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### **Candida haemulonii complex: a little known Candida**

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**Background:** *Candida haemulonii* complex (*Candida haemulonii* [I], *Candida haemulonii* var. *Vulnera* [II] and *Candida duobushaemulonii* [III]) has recently acquired relevance, not so much for their high incidence in human clinical sample cultures but for the notable resistance to antifungals. This study aimed to compare several methods of identification of these rare species of *Candida* as well as to evaluate different methods for the study of their antifungal sensitivity.

**Material/methods:** Between 2011 and 2016, 10 strains of *C. haemulonii* complex have been isolated from clinical samples in our laboratory. They came from blood cultures (4), skin ulcers (2), diabetic foot exudates (2), joint fluid (1) and non-surgical wound exudate (1).

Isolates were analyzed and the results were compared to those of Vitek-MS<sup>TM</sup> ( v3 SARAMIS MS -ID, bioMérieux, Marcy-l'Étoile, France), Vitek2 ( bioMérieux, Marcy-l'Étoile, France) and API32C (bioMérieux, Marcy-l'Étoile, France). As reference method the amplification and sequencing of the internal transcribed spacer (ITS) region was used.

Antifungal sensitivity was tested by standardized methods of both CLSI (M27-A3) and EUCAST, and by two commercial methods as Vitek2 ( bioMérieux, Marcy-l'Étoile, France) using AST-YS07 cards and Sensititre<sup>TM</sup> YeastOne YO10 (TREK Diagnostic Systems, East Grinstead, United Kindom).

**Results:** Sequencing results of the 10 strains identified: 5 *C. haemulonii* [I], 4 *C. duobushaemulonii*[III] and 1 *C. haemulonii* var. *vulnera*[II]. Both Vitek-MS<sup>TM</sup> and Vitek2 identified all strains as *C. haemulonii* complex but the first one exhibited a 99% identification percentage while the second showed a lower discrimination with 95.6%. At 24 hours API32C system incorrectly identified i) *C. haemulonii* [I] as *C. globosa*[4] or *C. sake*[1], ii) *C. duobushaemulonii*[III] as *C. sake* and iii) did not identify *C. haemulonii* var. *vulnera*[II]. At 48 hours the result was the same in 4 strains, did not identify 4 strains and in 2 strains changed the identification to *C. intermedia*.

Results of CLSI method, EUCAST method, Vitek2 and Sensititre<sup>TM</sup> were similar, and all strains showed resistance to both amphotericin and azoles.

**Conclusions:** Although both Vitek-MS™ and Vitek2 showed to be valid methods for identifying *C. haemulonii* complex, the former does so with a higher percentage of identification and in less time. None of the methods identified the strains to the species subgroup. There is a good correlation between all methods assayed to perform antifungal susceptibility testing, both with commercial methods and with standardized methods, confirming the resistance of these species to amphotericin  $\beta$  and to the azoles.