

TITLE: Methicillin-resistant *Staphylococcus*: HOW TO DETECT (CLSI x BrCAST)

AUTHORS DAVID, L. A.; MELO, D. A.; HOLMSTRÖM, T. C. N.; MOTTA, C. C.; SANTOS, T. H.; SANTOS, M. G.; FRIAS, S.S. ;COELHO, I. S.; COELHO, S. M. O. ;SOUZA, M. M. S.

INSTITUTION: 1.UNIVERSIDADE FEDERAL RURAL DO RIO DE JANEIRO (UFRRJ), SEROPÉDICA, RJ (RODOVIA BR 465, KM 07, S/N ZONA RURAL, SEROPÉDICA - RJ, 23890-000);

ABSTRACT:

Methicillin-resistant *Staphylococcus* (MRS) is an important human pathogen that is also a concern in veterinary medicine. The described resistance mechanism to beta-lactams in this species include the production of a low-affinity penicillin-binding protein 2a (PBP2a) determined by the expression of *mecA* gene. Phenotypic methicillin screening tests for the *mecA* mediated mechanism include cefoxitin disk diffusion for *S. aureus*, *S. lugdunensis* and coagulase-negative staphylococci, where isolates are resistant if zone diameter ≤ 21 mm, and cefoxitin broth microdilution, for *S. aureus* and *S. lugdunensis*, in which the strains are considered resistant if MIC > 4 $\mu\text{g/mL}$. For the detection of methicillin resistance mediated by *mecA* in *Staphylococcus pseudintermedius* and *S. schleiferi* preconized oxacillin disk diffusion, where isolates are considered resistant if zone diameter ≤ 17 mm according to CLSI. According to BrCast, the unique species evaluated is *S. aureus* and the phenotypic test preconized to determine methicillin-resistant *S. aureus* is the cefoxitin disk diffusion, where the isolates are considered resistant if zone diameter ≤ 22 mm. The absence of parameter for other species of *Staphylococcus* of importance in public health and veterinary medicine limits the use of BrCast for the screening of strains. Phenotypic expression of beta-lactam resistance in *Staphylococcus* isolates is usually heterogeneous, and the amplification of *mecA* gene is prescribed as a gold standard method according CLSI and BrCAST. However, with the discovery of homologous and variants of *mecA* gene, a more specific analysis is required for detection of this resistance. For a real detection and screening of this resistance appropriated phenotype markers should be used. In this way, CLSI presents best options for this analysis, once including a larger variety of *Staphylococcus* species and specific tests. The emergence of MRS in a variety of hosts and sources demonstrates that colonization and dissemination is a serious problem, and control is a continuous challenge.

Keywords: Beta-lactam resistance, *Staphylococcus* spp. and *mec* gene.

Development Agency: CNPq; CAPES