberate hydrogen sulfide (H₂S) from sulphur-bearing amino acids producing a visible, black colour reaction.
2. To determine the ability of an organism to split indole from the tryptophan molecule.
3. To determine if the organism is motile or non-motile.

This test is used, in conjunction with others, for the identification of *Enterobacteriaceae* when unable to identify using VITEK or API system.

Reagents

Kovac's Reagent

Other Materials

SIM Medium.

Inoculating wire or sterile glass pasteur pipette.

Procedure

1. With a pasteur pipette, draw up a small amount of previously inoculated TSB.
2. Stab vertically into the medium to within 1/4 to 1/2 inch from bottom: withdraw inoculating needle following line of inoculation.
3. Incubate O₂, 35°C X 18-24 hours.
4. Add a few drops of Kovac's reagent and observe for development of a red colour.

Interpretation

H₂S production

- (a) Positive: any blackening of the medium
- (b) Negative: no blackening

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Motility

- (a) Positive: motile organisms migrate from the stab line and diffuse into the medium causing turbidity. They may exhibit fuzzy streaks of growth. (Compare with an uninoculated tube.)
- (b) Negative: bacterial growth accentuated along stab line; surrounding medium remains clear.

Summary:

Results are recorded as follows. Remember that H₂S is first, then indole and finally motility.

- /-/ - no H₂S, indole neg, non motile
- /-/+ no H₂S, indole neg, motile
- /+/- no H₂S, indole pos, non motile
- /+/+ no H₂S, indole pos, motile
- +/-/- H₂S, indole neg, non motile
- +/-/+ H₂S, indole neg, motile
- +/+/- H₂S, indole pos, non motile
- +/+/+ H₂S, indole pos, motile

Refer to Manual of Clinical Microbiology for specific organism reactions.

Precautions

1. An H₂S-producing organism may exhibit blackening on SIM medium, but none on TSI medium.
2. Some H₂S inhibition occurs when the temperature exceeds 34°C.
3. Many bacteria are motile at one temperature and non-motile when at another.
4. If a motility test is difficult to interpret, compare with an uninoculated motility tube. If still in doubt, perform a wet prep or hanging drop preparation using a heavy loopful of an 18-24 hr culture.

Quality Control

Quality control must be performed on each new lot of SIM before being put into general use.

- K. pneumoniae* (ATCC 13883): -/-/ -
- P. vulgaris* (ATCC 13315): +/+/+

References

1. MacFaddin JF, Biochemical Tests for identification of Medical Bacteria, 2nd ed., Williams and Wilkins, Baltimore MD, 1980, p162-173, 173-183, 214-218.