

MALDI Biotyper®

MBT Lipid Xtract™ Kit

Analysis of Lipid A and its derivatives for rapid colistin resistance detection

Innovation with Integrity

RUO

Fast resistance detection of gram-negative bacteria on MALDI Biotyper[®] sirius using negative ion mode

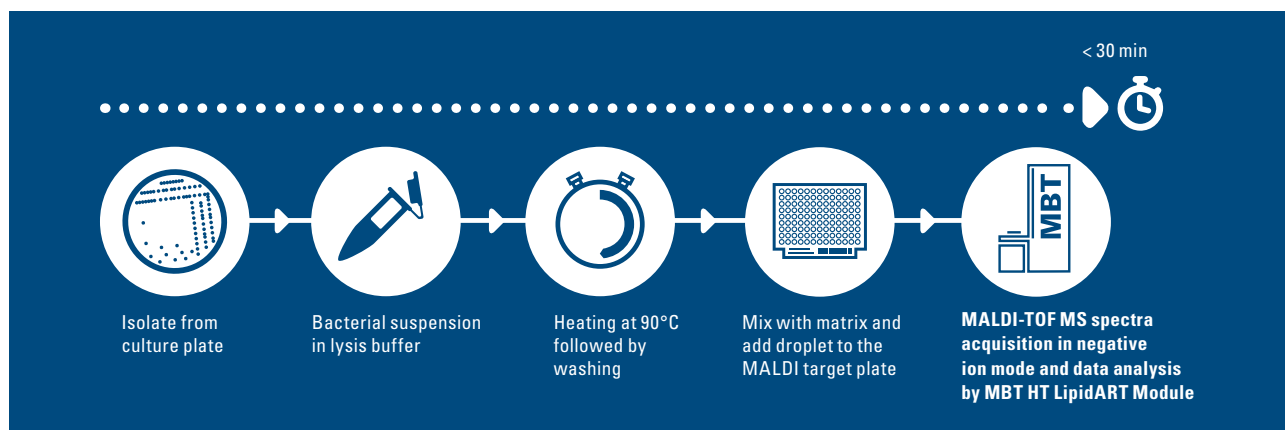
With the negative ion mode available on Bruker's high-end MALDI Biotyper sirius Systems, analysis of lipids has become accessible for microbial research, enabling exploration of lipidomics for resistance detection.

Polymyxin resistance in gram-negative bacteria arises due to changes to the lipopolysaccharide (LPS) structure, with modifications to Lipid A leading to repulsion effects of polymyxin antibiotics such as colistin. The mass changes resulting from the Lipid A modifications can easily be detected by MALDI-TOF mass spectrometry, in negative ion mode. The MBT Lipid Xtract Kit facilitates extraction of Lipid A and its derivatives from gram-negative bacteria, for subsequent analysis by MALDI Biotyper sirius Systems.



Extraction of Lipid A and its derivatives for rapid colistin resistance detection and other research applications

The MBT Lipid Xtract Kit allows sample preparation of the Lipid A molecule and all its modifications within less than 15 minutes. Material from a small colony undergoes lysis, and is mixed with Lipid Xtract matrix after a washing step. A droplet of this mixture is transferred to a MBT Biotarget 96 and dried, whereafter spectra are acquired in the lower mass range, using the negative ion mode on a MALDI Biotyper sirius System. The high extraction efficiency of the kit enables a broad range of MALDI-TOF applications for Lipid A.



Analysis of Lipid A and its derivatives for rapid colistin resistance detection

Lipid A modifications

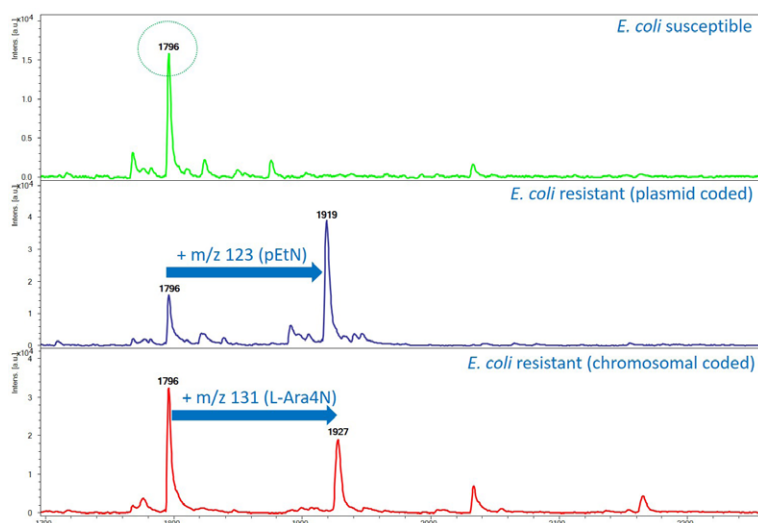
Modifications to the Lipid A molecules include fatty acid additions, phosphoethanolamine (pEtN) addition to the core and lipid A regions, and 4-amino-4-deoxy-L-arabinose (Ara4N) addition to the core and lipid A regions. A wide diversity of Lipid A structures and modifications in various taxonomic groups of gram-negative bacteria has been described. [1]

These modifications can be detected easily by the MALDI Biotyper sirius when using the MBT Lipid Xtract Kit for MALDI-TOF sample preparation.

Information provided by Lipid A spectra

The MBT Lipid Xtract Kit enables outstanding sample preparation of the Lipid A molecule and its modifications, resulting in high quality MALDI-TOF spectra with excellent resolution.

Detection of these modifications by the MALDI Biotyper sirius can be translated into valuable information by the dedicated MBT HT LipidART software module, part of the MBT Compass HT software.



pEtN (+123 Da) and L-Ara4N (+131 Da) modifications of Lipid A detected after extraction of an *E. coli* isolate by the MBT Lipid Xtract Kit and analysis by the MALDI Biotyper sirius, in less than 30 minutes.

MBT HT LipidART Module

Depending on the mass difference observed, it can be concluded whether the resistance-inducing Lipid A modification is plasmid or chromosomal coded, or both. With a few mouse clicks, this information is read from the spectra by the MBT HT LipidART software module, which indicates whether the investigated strain is resistant or susceptible.

Answers at a glance

The MBT HT LipidART software module comes with easily interpretable answers, indicating whether the resistance is based on chromosomal or plasmid coded modifications.

Resistance status in half an hour only

The exceptional speed of the test, giving a result after only 30 minutes starting from a colony, allows testing of many samples in a short period of time.

Sample Id	Species	Colistin	Spectrum
1	Ecoli_171207_COL_02...	Chromosomal coded	▲
2	Ecoli_171207_COL_02...	R	▲
3	Ecoli_171207_COL_02...	Chromosomal coded	▲
4	Ecoli_171207_COL_02...	R	▲
5	Ecoli_171207_COL_02...	Chromosomal coded	▲
6	Ecoli_171207_COL_02...	R	▲
7	Ecoli_171207_COL_12...	Native	▲
8	Ecoli_171207_COL_12...	S	▲
9	Ecoli_171207_COL_12...	Native	▲
10	Ecoli_171207_COL_12...	S	▲
11	Ecoli_171207_COL_12...	Native	▲
12	Ecoli_171207_COL_12...	S	▲

Clear results from the MBT HT LipidART software module.

[1] Kawahara, K., 2021. Variation, Modification and Engineering of Lipid A in Endotoxin of Gram-Negative Bacteria. Int. J. Mol. Sci. 22, 2281. <https://doi.org/10.3390/ijms22052281>

Order information:

MBT Lipid Xtract Kit

Part No. 1889112

MBT HT LipidART Module

Part No. 1889444

Prerequisite for the module is the
MBT Compass HT (RUO) software.

For Research Use Only. Not for use in clinical diagnostic procedures.
Please contact your local representative for availability in your country.
Not for sale in the USA.

RUO

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