

Biofilm production: Differences regarding *Candida* species and clinical samples

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INTRODUCTION AND PURPOSE

- ❖ Biofilm production (BP) is being considered an important associated virulence factor of *Candida* spp.
- ❖ However, there is lack of information regarding the differences in BP between different *Candida* species and clinical samples.
- ❖ The **purpose** of our study was to assess BP among the most important *Candida* species and among different clinical samples and to classify them as low, moderate or high biofilm-forming isolates.

METHODS

- ❖ We retrospectively performed an in vitro model of BP in 96-well microtiter plates including 200 strains of *Candida* spp. isolated from different clinical samples (figure 1).
- ❖ BP was assessed using the crystal violet binding assay in triplicates (figure 2). The cut-offs used to define low, moderate, and high biofilm-forming isolates were <1, 1-2, and >2, respectively (Marcos-Zambrano LJ. et al. Int J Med Microbiol. 2014).

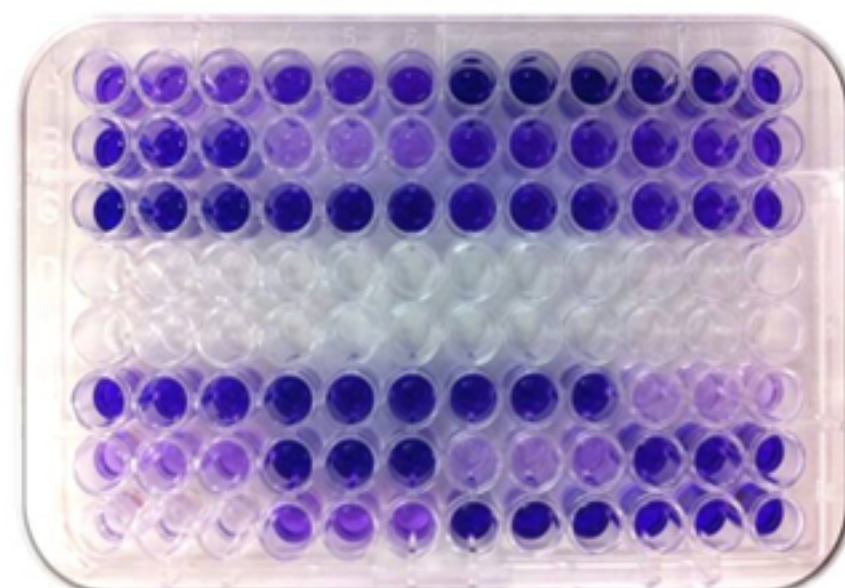


Figure 2. Microtiter plates

RESULTS

- ❖ Most *C. albicans* were moderate or high biofilm-producers, whereas *C. parapsilosis* were low or moderate.
- ❖ The highest BP values were found in *C. tropicalis* and, in contrast, the lowest BP values were detected in *C. guilliermondii*.
- ❖ *Candida* spp. isolated from samples representing deep seated infection (sterile liquids, biopsies, and catheter samples) produced more biofilm (mean 1.5) than those isolated from urine and respiratory tract samples (mean 0.8,) $p < 0.001$.

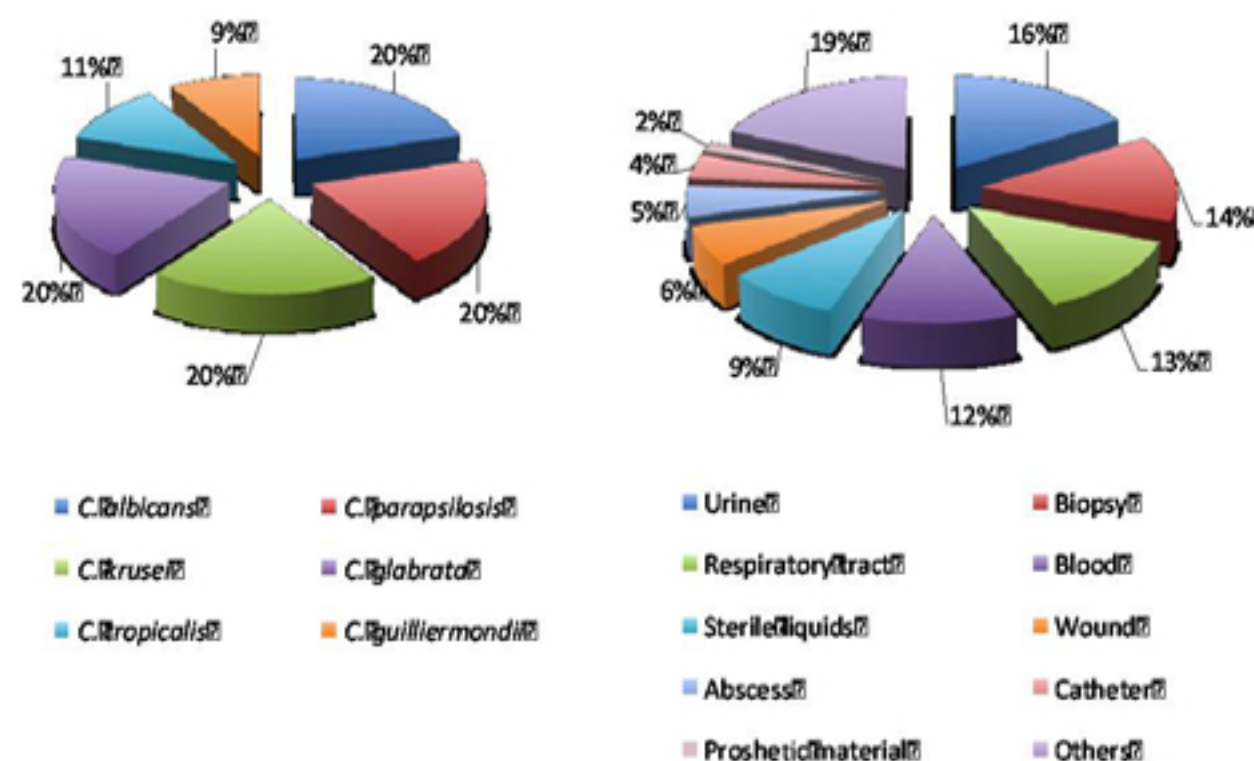


Figure 1. Distribution of *Candida* spp. and clinical samples

Table. Description of biofilm production regarding *Candida* spp. and clinical samples

Species	Biofilm			p	
	Mean (SD)	Low, N (%)	Moderate, N (%)		High, N (%)
<i>C. albicans</i>	1.8 (0.5)	3 (7.3)	19 (46.3)	19 (46.3)	<0.001
<i>C. parapsilosis</i>	1.3 (0.9)	15 (37.5)	14 (35.0)	11 (27.5)	
<i>C. krusei</i>	0.4 (0.3)	37 (92.5)	3 (7.5)	0 (0.0)	
<i>C. glabrata</i>	0.3 (0.4)	36 (92.3)	3 (7.7)	0 (0.0)	
<i>C. tropicalis</i>	2.4 (0.7)	1 (4.5)	5 (22.7)	16 (72.7)	
<i>C. guilliermondii</i>	0.6 (0.5)	14 (77.8)	4 (22.2)	0 (0.0)	
Clinical samples					<0.001
Urine	0.8 (0.7)	21 (63.6)	9 (27.3)	3 (9.1)	
Biopsies	1.5 (0.8)	8 (28.6)	10 (35.7)	10 (35.7)	
Respiratory tract	0.4 (0.4)	24 (92.3)	1 (3.8)	1 (3.8)	
Blood	1.4 (0.9)	8 (33.3)	8 (33.3)	8 (33.3)	
Sterile liquids	1.6 (1.1)	6 (33.3)	4 (22.2)	8 (44.4)	
Wound	0.9 (0.8)	9 (69.2)	3 (23.1)	1 (7.7)	
Abscess	1.3 (1.0)	5 (50.0)	2 (20.0)	3 (30.0)	
Catheter	1.7 (0.6)	2 (25.0)	2 (25.0)	4 (50.0)	
Prosthetic material	1.8 (0.8)	0 (0.0)	2 (66.7)	1 (33.3)	
Others	0.9 (0.8)	23 (62.2)	7 (18.9)	7 (18.9)	
Urine	0.8 (0.7)	21 (63.6)	9 (27.3)	3 (9.1)	

CONCLUSION

- ✓ BP in *Candida* varies with different *Candida* species being higher with *C. tropicalis*. In addition, different clinical samples are associated with different degrees of BP. A higher BP correlates with samples obtained from samples representing invasive disease.