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EVALUATION OF THE COPAN SL SOLUTION TO IMPROVE SPUTUM CULTURE

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ABSTRACT

Background: COPAN SL solution with sputum dipper (Copan, CA) is a new device that enables the emulsification of sputum and mucus resulting in a homogenous suspension allowing for easier, more consistent and reproducible planting and streaking of specimens. The objective of this study was to evaluate the new Copan SL Solution to improve the recovery of microorganisms from sputum cultures.

Methods: There were 50 sputum specimens included in this study. Two different sample preparation protocols were performed for each clinical specimen. Protocol A was the standard protocol in which sputum samples were cultured directly on 4 different culture media plates: Mac Conkey, Chocolate, Rose and Blood Agar (BD/BBL, USA). On Protocol B, sputum samples were first transferred to the SL solution with the sputum dipper. The SL tube was vortexed for 15 seconds and left undisturbed for a minimum of 15 minutes. The specimen was then inoculated on the same 4 media used for traditional cultures. Standard incubation and identification methods were performed. Results from specimens processed by protocol A and B from the same clinical specimens were compared.

Results: There were 61 results of microorganisms from specimens processed by protocol A and 67 from specimens processed by protocol B. The 6 additional microorganisms isolated from protocol B were identified as ***P. aeruginosa*** (n=4; 2 of them mucoid), ***S. aureus*** (n=1) and ***S. maltophilia*** (n=1). Each result was semi-quantitated as rare, light, moderate and heavy growth. Recovery rates of microorganisms growth (e.g. rare to light, light to moderate, moderate to heavy) were higher in 32 microorganisms processed by Protocol B versus 16 microorganisms processed by Protocol A. The same qualitative and quantitative results from specimens processed by protocol A and B were obtained in only 16 clinical specimens.

Conclusion: SL solution using the sputum dipper is an efficient system to liquefy sputum. In most cases, recovery rates of microorganism growth are higher and superior after processing the sputum with SL solution. In addition to that, the specimen treated with SL solution, when plated, produces consistent and reproducible results.

INTRODUCTION

Respiratory samples represent a significant proportion of routine microbiological specimens and they are very important for management of critically ill patients. Some of these specimens (p. ex. Sputum) sometimes require emulsification before culture, to allow a better recovery of the organisms from the sputum.

COPAN SL solution with sputum dipper (Copan, CA) is a new device that enables the emulsification of sputum and mucus resulting in a homogenous suspension allowing for easier, more consistent and reproducible planting and streaking of specimens. Copan's SL solution is a ready to use mucolytic agent with the principle active ingredient being dithiotreitol (DTT). SL solution quickly liquefies sputum specimens without affecting the morphology, growth or microscopic staining of pathogens in the sputum.

OBJECTIVES

The objective of this study was to evaluate the new Copan SL Solution to improve the recovery of microorganisms from sputum cultures.

METHODS

- A total of 50 sputum specimens were included in this study
- Two different sample preparation protocols were performed for each clinical specimen: Protocol A and Protocol B

Protocol A: standard protocol

Sputum samples cultured directly on 4 different culture media plates (BD/BBL and Hardy Diagnostics, USA):

- Mac Conkey
- Chocolate Agar
- Rose Agar
- Blood Agar

METHODS

Protocol B: SL Protocol

1. Sputum were transferred to the SL solution using the sputum dipper (Figure 1).
2. The SL tube was vortexed for 15 seconds and left undisturbed for a minimum of 15 minutes

After emulsification, sputum samples were cultured on 4 different culture media plates (BD/BBL, and Hardy Diagnostics USA):

- Mac Conkey
- Chocolate Agarr
- Rose Agar
- Blood Agar

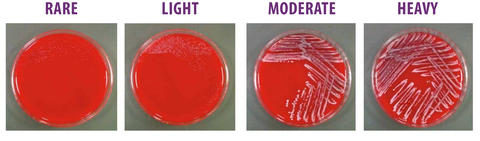
- Plates from Protocol A and Protocol B were incubated at 37°C for 48h
- The specimens identification were performed using the Vitek 2 Automation System (bioMerieux, France)
- Each organism was semi-quantitated as rare, light, moderate and heavy growth (Figure 2)
- Results from cultures processed by protocol A and B from the same clinical specimens were compared regarding specimen growth and quantity

Figure 1.

SL solution with sputum dipper

Figure 2.

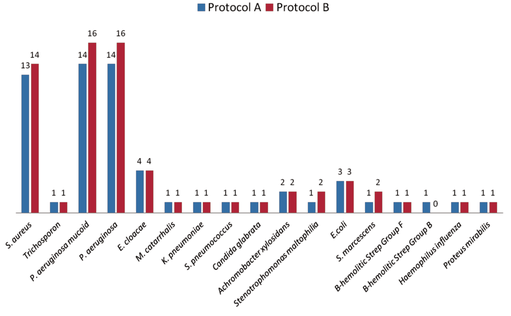
Examples of semi-quantitative growth:



RESULTS

- Only 16 out of 50 sputum specimens had the same result between both protocols
- Protocol A: 61 microorganisms were isolated and identified
- Protocol B: 67 microorganisms were isolated and identified
- Additional 6 microorganisms isolated from protocol B were identified as:
  - ***P. aeruginosa*** (n=4; 2 of them mucoid)
  - ***S. aureus*** (n=1)
  - ***S. maltophilia*** (n=1)

Organisms Identified in Protocols A and B:



RESULTS

Difference of quantification between Protocol A and B

Protocol A	Protocol B	Total Difference
Light	Moderate	= 4
Light	Heavy	= 6
Rare	Light	= 10
Rare	Moderate	= 2
Rare	High	= 2
Moderate	High	= 8
		Total = 32

Protocol A	Protocol B	Total Difference
Moderate	Light	= 3
Moderate	Rare	= 2
Heavy	Moderate	= 3
Heavy	Light	= 6
Light	Rare	= 2
		Total = 16

CONCLUSION

1. SL solution using the sputum dipper is an efficient system to liquefy sputum
2. Most cases, recovery rates of microorganism growth are higher and superior after processing the sputum with SL solution
3. Specimens treated with SL solution, when plated, produce consistent and reproducible results
4. In addition to that, SL solution transforms specimens into liquid format and is provided in instrument-ready tubes allowing specimens to be processed using a pre-analytical automation system