Analysis of Microorganisms Using MALDI-TOF-MS

A New Tool for Research Applications
AXIMA-iD™ utilises SARAMIS: the easy to use microbial identification software which has revolutionized daily routine in analytical and diagnostic-research laboratories.

MALDI-TOF


The biomolecules embedded in the matrix crystals are desorbed and ionized by a laser pulse and accelerated in a high voltage field. Different ions are detected after a time-of-flight proportional to their mass, generating a high resolution mass spectrum of the sample; the ‘fingerprint’. Depending on the choice of mass spectrometer, both intact proteins (linear mode) and structural determination of fragments (reflectron mode) can be investigated.

AXIMA Assurance is a linear mode MALDI-TOF system with a high performance-to-price ratio. It is a robust, high sensitivity system for research use microbial identification and investigations into the proteins of microorganisms.

AXIMA Confidence is a combination linear and reflectron mode MALDI-TOF system. In addition to microbial identification, the reflectron provides higher resolution and greater mass accuracy. The ability to perform Post Source Decay (PSD) provides the possibility to carry out MS/MS experiments, for improved structural elucidation and sequencing of peptides and proteins.

AXIMA Performance offers the same advantages as the Confidence, but with the addition of high-energy Collision Induced Dissociation (CID) to give greater fragmentation and thus better structural elucidation and sequencing for research into the proteome of microorganisms.

SARAMIS Software

Each SuperSpectrum is derived from multiple reference spectra of at least 15 individual isolates of a species, acquired after varying growth times and from different growth media to ensure robustness and reproducibility.

SARAMIS offers a comprehensive database of species (supported by internationally recognized strain collections and clinical laboratories) and the flexibility for the user to create new entries and databases.

Cultured microorganisms can be directly applied to MALDI sample target and introduced into one of the AXIMA series mass spectrometers. Analysis and identification can be completed in 1-2 minutes.

The software identifies gram-positive and gram-negative bacteria, yeasts, fungi and spores based on their characteristic MALDI-TOF-MS fingerprints down to sub-species level. No preselection of analytical methods is required; hands-on time is reduced and costs are cut dramatically.

AXIMA-iD™ is the perfect addition to the research laboratory. It meets the demands for fast and reliable screening of the broadest range of microorganisms and is complemented by biochemical methods for antibiotic susceptibility testing, by PCR diagnostic and by sequencing for unknown species using traditional MS and MS/MS methods.

In addition, investigations into the lipids, glycopeptides and glycoproteins of microorganisms can be undertaken.
Workflow

STEP 1: TYPICAL SAMPLE PREPARATION
AXIMA-iD\textsuperscript{Plus} identifies a sample grown overnight on a culture plate. A small number of cells is transferred to a FlexiMass-DS\textsuperscript{TM} disposable polymeric target, followed by the addition of a matrix solution. The sample is then air-dried.

STEP 2: IDENTIFICATION
The FlexiMass-DS target is loaded into the AXIMA where the mass spectral ‘fingerprints’ of the samples are acquired. These fingerprints are matched against the SARAMIS database of SuperSpectra for immediate identification. Results are displayed within 1-2 minutes.

Applications
AXIMA-iD\textsuperscript{Plus} covers a wide range of applications. Various industries benefit from this new analytical approach, such as diagnostics research, pharmaceutical industry, healthcare and food industry.

In the drug discovery process, AXIMA-iD\textsuperscript{Plus} recognizes new isolates generated by microorganisms and classifies the unknown into a taxonomic tree.

For use in culture collections, AXIMA-iD\textsuperscript{Plus} identifies and classifies strains based on phenotype characteristics. AXIMA-iD\textsuperscript{Plus} can also be used to develop manufacturing processes for the food and beverage industry; to maintain quality and to recognize upcoming toxic microorganisms at an early stage.

References


FOR RESEARCH USE ONLY
SARAMIS is covered by European Patent numbers EP1437673 and EP1253622

SARAMIS is a trademark of bioMérieux. No attempt is made to supercede this or any other trademarks

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