

Evaluation of the Sensitre YeastOne colorimetric antifungal panel for susceptibility testing of *Candida* species to anidulafungin and caspofungin, adopting the new CLSI clinical breakpoints and epidemiological cutoff values

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Nilgün KARABIÇAK¹, Onur KARATUNA^{2, 3}, Işın AKYAR^{2, 3}

¹ Mycology Reference Laboratory, Public Health Institute of Turkey, Ankara, Turkey

² Acıbadem University School of Medicine, Department of Medical Microbiology, Istanbul, Turkey

³ Acıbadem Labmed Medical Laboratories, Istanbul, Turkey



Objectives

The purpose of this study was to evaluate the performance of the Sensitre YeastOne (SYO) panel to determine the *in vitro* activity of echinocandins against *Candida* species isolated from clinical specimens using the recently revised CLSI clinical breakpoints (CBPs) and epidemiological cutoff values (ECVs) criteria, as appropriate.

Methods

A total of 205 clinical *Candida* isolates were included. The Clinical and Laboratory Standards Institute (CLSI) reference broth microdilution method (BMD) was performed for the isolates against anidulafungin and caspofungin at the Mycology Reference Laboratory, Public Health Institution of Turkey. Reference CLSI BMD MIC end points and the SYO (Thermo Fisher Scientific, Waltham, MA, USA) end points were read after 24-h of incubation and interpreted according to CLSI M27-S4, as susceptible (S), intermediate (I), resistant (R) and ECVs criteria, as appropriate.

Results

The invasive *Candida* isolates (n=205) revealed 176 isolates from five common (*Candida albicans*, n=81; *C. parapsilosis*, n=35; *C. glabrata*, n=25; *C. tropicalis*, n=23, *C. krusei*, n=12;) and 29 isolates from five rare (*C. kefyr*, n=16; *C. lusitanae*, n=7, *C. lipolytica*, n=3; *C. guilliermondii*, n=2; *C. zeylanoides*, n=1).

Among the common species anidulafungin resistance was observed only in two isolates (*C. albicans*, n=1 and *C. krusei*, n=1) with both tests (Table 1). However, using the CLSI BMD method, 32% of *C. glabrata* isolates were anidulafungin S, caspofungin I-R, similar discrepancies were also observed for 11% and 22% of *C. parapsilosis* and *C. tropicalis* isolates, respectively. If only SYO data were considered for caspofungin, these discrepancies would not be observed (Table 2). Due to the lack of species-specific CBPs for the less common species (n=29), evaluation for this group was done according to the ECVs; the nine *C. keyfr* (9/16) were found caspofungin non-WT / anidulafungin WT with the CLSI BMD method, however using SYO all *C. keyfr* isolates were WT.

Table 1. Anidulafungin MIC₅₀ and MIC₉₀ values obtained with the CLSI broth microdilution method and Sensitre YeastOne method at the 24-h end point reading according to *Candida* spp. (n=205)

<i>Candida</i> spp. (No. of isolates)	MIC (µg/mL)		
	MIC Range	MIC ₅₀	MIC ₉₀
<i>C. albicans</i> (n=81)			
Broth microdilution	0.015-4	0.06	0.25
YeastOne	0.015-1	0.015	0.06
<i>C. parapsilosis</i> (n=35)			
Broth microdilution	0.015-4	1	4
YeastOne	0.125-1	0.25	1
<i>C. glabrata</i> (n=25)			
Broth microdilution	0.015-0.25	0.125	0.5
YeastOne	0.015-0.06	0.03	0.06
<i>C. tropicalis</i> (n=23)			
Broth microdilution	0.03-0.5	0.125	0.25
YeastOne	0.015-0.5	0.06	0.125
<i>C. krusei</i> (n=12)			
Broth microdilution	0.06-1	0.06	0.5
YeastOne	0.015-1	0.03	0.25
<i>C. kefyr</i> (n=16)			
Broth microdilution	0.125-0.5	0.125	0.5
YeastOne	0.015-0.06	0.03	0.06
<i>C. lusitanae</i> (n=7)			
Broth microdilution	0.125-2	0.25	-
YeastOne	0.015-0.125	0.03	-
<i>C. lipolytica</i> (n=3)			
Broth microdilution	0.125-0.5	0.125	-
YeastOne	0.03-0.03	0.03	-
<i>C. guilliermondii</i> (n=2)			
Broth microdilution	0.25-1	0.25	-
YeastOne	0.125-0.5	0.125	-
<i>C. zeylanoides</i> (n=1)			
Broth microdilution	0.25	-	-
YeastOne	0.06	-	-

Table 2. Caspofungin MIC₅₀ and MIC₉₀ values obtained with the CLSI broth microdilution method and Sensitre YeastOne method at the 24-h end point reading according to *Candida* spp. (n=205)

<i>Candida</i> spp. (No. of isolates)	MIC (µg/mL)		
	MIC Range	MIC ₅₀	MIC ₉₀
<i>C. albicans</i> (n=81)			
Broth microdilution	0.015-4	0.125	0.5
YeastOne	0.015-2	0.03	0.06
<i>C. parapsilosis</i> (n=35)			
Broth microdilution	0.015-4	1	2
YeastOne	0.03-0.5	0.25	0.25
<i>C. glabrata</i> (n=25)			
Broth microdilution	0.06-0.5	0.06	0.5
YeastOne	0.03-0.125	0.06	0.125
<i>C. tropicalis</i> (n=23)			
Broth microdilution	0.03-1	0.125	0.5
YeastOne	0.015-0.125	0.03	0.06
<i>C. krusei</i> (n=12)			
Broth microdilution	0.06-1	0.06	0.25
YeastOne	0.015-1	0.03	0.125
<i>C. kefyr</i> (n=16)			
Broth microdilution	0.015-0.5	0.06	0.5
YeastOne	0.008-0.03	0.015	0.03
<i>C. lusitanae</i> (n=7)			
Broth microdilution	0.25-1	0.25	-
YeastOne	0.015-0.25	0.03	-
<i>C. lipolytica</i> (n=3)			
Broth microdilution	0.25-0.5	0.25	-
YeastOne	0.03-0.25	0.03	-
<i>C. guilliermondii</i> (n=2)			
Broth microdilution	0.25-1	0.25	-
YeastOne	0.06-0.125	0.06	-
<i>C. zeylanoides</i> (n=1)			
Broth microdilution	0.015	-	-
YeastOne	0.008	-	-

Conclusion

YeastOne assay employed in laboratory may reduce the MIC variability in caspofungin against *Candida* species that are observed using CLSI BMD methods.

The new CLSI CBPs can be safely adopted for five common *Candida* species. The isolates were classified as echinocandin resistant using the SYO panel and the new CLSI CBPs. These *fks* mutant strains of *Candida* must be further characterised.