BRUKER

MICRONAUT

- MICRONAUT-S
  Detection of Resistance Mechanisms

Manufactured by MERLIN

BMD – MIC

Innovation with Integrity

Automated and Customized Susceptibility Testing

MICRONAUT-S

For detection of resistance mechanisms and specific resistances of clinical and/or epidemiological importance

Multi-drug resistance (MDR) among gram-negative and gram-positive pathogens has increased worldwide in recent years, impacting both hospital and community acquired infections.

Several bacterial species like *Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter* spp. and *Escherichia coli*, have developed increased resistance against many antibiotic agents.

These organisms are playing a major role in nosocomial infections associated with high mortality rates and detection of their potential resistance mechanism is therefore of high clinical and epidemiological importance.

Antibiotic resistance among this group of organisms is mainly based on resistance genes encoded on plasmids and can easily and efficiently be transferred between pathogens. The easy spread of drug resistance genes encoding for certain ß-lactamases (e.g. ESBL or carbapenemases), is a growing source of concern as it results in resistance to virtually all ß-lactams, therefore dramatically eliminating the usefulness of the most important class of antibiotics.

The MICRONAUT-S plates are designed to provide the routine laboratory an efficient tool for phenotypic detection of the important resistance mechanisms among these bacteria.

MICRONAUT making the difference

- MICRONAUT is the only broth microdilution system which can differentiate between all Ambler class A (ESBL, KPC), class B (MBL), class C (AMP-C) and class D (OXA-48-like) cephalosporinases and / or carbapenemases
- The MICRONAUT system offers multiple products which detect a wide range of ß-lactamase production in a single test
- MICRONAUT-S products cover important resistance mechanisms described by EUCAST[1]:

Resistance mechanisms	MICRONAUT-S key products
Carbapenemase production (KPC, MBL, OXA-48-like) in • Enterobacterales • *P. aeruginosa*	**MICRONAUT-S Carbapenemases Detection** (New! Includes confirmatory assay for phenotypic detection of OXA-48 like enzymes)
Cephalosporinase & Carbapenemase production (ESBL, AMP-C, KPC, MBL, OXA-48-like) in • Enterobacterales • *P. aeruginosa*	**MICRONAUT-S ß-Lactamases**
Multi-drug resistance (MBL, KPC, AMP-C, OXA-48 -like, MCR-1) in • Enterobacterales • *P. aeruginosa* • *Acinetobacter* spp.	**MICRONAUT-S MDR MRGN Screening** Includes novel antibiotics e.g. ceftazidime-avibactam and ceftolozane-tazobactam
Methicillin resistance (MRSA) in • *Staphylococcus aureus*	**MICRONAUT-S MRSA / GP** Includes highly effective back-up antibiotics: ceftaroline, daptomycin, linezolid, tigecycline, vancomycin, and teicolplanin
Reduced susceptibility against glycopeptides in • *Staphylococcus aureus*	
Vancomycin resistance (VAN A, VAN B) in • *Enterococcus faecium* • *Enterococcus faecalis*	
Non-wild-type susceptibility against penicillin in • *Streptococcus pneumoniae*	

[1] *EUCAST guidelines for detection of resistance mechanisms and specific resistances of clinical and/or epidemiological importance. Version 2.0; July 2017. Available online at: http://www.eucast.org/ filead-min/src/media/PDFs/EUCAST_files/Resistance_mechanisms/EUCAST_detection_of_resistance_mechanisms_170711.pdf.*

Order information

MICRONAUT-S Carbapenemases Detection

2 tests per plate, 40 plates per box / Part No. E1-120-080

MICRONAUT-S Carbapenemases Detection

NEW 2-test plate for phenotypic detection of clinically relevant carbapenemases in Enterobacterales and *Pseudomonas aeruginosa*

What can it be used for?

Based on the standard broth microdilution (BMD) procedure, the MICRONAUT-S Carbapenemases Detection system provides the phenotypic detection of clinically relevant carbapenemases in Enterobacterales and *Pseudomonas aeruginosa*.

Features and benefits

- **NEW** Phenotypic confirmatory test for detection of **OXA-48-like** type D-carbapenemases by MIC determination of meropenem as a mono compound and in combination with the new ß-lactamase inhibitor avibactam, and the determination of high-level temocillin resistance
- Phenotypic detection of MBL (Metallo-ß-Lactamases) by MIC determination of meropenem as a mono compound and in combination with the divalent cationic chelator EDTA
- Phenotypic detection of KPC (*Klebsiella pneumoniae* carbapenemase) by MIC determination of meropenem as a mono compound and in combination with 3-Amino-Phenyl-Borate (3-APB)
- Determination of low-level carbapenem resistance against the mono compound meropenem
- Analysis and interpretation possible after visual or photometric reading
- MICRONAUT software for the analysis and interpretation after photometric reading provides indication of confirmed resistance mechanisms (MBL, KPC, OXA-48-like enzymes) by MIC quotient assessment and detection of high level temocillin resistance

Order information

MICRONAUT-S ß-Lactamases

1 test per plate, 40 plates per box / Part No. E1-111-040

MICRONAUT-S ß-Lactamases

Phenotypic detection of multiple ß-Lactamases (multiple resistance determinants) in a single test system

What can it be used for?

Based on the standard broth microdilution (BMD) procedure, the MICRONAUT S ß-Lactamases system provides the phenotypic detection of clinically relevant cephalosporinases and carbapenemases in Enterobacterales and non-fermenters.

Features and benefits

- MIC determination of antibiotics and antibiotic combinations against all relevant gram-negative bacteria (Enterobacterales, *Aeromonadaceae*, *Pseudomonadaceae etc.*)
- Phenotypic detection of ESBL (Extended Spectrum ß-Lactamases) by susceptibility testing with 3 extended spectrum cephalosporins and their combination with clavulanic acid
- Phenotypic detection of AMP-C (aminopenicillin inactivating cephalosporinase) by susceptibility testing with 3 extended spectrum cephalosporins and their combination with 3-Amino-Phenyl-Borate (3-APB)
- Phenotypic detection of KPC (*Klebsiella pneumoniae* carbapenemase) by MIC determination of meropenem as a mono substance and in combination with 3-Amino-Phenyl-Borate (3-APB)
- Phenotypic detection of MBL (Metallo-ß-Lactamases) by MIC determination of meropenem as a mono compound and in combination with the divalent cationic chelator EDTA
- Detection of OXA-48-like type D-carbapenemases based on determination of high-level temocillin resistance
- Detection of low-level carbapenem resistance based on introduction of ertapenem / meropenem screening cut-off value according to EUCAST
- Analysis and interpretation after visual or automated reading
- MICRONAUT software for the analysis and interpretation after automated reading with:
    - Indication of confirmed resistance mechanisms (ESBL, MBL, KPC, AMP-C) by MIC quotient assessment and detection of high-level temocillin resistance
    - Phenotypic confirmation of resistance mechanisms even at the occurrence of multiple ß-lactamases

Order information

MICRONAUT-S MDR MRGN Screening

1 test per plate, 40 plates per box / Part No. E1-218-040

MICRONAUT-S MDR MRGN Screening

MIC plate for Antimicrobial Susceptibility Testing (AST) of Multi-Drug Resistant gram-negative bacteria (MDR phenotype)

What can it be used for?

Based on the standard broth microdilution (BMD) procedure, the AST plate MICRONAUT-S MDR MRGN-Screening provides the phenotypic detection of clinically relevant resistance mechanisms (incl. confirmation of cephalosporinases and carbapenemases) in Enterobacterales and non-fermenters.

Features and benefits

- Detection of low level carbapenem resistance based on introduction of meropenem screening cut-off value according to EUCAST
- Testing of a broad spectrum of antibiotics including the novel antibiotic combinations ceftazidime-avibactam, ceftolozane-tazobactam and other effective back up antibiotics
- MIC determination of antibiotics and antibiotic combinations against all relevant gram-negative bacteria (Enterobacterales, *Aeromonadaceae*, *Pseudomonadaceae* etc.) including ceftazidime-avibactam and ceftolozane-tazobactam
- Phenotypic detection of AMP-C (aminopenicillin inactivating cephalosporinase) by susceptibility testing of ceftazidime and its combination with 3-Amino-Phenyl-Borate (3-APB)
- Phenotypic detection of KPC (*Klebsiella pneumoniae* carbapenemase) by MIC determination of meropenem as a mono substance and in combination with 3-Amino-Phenyl-Borate (3-APB)
- Phenotypic detection of MBL (Metallo-ß-Lactamases) by MIC determination of meropenem as a mono compound and in combination with the divalent cationic chelator EDTA
- Detection of OXA-48-like type D-carbapenemases based on determination of temocillin high-level resistance
- Phenotypic detection of colistin resistance (e.g. MCR-1)
- Evaluation after visual or automatic reading and interpretation according to CLSI standard or EUCAST criteria
- MICRONAUT software for evaluation and interpretation after automated reading, with indications of confirmed resistance mechanisms
- Fosfomycin concentration range covers ECOFF value for Pseudomonas aeruginosa according to EUCAST

Order information

MICRONAUT-S MRSA/GP

1 test per plate, 40 plates per box / Part No. E1-055-040

MICRONAUT-S MRSA/GP

Phenotypic detection of clinically relevant single or multi-resistances in gram-positive bacteria

What can it be used for?

Based on the broth microdilution (BMD) procedure, the MICRONAUT-S MRSA/GP system provides the phenotypic detection of clinically relevant single or multi-resistance in Staphylococci, Enterococci and Streptococci organisms. The susceptibility testing with highly effective reserve antibiotics like ceftaroline, linezolid, tigecycline, daptomycin, and vancomycin offers therapeutic options in case of extreme multi-resistance.

Susceptibility testing of Staphylococci

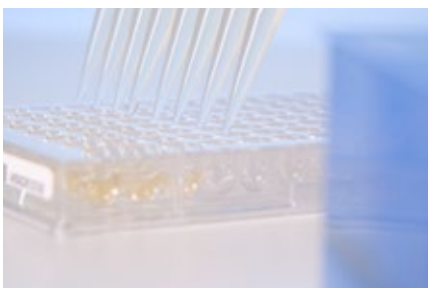
- Detection of staphylococcal penicillinases
- Detection of **MRSA** resistance phenotype by MIC determination of oxacillin and cefoxitin
- Detection of oxacillin borderline resistance phenotype (BORSA) by detection of cefoxitin susceptibility
- Detection of the induced **MLS_B** resistance by erythromycin/clindamycin combination test according to CLSI standard
- Test interpretation according to EUCAST and CLSI standard

Susceptibility testing of Enterococci

- Detection of ampicillin resistance
- Detection of the phenotypic resistance pattern of vancomycin **(VAN A, VAN B)** resistant Enterococci by determination of the MIC via teicoplanin and vancomycin
- Differentiation between *Enterococcus faecium* and *Enterococcus faecalis* by determination of the MIC via Synercid®
- Detection of **HLAR** strains through high-level-resistance testing via gentamicin
- Testing of highly effective antibiotics as therapeutic options in case of extreme multi-resistance

Susceptibility testing of Pneumococci

- Detection of non-wild-type penicillin susceptibility
- Detection of ceftaroline resistance
- Detection of erythromycin resistance
- Detection of vancomycin resistance
- Detection of group IV quinolones (moxifloxacin) resistance
- Testing of highly effective antibiotics as therapeutic options in case of extreme multi-resistance



MICRONAUT-S

Principle

The susceptibility testing with MICRONAUT-S is based on the rehydration of antibiotics by adding a standardized bacterial suspension. After incubation, the MIC results are read with a validated photometer or visually. MIC results are interpreted by using the MICRONAUT software.

Test procedure

- Prepare a 0.5 McFarland bacteria suspension in NaCl
- Transfer an aliquot into broth (i.e. cation adjusted Mueller-Hinton broth; CAMHB)
- Inoculate the MICRONAUT-S test plate
- Incubate for 18-24 hours at 35-37°C
- Read the results photometrically with a validated photometer followed by automated interpretation of the results by the MICRONAUT software or
- Read the results visually and interpret the MIC results

Note: a list of validated photometric readers is available from MERLIN

Shelf life and storage

- Shelf life: 24 months from date of production
- Storage: at room temperature (15-25°C)

Order information

Complimentary products (broth):

Mueller Hinton Broth, cation adjusted
100x11 mL / Part No. E2-331-100

Mueller Hinton Broth, cation adjusted
20x11 mL / Part No. E2-331-020

Please contact your local representative for availability in your country. Not for sale in the USA.

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