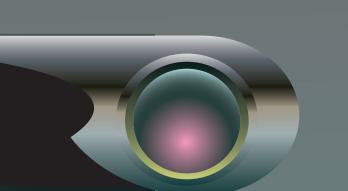


C-214 Comparison of HardyCHROMTM Candida with the Vitek Yeast Biochemical Card Identification System for the Identification of Common Yeast Pathogens



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Revised Abstract



Candida species are common human commensals that are capable of causing a wide variety of diseases. In the past, invasive candidiasis was most commonly associated with Candida albicans, but recently other species, such as C. glabrata, have become common causative agents for this type of infection. In the last few years candidiasis has been steadily increasing in the United States, and is now considered to be the fourth most common cause of nosocomial septicemia. Since these types of infections have an estimated fifty percent mortality rate, early detection is vital to ensure proper diagnosis and treatment. In an effort to expedite clinical identification and to save labor and supply costs a study

was performed by Central Coast Pathology HardyCHROMTM Candida and the Vitek Consultants to assess the effectiveness of Yeast Biochemical Card identification HardyCHROMTM Candida for species identification. HardyCHROMTM Candida contains chromogenic substrates that interact with the unique enzymes produced by the most common strains of pathogenic Candida spp., which allows for species identification based solely on colony morphology and color. According to the manufacturer's technical insert, strains of C. albicans, C. tropicalis, and C. krusei can be identified within 48 hours without further additional testing, while strains of C. glabrata can be presumptively identified. In this study a total of 101 clinical isolates were identified using both

system. From the 101 isolates tested, HardyCHROMTM Candida was found to have an overall 99% specificity rate when compared to the Vitek Yeast Biochemical Card identification system. C. albicans, C. tropicalis and C. krusei were identified with a specificity of 100%. C. glabrata and C. parapsilosis were identified with a specificity of 93% and 100% respectively. Overall, this study suggests that the chromogenic medium, HardyCHROMTM Candida is an accurate and cost effective way to easily differentiate and identify commonly isolated clinical yeast strains.

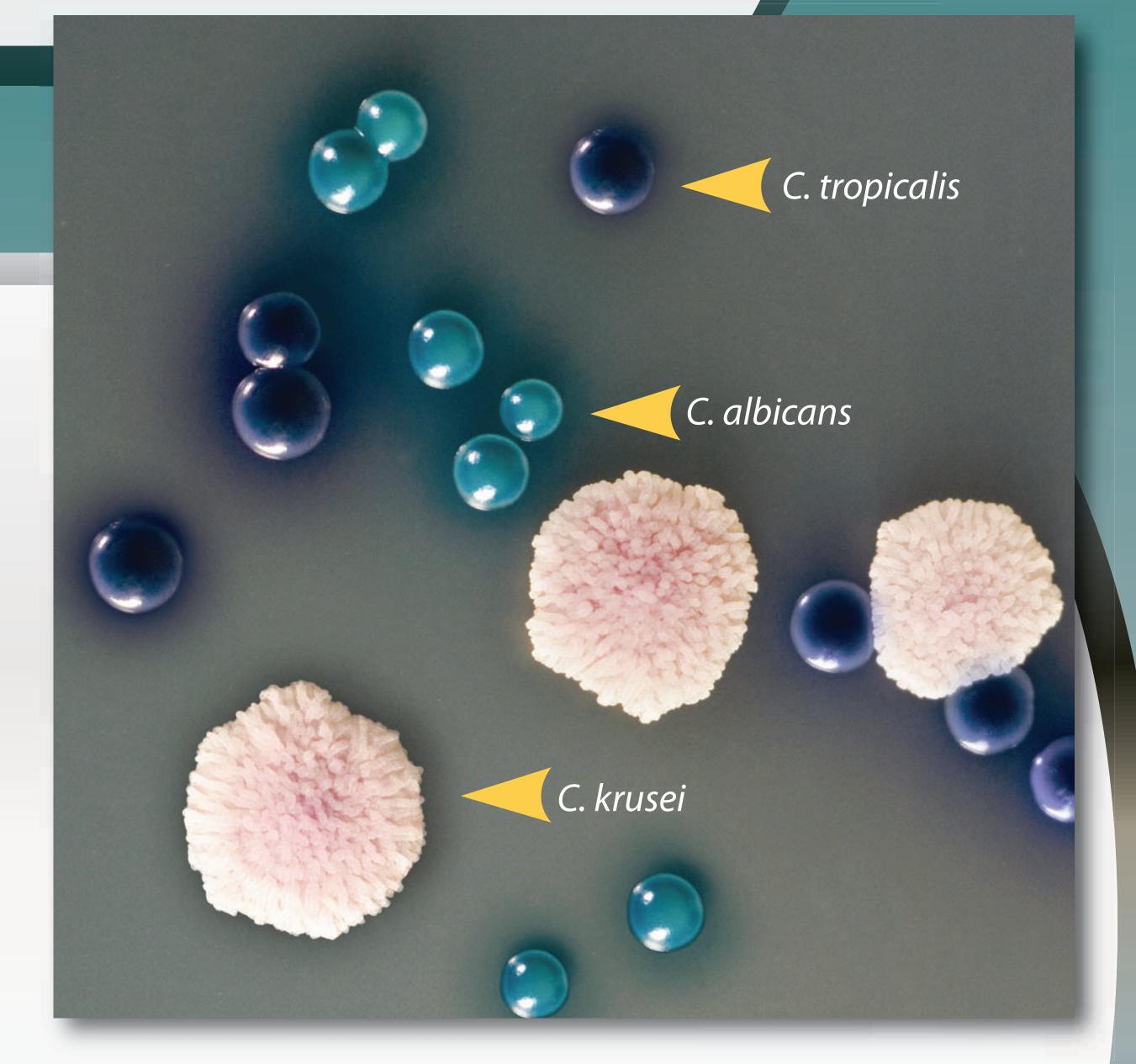
Introduction

The incidence of fungal infections has dramatically increased due to several factors, such as increased numbers of immunocompromised patients and the widespread use of broad-spectrum antibiotics. At this time Candida albicans is the most frequently isolated yeast pathogen, but C. glabrata is rapidly emerging as a common cause of nosocomial yeast infections. Other pathogenic yeast species isolated from clinical samples include C. tropicalis and C. krusei, though these are isolated less frequently 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. Unfortunately reference identification procedures that use

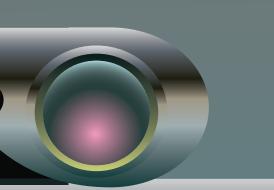
biochemical and morphological studies are often impractical in that they are expensive, labor intensive, and only provide results after several days. Likewise, conventional methods of yeast identification consist primarily of assimilation and fermentation studies which tend to be cumbersome and labor intensive. Due to these factors there has been a great demand for the development of a differential primary media, which would allow for the rapid and reliable identification of the most commonly encountered pathogenic yeast strains.

HardyCHROMTM Candida uses a combination of chromogens for the detection of the most 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 easy identification. In this study,



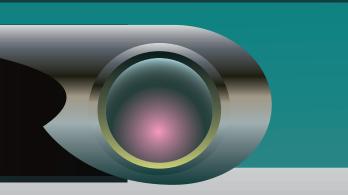
HardyCHROMTM Candida was evaluated for performance and accuracy in the identification of commonly isolated clinical Candida species. The media results were later compared to the results obtained from the Vitek Yeast Biochemical Card Identification System.

Materials & Methods



This study evaluated a total of 101 clinical yeast specimens that were isolated from patient swabs received by the Central Coast Pathology Consultants laboratory. These isolates were used to inoculate HardyCHROMTM Candida plates. Colony color and morphology were evaluated after 48 hours of incubation at 35°C. The isolates used in this study were also identified with the Vitek Yeast Biochemical Card Identification System, which served as the gold standard for this study.

Results



The isolates identified by the Vitek Yeast Biochemical Card Identification System were as follows: C. albicans (n=60), C. tropicalis (n=6), C. glabrata (n=14), C. krusei (n=3), C. parapsilosis (n=12), C. guillermondii (n=1), C. dubliniensis (n=2), C. kefyr (n=2), and C. famata (n=1). These results were then compared with the HardyCHROMTM Candida plate results, and the performance and specificity of the media was evaluated in the following data table:

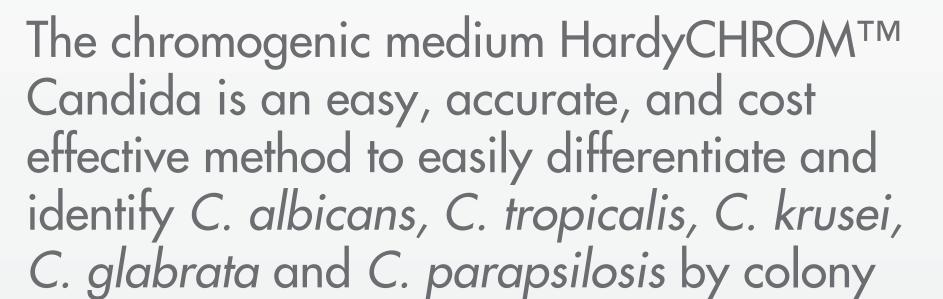
Clinical Isolates identified using Vitek System (n)	Morphology and Color of Clinical Isolates on HardyCHROM TM Candida	HardyCHROM™ Candida	
		Sensitivity	Specificity
C. albicans (n=60)	All isolates produced smooth, apple-green colonies	100%	100%
C. tropicalis (n=6)	All isolates produced smooth, dark blue colonies with blue halos in the media	100%	100%
C. glabrata (n=14)	Thirteen isolates produced smooth, light pink colonies with dark mauve centers, while one isolate produced a light pink colony without a mauve center.	93%	100%*
C. krusei (n=3)	All isolates produced rough, light pink crenated colonies	100%	100%
C. parapsilosis (n=12)	All isolates produced dry, dark purple colonies.	100%*	100%*
C. guilliermondii (n=1)	Single isolate produced a smooth, mauve colony.	*	*
C. dubliniensis (n=2)	Both isolates produced smooth light green colonies	*	*
C. kefyr (n=2)	Both isolates produced a smooth, mauve colony.	*	*
C. famata (n=1)	Single isolate produced a smooth, tan colony.	*	*

^{*}According to the product technical data sheet, HardyCHROMTM Candida is not intended for use in the identification of species other than C. albicans, C. tropicalis and C. krusei. See Discussion

Discussion

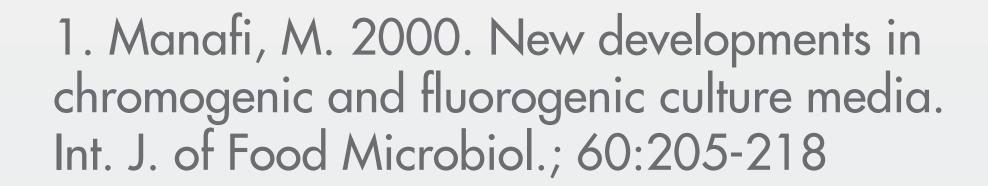
HardyCHROM™ Candida was found to be an easy, accurate and reliable method for the rapid identification of clinically significant Candida species. Overall, this media demonstrated a specificity rate of 100% for the identification of C. albicans, C. tropicalis, C. krusei, C. glabrata and C. parapsilosis. The technical insert for the product specifies that colonies of C. glabrata appear most often as pink with a darker pink center. This study demonstrated that when the colonies have this appearance, the specificity rate was 100% (13 out of 13 isolates). One isolate was pink but did not produce a darker pink center. Thus, the sensitivity for the identification of C. glabrata is 93%. It was also found that C. parapsilosis produced unique dark purple colonies that were easily identified with 100% accuracy. Further studies using HardyCHROMTM Candida with a greater number of specimens may support the color and morphology descriptions for the other less common Candida species (C. dubliniensis, kefyr, guillermondii and famata) identified in this study.

Conclusion



References

color and morphology.



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