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Evaluation of HardyCHROM™ Candida for the Isolation and Identification of Common Yeast Pathogens

W. Phillips, R. Clasen, S. Strickler, A. Y. Hsiung, J. Hardy
Hardy Diagnostics, Santa Maria, CA

Abstract

Candida species are known to be common human commensals capable of causing a wide variety of diseases. Until recently invasive candidiasis was most commonly associated with *Candida albicans*, but other species, such as *C. glabrata*, are becoming more common as causative agents for nosocomial infections. Candidiasis infections are currently on the rise, and are now estimated to be the fourth most common cause of nosocomial bloodstream infections in the United States. Unfortunately these infections have an estimated 50% percent mortality rate, making them a serious concern. In addition to this the increasing number of immunocompromised patients has lead to a widening range of recognized pathogenic strains of yeast. These factors have contributed to the need for a rapid and reliable method for the cultivation and identification of commonly associated pathogenic strains of yeast.

In this study the accuracy of Hardy Diagnostics HardyCHROM™ Candida was evaluated using previously identified strains of *Candida* species. A total of 101 yeast isolates were tested including 40 clinical strains of *C. albicans*, 21 *C. tropicalis*, 17 *C. krusei*, and 23 *C. glabrata*. In addition to the clinical strains, 10 ATCC quality control organisms were also evaluated on this media. Performance was evaluated at 48 hours following incubation at 35°C.

Of the 111 isolates tested, HardyCHROM™ Candida demonstrated 100% sensitivity and specificity with expected color reactions after 48 hours of incubation (*C. albicans* - apple green, *C. krusei* - rough white, *C. tropicalis* – mauve, and *C. glabrata* - light pink). This study suggests that HardyCHROM™ Candida is accurate and reliable in the differentiation and identification of common Candida species isolated from clinical specimens.

Introduction

Candida species have progressed from being infrequent pathogens to among the most important and frequent opportunistic microorganisms isolated in nosocomial infections. It is estimated that the incidence of fungal infections has dramatically increased due to several factors such as the rise of immunocompromised patients and the widespread use of broad-spectrum antibiotics. At this time *Candida albicans* remains the most frequently isolated yeast pathogen, however, *C. glabrata* is rapidly emerging as an opportunistic pathogen associated with a large percentage of nosocomial yeast infections. Other common pathogenic yeasts isolated from patients include *C. tropicalis* and *C. krusei*, though these are of minor clinical significance in comparison to *C. albicans* and *C. glabrata*.

Ideally, laboratories should be able to detect and identify the major Candida species associated with clinical specimens in order to quickly and accurately prescribe treatment. Most clinical laboratories start the yeast identification process with the germ tube test and then continue with more extensive testing. Reference identification procedures that use biochemical and morphological studies are often unpractical in that they are labor intensive and only provide results after several days. Conventional methods of yeast identification consisting primarily of assimilation and fermentation can also be cumbersome and labor intensive. Due to these factors there has been a great demand for the development of differential primary media for the rapid and reliable identification of the pathogenic yeast strains.

HardyCHROM™ Candida uses a combination of chromogens for the detection of commonly isolated yeast pathogens. The chromogens in this media release chromophores when cleaved by enzymes unique to certain Candida species, resulting in species-specific colored colonies that allow for presumptive species identification. In this study, HardyCHROM™ Candida was evaluated for performance and accuracy in the identification of commonly isolated clinical Candida species.

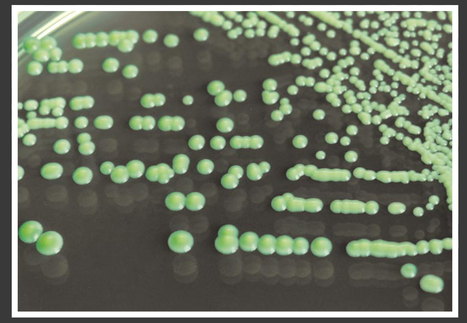
Materials and Methods

This study evaluated a total of 111 previously identified *Candida* clinical isolates from Hardy Diagnostics' microorganism collection. The isolates used in this study were as follows: *C. albicans* (n=40), *C. tropicalis* (n=21), *C. glabrata* (n=23), *C. krusei* (n=17), and 10 ATCC strains of representatives from the preceding genera. Results were based on colony color and morphology after 48 hours of incubation at 35°C.

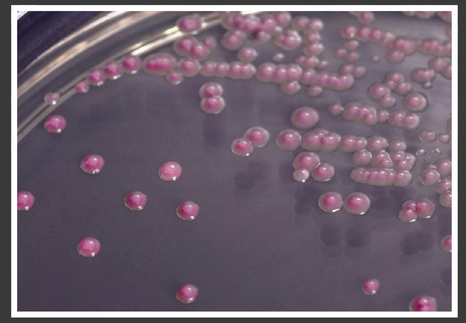
Results

All Candida species tested showed the following colors at 48 hours of incubation:

Microorganism(n)	Expected color	Isolates showing expected color reactions
C. albicans (n=45)	Smooth apple-green colonies	100%
C. tropicalis (n=23)	Smooth mauve colonies	100%
C. glabrata (n=25)	Smooth light pink colonies	100%
C. krusei (n=18)	Rough white crenated colonies	100%

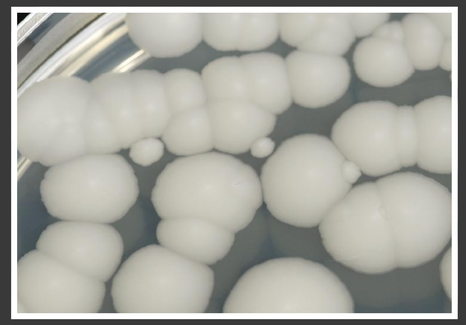


Colony morphology of *C. albicans* on HardyCHROM™ Candida



Colony morphology of *C. tropicalis* on HardyCHROM™ Candida

Colony morphology of *C. glabrata* on HardyCHROM™ Candida



Colony morphology of *C. krusei* on HardyCHROM™ Candida

Conclusions

HardyCHROM™ Candida demonstrated 100% accuracy among the samples tested with expected color reactions.

HardyCHROM™ Candida is an easy and reliable method for the presumptive identification of commonly isolated *Candida* species including *C. albicans*, *C. tropicalis*, *C. krusei*, and *C. glabrata*; thus streamlining the identification process and allowing faster reporting and appropriate adjustments in the drug therapy.

Further testing using yeast species other than those listed above is recommended for future studies.

References

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2. M. Yucesoy, et al. 2005. *Comparison of three differential media for the presumptive identification of yeasts*, Clinical Microbiology and Infection; 11:245-247

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