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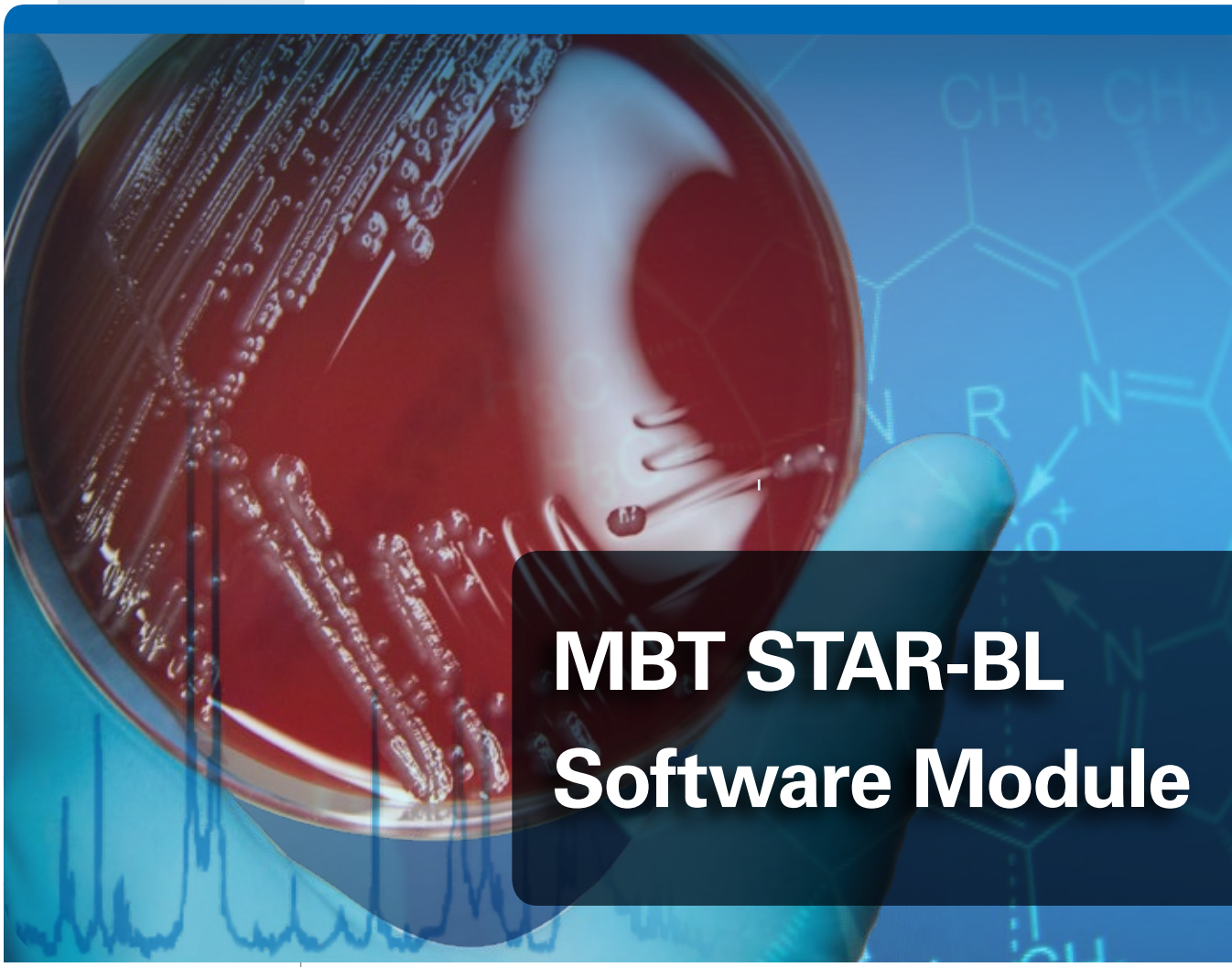


MBT STAR-BL Software Module

MALDI Biotyper®

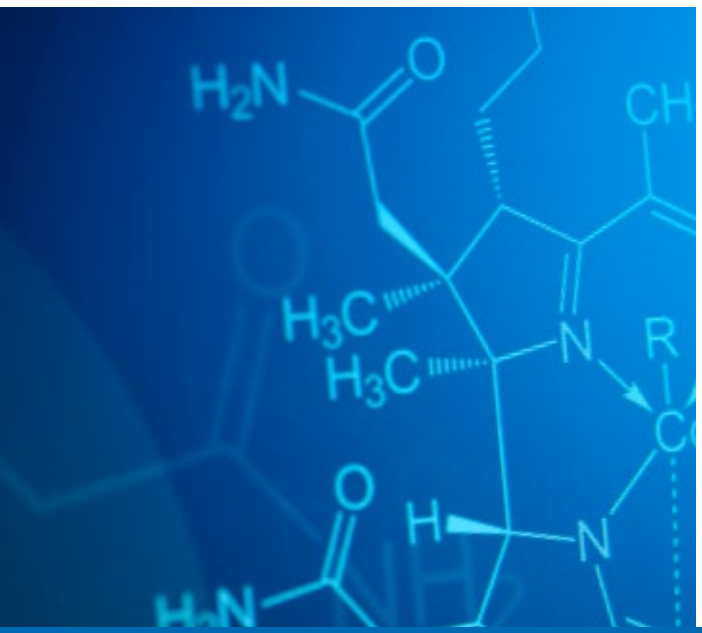
Changing Microbiology

For research use only. Not for use in clinical diagnostic procedures.

MALDI-TOF

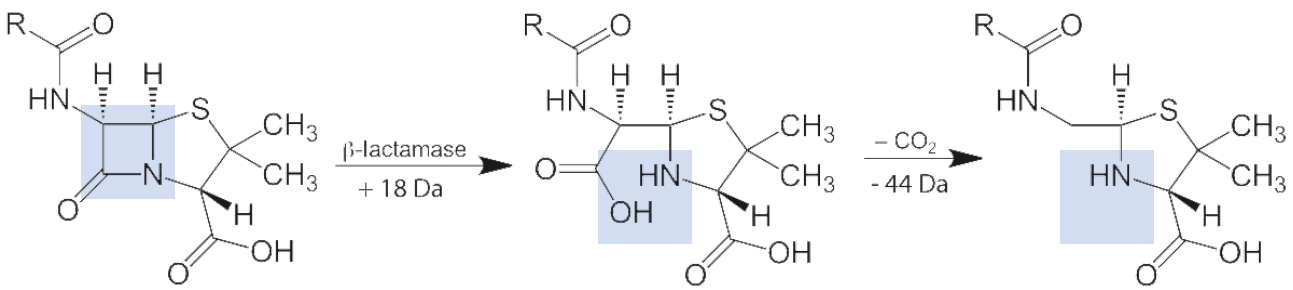
Innovation with Integrity

Selective Testing for Beta-Lactamase Activity



Antibiotics are often the only effective treatment for severe illnesses caused by microorganisms. Therefore, bacterial antibiotic resistance poses a significant threat to public health worldwide.

An important resistance mechanism is enzymatic drug inactivation by extended-spectrum beta-lactamases (ESBLs) and carbapenemases. These bacterial enzymes deactivate β-lactam antibiotics by hydrolyzing the antibiotics' β-lactam ring. The MBT Compass STAR-BL software module enables fast and accurate analysis of the level of β-lactamase activity in bacterial cultures in microbiological research.



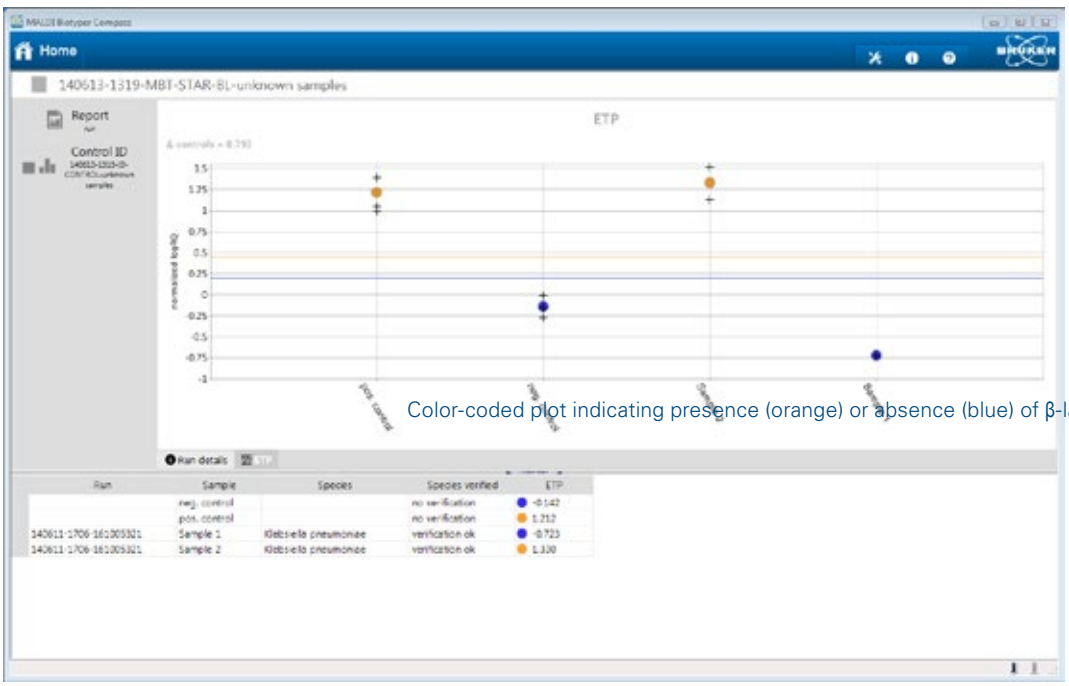
Hydrolysis of an antibiotic's β-lactam ring leads to mass shifts that can easily be detected by MALDI-TOF mass spectrometry.

A Fast and Simple Workflow

To determine the level of β-lactamase activity in a bacterial culture, samples from overnight cultures or positive blood cultures are incubated in an antibiotic solution. After incubation and centrifugation, cell-free supernatant is spotted onto a MALDI target plate and overlaid with matrix. Spectra are then acquired using the MALDI Biotyper.

In cultures where no β-lactamase activity is present, peaks corresponding to the intact antibiotic will be present in the mass spectrum. In cultures where β-lactamase activity is present, peaks corresponding to hydrolyzation products of the antibiotic will also be seen. The intensity ratio of hydrolyzed to intact antibiotic signals indicates the level of β-lactamase activity.

The MBT STAR-BL software module provides rapid, automatic calculation of the summed hydrolyzed and intact antibiotic signal intensities and the corresponding ratio. Results are normalized to signal intensities obtained from positive and negative control strains and displayed as a color-coded plot that enables at-a-glance evaluation.

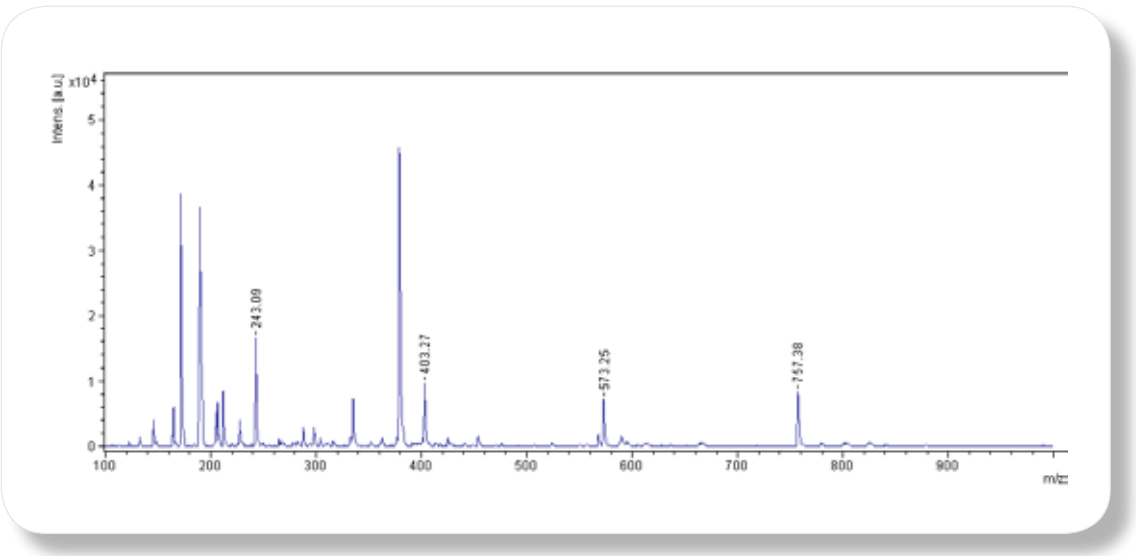


Color-coded plot indicating presence (orange) or absence (blue) of β-lactamase activity in bact

Efficient Calibration for Accurate Analysis

A prerequisite for accurate analysis of intact and hydrolyzed antibiotic fragment signals in the low molecular mass range (100–1000 Da) is an efficient calibration of the MALDI-TOF mass spectrometer. MBT STAR antibiotic calibration standard (MBT STAR-ACS) contains a mixture of four small peptides that provide characteristic and well-defined MALDI-TOF mass spectra signals in the mass range between 100 and 1000 Da.

Calibrating the mass spectrometer using MBT STAR-ACS ensures efficient calibration of the MALDI-TOF mass spectrometer and ensures reliable and accurate results.



MALDI-TOF mass spectrum of MBT STAR antibiotic calibration standard (MBT STAR-ACS)

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