Evaluation of COPAN Thioglycollate Broth (THIOL Broth)

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Background

COPAN (Brescia, Italy) has introduced the LBM (Liquid Based Microbiology) specimen collection and preservation devices for collection and transport of clinical specimens. In support to the collection and transport devices Copan has also introduced a line of enrichment media including Thioglycollate broth (THIOL Broth, 4 mL) in a PTE vial.

The enriched medium is recommended for the isolation and cultivation of fastidious or slow growing obligatory anaerobic microorganisms. The medium contains both Vitamin K and Hemin. Vitamin K is a growth requirement for some anaerobic micro-organisms. Hemin is incorporated to supply the X factor for stimulated growth of many fastidious organisms.

The isolation of micro-organisms from clinical material frequently requires the use of enriched media in addition to the selective differential and non selective plated media normally used for primary isolation. The use of liquid "back-up" media reduces the possibility of completely missing an etiological agents that are present in low numbers, slow growing on plated media, susceptible to selective agents or sensitive to unfavorable incubation conditions; i.e. insufficient anaerobiosis for optimal growth of obligate anaerobes.

THIOL Broth (COPAN, Brescia, Italy

Objectives

The objectives for this study was to evaluate the performance of the COPAN THIOL Broth according to CLSI guideline M22-A3 (Quality Control for Commercially Prepared Microbiological Culture Media) and comparison of the currently used medium (BBL™ Fluid Thioglycollate Medium, Becton Dickinson).

Materials & Methods

The method used for this evaluation is based on CLSI protocol M22-A3. According to this document Thioglcyllate broth belongs to the exempt media category and only a minimum of quality control is required. Nevertheless in this project we evaluated the growth performance using a larger number of quality control strains.

In addition to the CLSI protocol, serial dilutions, of the required 0.5 McFarland suspensions, were made and used to inoculate an eSwab device for each strain; a five fold dilution was selected. THIOL Broth tubes were inoculated on the WASP™ (COPAN, Italia) using a 30 µL loop (resulting in a final concentration, of: ~7, ~1 and <1 CFU/THIOL Broth) and incubated according to the instructions of the manufacturer. After incubation the THIOL Broth was streaked on the WASP™ using a 10 µL loop.

A comparison was made with the medium currently in use for clinical specimens following the instructions of the manufacturer and laboratory protocols. Growth/no growth was compared together with the identification of the isolated organisms. For discordant results the clinical impact was estimated (e.g. change on medication).

Used Strains:

- *Bacteroides fragilis*
- *Bacteroides vulgatus*
- *Citrobacter freundii*
- *Clostridium perfringens*
- *Clostridium difficile*
- *Enterobacter cloacae*
- *Enterococcus casseliflavus*
- *Escherichia coli*
- *Finegoldia magna*
- *Fusobacterium nucleatum*
- *Haemophilus influenzae*
- *Klebsiella oxytoca*
- *Klebsiella pneumoniae*
- *Listeria monocytogenes*
- *Peptostreptococcus anaerobius*
- *Propionibacerium acnes*
- *Proteus mirabilis*
- *Proteus vulgaris*
- *Pseudomonas aeruginosa*
- *Salmonella enterica*
- *Staphylococcus aureus*
- *Staphylococcus epidermidis*
- *Staphylococcus saprophyticus*
- *Stenotrophomonas maltophilia*
- *Streptococcus agalactiae*
- *Streptococcus dysgalactiae*
- *Streptococcus pneumoniae*
- *Streptococcus pyogenes*
- *Yersinia enterocolitica*

Results

Visual inspection and sterility control of the received media did not show any abnormalities. The growth performance tested with 29 different strains (including fastidious and anaerobic organisms) was completely in compliance with the requirements as described in CLSI M22-A3. All of the 29 selected strains showed growth with the highest concentration (~7 CFU/THIOL Broth). Almost 80% of the used strains showed growth with the second dilution (~1 CFU/THIOL Broth) used and 10% of the selected strains showed growth with the lowest dilution (<1 CFU/THIOL Broth) used.

Results (continued)

Clinical specimens (n = 200) were tested with the currently used medium and the COPAN THIOL Broth. An agreement of 90.0% (n = 180) was obtained. For the remaining 10.0 % (n = 20), the following differences were found:

Of the BBL™ Fluid Thioglycollate Medium (Becton Dickinson) 14 showed no growth where the THIOL Broth (COPAN) did. Even more, 7 out of 14 (3.5 %) gave a possible clinical significant result with the COPAN THIOL Broth.

Vice versa, 6 of the COPAN THIOL Broth showed no growth where the B.D. BBL™ Fluid Thioglycollate Medium did. Two out of six (1.0 %) gave a possible clinical significant result with the B.D. BBL™ Fluid Thioglycollate Medium.

		BBL™ Fluid Thioglycollate Medium (B.D.)	
		Growth	No growth
THIOL Broth (COPAN)	Growth	106 (53.0 %)[1]	14 (7.0 %)
	No Growth	6 (3.0 %)	74 (37.0 %)

1. In all cases growth was clinically comparable.

Conclusions

The new COPAN THIOL broth is in compliance with CLSI M22-A3 and supports the growth of a wide variety of aerobic and facultative anaerobic microorganisms even in low concentrations. Compared to the currently used medium on clinical specimen the COPAN THIOL Broth showed a better performance and no major differences were found.

References

1. THIOL Broth IFU, COPAN Rev. 00 Date 2014-05
2. BBL™ Fluid Thioglycollate Medium IFU, B.D. rev. 11 Date 2011-01
3. Quality Control for Commercially Prepared Microbiological Culture Media; Approved Standard—Third Edition. CLSI document M22-A3. Wayne, PA: Clinical and Laboratory Standards Institute; 2004.

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