The purpose of this study was to explore if a disposable CSA could differentially identify 7 species of pathogenic yeasts growing in blood culture" Shrestha et al (2017).

Abstract

BACKGROUND: A colorimetric sensor array (CSA) has been demonstrated to rapidly detect and identify bacteria growing in blood cultures by obtaining a species-specific "fingerprint" of the volatile organic compounds (VOCs) produced during growth. This capability has been demonstrated in prokaryotes, but has not been reported for eukaryotic cells growing in culture. The purpose of this study was to explore if a disposable CSA could differentially identify 7 species of pathogenic yeasts growing in blood culture.

METHODS: Culture trials of whole blood inoculated with a panel of clinically important pathogenic yeasts at four different microorganism loads were performed. Cultures were done in both standard BacT/Alert and CSA-embedded bottles, after adding 10 mL of spiked blood to each bottle. Color changes in the CSA were captured as images by an optical scanner at defined time intervals. The captured images were analyzed to identify the yeast species. Time to detection by the CSA was compared to that in the BacT/Alert system.

RESULTS: One hundred sixty-two yeast culture trials were performed, including strains of several species of Candida (Ca. albicans, Ca. glabrata, Ca. parapsilosis, and Ca. tropicalis), Clavispora (synonym Candida) lusitaniae, Pichia kudriavzevii (synonym Candida krusei) and Cryptococcus neoformans, at loads of 8.2 × 105, 8.3 × 103, 8.5 × 101, and 1.7 CFU/mL. In addition, 8 negative trials (no yeast) were conducted. All negative trials were correctly identified as negative, and all positive trials were detected. Colorimetric responses were species-specific and did not vary by inoculum load over the 500000-fold range of loads tested, allowing for accurate species-level identification. The mean sensitivity for species-level identification by CSA was 74% at detection, and increased with time, reaching almost 95% at 4 hours after detection. At an inoculum load of 1.7 CFU/mL, mean time to detection

with the CSA was 6.8 hours (17%) less than with the BacT/Alert platform.

CONCLUSION: The CSA combined rapid detection of pathogenic yeasts in blood culture with accurate species-level identification.

Full Text

Reference:

Shrestha, N.K., Lim, S.H., Wilson, D.A., SalasVargas, A.V., Churi, Y.S., Rhodes, P.A., Mazzone, P.J. and Procop, G.W. (2017) The combined rapid detection and species-level identification of yeasts in simulated blood culture using a colorimetric sensor array. PLoS One. 12(3), p.e0173130. eCollection 2017.

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