



COUNTY OF SAN LUIS OBISPO PUBLIC HEALTH LABORATORY

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LABORATORY TEST FACT SHEET

TEST: MALDI-TOF Mass Spectrometry

ORDER CODES: 2460, 3660, 3950, 3960

TEST DESCRIPTION

The Bruker MALDI Biotyper is an instrument that uses matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry (MS) to identify microorganisms found in human specimens. MALDI-TOF MS technology analyzes the proteins, mainly ribosomal proteins, of a microorganism. The entirety of a microorganism's proteins is converted into a characteristic mass and intensity distribution, termed mass spectrum. This mass spectrum is compared to the mass spectra of microorganisms in a reference library or database. An overall score is generated that signifies how closely the microorganism matches the mass spectrum profile of another microorganism in the database. The identity of the microorganism is confirmed when a close match is found. The Bruker MALDI Biotyper can be used to identify bacteria, mycobacteria, yeasts, and molds.

SENSITIVITY AND SPECIFICITY

The sensitivity and specificity of MALDI-TOF MS is related to the breadth of the library or database that serves as a comparator and varies for different classes of microorganisms. A review article indicated that the specificity for the MALDI-TOF MS ranges from 87.3% to 100% for genus level identification of clinical isolates. In addition, the sensitivity is estimated to be 10^4 to 10^5 colony forming units for *Escherichia coli* (Hou et al. *Journal of Food and Drug Analysis* 2019).

LIMITATIONS

- Direct testing of patient specimens is not possible. Microorganisms must be isolated prior to testing.
- A microorganism will not be identified if the reference library or database does not include the genus and/or species.
- Some microorganisms can only be identified to the genus or systematic group level.
 - In such cases, additional methods may be needed for final microorganism identification.
- This technology is not currently recommended to identify select agents, such as *Bacillus anthracis*.
- Taxonomy (name of microorganism) may reflect old nomenclature.
- Final results should be based on all relevant information, including specimen type, Gram staining, colony morphology, growth characteristics, etc.

SPECIMENS ACCEPTED FOR TESTING

1. Upon validation, two types of specimens will be accepted:
 - a. Patient specimens submitted for bacterial, mycobacterial, and fungal culture will be eligible for testing once a microorganism has been isolated from the specimen
 - b. Bacterial, mycobacterial, and fungal isolates sent by the submitter

STORAGE AND TRANSPORT TEMPERATURE

Storage and transport should follow the requirements specific to the microorganism being cultured or identified.

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CPT CODES

- Bacterial identification: 87077
- Mycobacterial identification: 87118
- Yeast identification: 87106
- Mold identification: 87107