BMIC™

Antibacterial Minimum Inhibitory Concentration

Test for determination of Antibacterial Minimum Inhibitory Concentration
Product dedicated for professional studies for in vitro diagnostics of human and other origin samples.

REFERENCE NUMBERS

	Name	Scale	Cat. No 1 strip	Cat. No 5 strips	Cat. No 10 strips	Cat. No 30 strips
BMIC	Amikacin	0.016-256	0001B01	0001B05	0001B10	0001B30
BMIC	Amoxicillin	0.016-256	0002B01	0002B05	0002B10	0002B30
BMIC	Amoxicillin-clavulanic acid	0.016/2-256/2	0003B01	0003B05	0003B10	0003B30
BMIC	Amoxicillin-clavulanic acid(2:1)	0.016-256	0004B01	0004B05	0004B10	0004B30
BMIC	Ampicillin	0.016-256	0005B01	0005B05	0005B10	0005B30
BMIC	Ampicillin-sulbactam	0.016/4-256/4	0006B01	0006B05	0006B10	0006B30
BMIC	Ampicillin-sulbactam (2:1)	0.016-256	0007B01	0007B05	0007B10	0007B30
BMIC	Azithromycin	0.016-256	0008B01	0008B05	0008B10	0008B30
BMIC	Aztreonam	0.016-256	0009B01	0009B05	0009B10	0009B30
BMIC	Aztreonam	0.064-1024	0010B01	0010B05	0010B10	0010B30
BMIC	Bacitracin	0.016-256	0011B01	0011B05	0011B10	0011B30
BMIC	Cefaclor	0.016-256	0012B01	0012B05	0012B10	0012B30
BMIC	Cefadroxil	0.016-256	0013B01	0013B05	0013B10	0013B30
BMIC	Cefalexin	0.016-256	0014B01	0014B05	0014B10	0014B30
BMIC	Cefazolin	0.016-256	0015B01	0015B05	0015B10	0015B30
BMIC	Cefdinir	0.016-256	0016B01	0016B05	0016B10	0016B30
BMIC	Cefepime	0.002-32	0017B01	0017B05	0017B10	0017B30
BMIC	Cefepime	0.016-256	0018B01	0018B05	0018B10	0018B30
BMIC	Cefepime/Tazobactam (2:1)	0.016-256	0019B01	0019B05	0019B10	0019B30
BMIC	Cefiderocol	0.016-256	0020B01	0020B05	0020B10	0020B30
BMIC	Cefixime	0.016-256	0021B01	0021B05	0021B10	0021B30
BMIC	Cefmetazole	0.016-256	0022B01	0022B05	0022B10	0022B30
BMIC	Cefonicid	0.016-256	0023B01	0023B05	0023B10	0023B30
BMIC	Cefoperazone	0.016-256	0024B01	0024B05	0024B10	0024B30
BMIC	Cefoperazone-sulbactam (2:1)	0.016-256	0025B01	0025B05	0025B10	0025B30
BMIC	Cefotaxime	0.002-32	0026B01	0026B05	0026B10	0026B30
BMIC	Cefotaxime	0.016-256	0027B01	0027B05	0027B10	0027B30
BMIC	Cefotetan	0.016-256	0028B01	0028B05	0028B10	0028B30
BMIC	Cefoxitin	0.016-256	0029B01	0029B05	0029B10	0029B30
BMIC	Cefpirome	0.016-256	0030B01	0030B05	0030B10	0030B30
BMIC	Cefpodoxime	0.016-256	0031B01	0031B05	0031B10	0031B30
BMIC	Cefprozil	0.016-256	0032B01	0032B05	0032B10	0032B30
BMIC	Ceftaroline	0.002-32	0033B01	0033B05	0033B10	0033B30
BMIC	Ceftaroline	0.016-256	0034B01	0034B05	0034B10	0034B30
BMIC	Ceftazidime	0.016-256	0035B01	0035B05	0035B10	0035B30
BMIC	Ceftazidime-avibactam	0.016/4-256/4	0036B01	0036B05	0036B10	0036B30
BMIC	Ceftibuten	0.002-32	0037B01	0037B05	0037B10	0037B30
BMIC	Ceftizoxime	0.002-32	0038B01	0038B05	0038B10	0038B30
BMIC	Ceftizoxime	0.016-256	0039B01	0039B05	0039B10	0039B30
BMIC	Ceftobiprole	0.002-32	0040B01	0040B05	0040B10	0040B30
BMIC	Ceftolozane-tazobactam	0.016/4-256/4	0041B01	0041B05	0041B10	0041B30
BMIC	Ceftriaxone	0.002-32	0042B01	0042B05	0042B10	0042B30
BMIC	Ceftriaxone	0.016-256	0043B01	0043B05	0043B10	0043B30
BMIC	Cefuroxime	0.016-256	0044B01	0044B05	0044B10	0044B30
BMIC	Cephalothin	0.016-256	0045B01	0045B05	0045B10	0045B30
BMIC	Chloramphenicol	0.016-256	0046B01	0046B05	0046B10	0046B30
BMIC	Ciprofloxacin	0.002-32	0047B01	0047B05	0047B10	0047B30
BMIC	Ciprofloxacin	0.016-256	0048B01	0048B05	0048B10	0048B30
BMIC	Clarithromycin	0.016-256	0049B01	0049B05	0049B10	0049B30
BMIC	Clindamycin	0.016-256	0050B01	0050B05	0050B10	0050B30
BMIC	Cloxacillin	0.016-256	0051B01	0051B05	0051B10	0051B30

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Kapitał Zakładowy 4.328.500.00 zł
NIP 946-2360-625
REGON 432519331

BMIC	Colistin	0.016-256	0052B01	0052B05	0052B10	0052B30
BMIC	Colistin	0.064-1024	0053B01	0053B05	0053B10	0053B30
BMIC	Dalbavancin	0.002-32	0054B01	0054B05	0054B10	0054B30
BMIC	Dalbavancin	0.016-256	0055B01	0055B05	0055B10	0055B30
BMIC	Daptomycin	0.016-256	0056B01	0056B05	0056B10	0056B30
BMIC	Delafloxacin	0.002-32	0057B01	0057B05	0057B10	0057B30
BMIC	Dicloxacillin	0.016-256	0058B01	0058B05	0058B10	0058B30
BMIC	Doripenem	0.002-32	0059B01	0059B05	0059B10	0059B30
BMIC	Doxycycline	0.016-256	0060B01	0060B05	0060B10	0060B30
BMIC	Enrofloxacin	0.002-32	0061B01	0061B05	0061B10	0061B30
BMIC	Eravacycline	0.002-32	0062B01	0062B05	0062B10	0062B30
BMIC	Ertapenem	0.002-32	0063B01	0063B05	0063B10	0063B30
BMIC	Erythromycin	0.016-256	0064B01	0064B05	0064B10	0064B30
BMIC	Faropenem	0.002-32	0065B01	0065B05	0065B10	0065B30
BMIC	Fidaxomicin	0.016-256	0066B01	0066B05	0066B10	0066B30
BMIC	Florfenicol	0.016-256	0067B01	0067B05	0067B10	0067B30
BMIC	Flucloxacillin	0.016-256	0068B01	0068B05	0068B10	0068B30
BMIC	Fosfomycin	0.016-256	0069B01	0069B05	0069B10	0069B30
BMIC	Fosfomycin	0.064-1024	0070B01	0070B05	0070B10	0070B30
BMIC	Fosmidomycin	0.016-256	0071B01	0071B05	0071B10	0071B30
BMIC	Fusidic acid	0.016-256	0072B01	0072B05	0072B10	0072B30
BMIC	Gatifloxacin	0.002-32	0073B01	0073B05	0073B10	0073B30
BMIC	Gemifloxacin	0.002-32	0074B01	0074B05	0074B10	0074B30
BMIC	Gentamicin	0.016-256	0075B01	0075B05	0075B10	0075B30
BMIC	Gentamicin	0.064-1024	0076B01	0076B05	0076B10	0076B30
BMIC	Griseofulvin	0.016-256	0077B01	0077B05	0077B10	0077B30
BMIC	Imipenem	0.002-32	0078B01	0078B05	0078B10	0078B30
BMIC	Imipenem	0.016-256	0079B01	0079B05	0079B10	0079B30
BMIC	Imipenem/Relebactam	0.002/4-32/4	0080B01	0080B05	0080B10	0080B30
BMIC	Kanamycin	0.016-256	0081B01	0081B05	0081B10	0081B30
BMIC	Kanamycin	0.002-32	0082B01	0082B05	0082B10	0082B30
BMIC	Lefamulin	0.016-256	0083B01	0083B05	0083B10	0083B30
BMIC	Levofloxacin	0.002-32	0084B01	0084B05	0084B10	0084B30
BMIC	Levofloxacin	0.016-256	0085B01	0085B05	0085B10	0085B30
BMIC	Linezolid	0.016-256	0086B01	0086B05	0086B10	0086B30
BMIC	Linezolid	0.002-32	0087B01	0087B05	0087B10	0087B30
BMIC	Marbofloxacin	0.002-32	0088B01	0088B05	0088B10	0088B30
BMIC	Mecillinam	0.016-256	0089B01	0089B05	0089B10	0089B30
BMIC	Meropenem	0.002-32	0090B01	0090B05	0090B10	0090B30
BMIC	Meropenem	0.016-256	0091B01	0091B05	0091B10	0091B30
BMIC	Meropenem/Vaborbactam	0.016/8-256/8	0092B01	0092B05	0092B10	0092B30
BMIC	Metronidazole	0.016-256	0093B01	0093B05	0093B10	0093B30
BMIC	Metronidazole	0.002-32	0094B01	0094B05	0094B10	0094B30
BMIC	Minocycline	0.016-256	0095B01	0095B05	0095B10	0095B30
BMIC	Moxalactam	0.016-256	0096B01	0096B05	0096B10	0096B30
BMIC	Moxifloxacin	0.002-32	0097B01	0097B05	0097B10	0097B30
BMIC	Moxifloxacin	0.016-256	0098B01	0098B05	0098B10	0098B30
BMIC	Mupirocin	0.064-1024	0099B01	0099B05	0099B10	0099B30
BMIC	Mupirocin	0.002-32	0100B01	0100B05	0100B10	0100B30
BMIC	Nalidixic acid	0.016-256	0101B01	0101B05	0101B10	0101B30
BMIC	Nalidixic acid	0.064-1024	0102B01	0102B05	0102B10	0102B30
BMIC	Netilmicin	0.016-256	0103B01	0103B05	0103B10	0103B30
BMIC	Nitrofurantoin	0.032-512	0104B01	0104B05	0104B10	0104B30
BMIC	Nitrofurantoin	0.016-256	0105B01	0105B05	0105B10	0105B30
BMIC	Nitroxoline	0.016-256	0106B01	0106B05	0106B10	0106B30
BMIC	Norfloxacin	0.016-256	0107B01	0107B05	0107B10	0107B30
BMIC	Norfloxacin	0.002-32	0108B01	0108B05	0108B10	0108B30
BMIC	Norfloxacin	0.032-512	0109B01	0109B05	0109B10	0109B30
BMIC	Ofloxacin	0.002-32	0110B01	0110B05	0110B10	0110B30
BMIC	Ofloxacin	0.016-256	0111B01	0111B05	0111B10	0111B30
BMIC	Omadacycline	0.002-32	0112B01	0112B05	0112B10	0112B30

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BMIC	Oritavancin	0.016-256	0113B01	0113B05	0113B10	0113B30
BMIC	Oxacillin	0.016-256	0114B01	0114B05	0114B10	0114B30
BMIC	Oxacillin	0.002-32	0115B01	0115B05	0115B10	0115B30
BMIC	Oxacillin/Vancomycin	0.064-8/0.25-16	0116B01	0116B05	0116B10	0116B30
BMIC	Paromomycin	0.064-1024	0117B01	0117B05	0117B10	0117B30
BMIC	Pefloxacin	0.016-256	0118B01	0118B05	0118B10	0118B30
BMIC	Penicillin G	0.002-32	0119B01	0119B05	0119B10	0119B30
BMIC	Penicillin G	0.016-256	0120B01	0120B05	0120B10	0120B30
BMIC	Phenoxymethylpenicillin	0.016-256	0121B01	0121B05	0121B10	0121B30
BMIC	Piperacillin	0.016-256	0122B01	0122B05	0122B10	0122B30
BMIC	Piperacillin-tazobactam	0.016/4-256/4	0123B01	0123B05	0123B10	0123B30
BMIC	Piperacillin-tazobactam	0.064/4-1024/4	0124B01	0124B05	0124B10	0124B30
BMIC	Plazomicin	0.016-256	0125B01	0125B05	0125B10	0125B30
BMIC	Polymyxin B	0.016-256	0126B01	0126B05	0126B10	0126B30
BMIC	Polymyxin B	0.064-1024	0127B01	0127B05	0127B10	0127B30
BMIC	Quinupristin-dalfopristin	0.002-32	0128B01	0128B05	0128B10	0128B30
BMIC	Rifampicin	0.002-32	0129B01	0129B05	0129B10	0129B30
BMIC	Rifampicin	0.016-256	0130B01	0130B05	0130B10	0130B30
BMIC	Roxithromycin	0.002-32	0131B01	0131B05	0131B10	0131B30
BMIC	Sparfloxacin	0.016-256	0132B01	0132B05	0132B10	0132B30
BMIC	Spectinomycin	0.064-1024	0133B01	0133B05	0133B10	0133B30
BMIC	Spiramycin	0.002-32	0134B01	0134B05	0134B10	0134B30
BMIC	Streptomycin	0.016-256	0135B01	0135B05	0135B10	0135B30
BMIC	Streptomycin	0.064-1024	0136B01	0136B05	0136B10	0136B30
BMIC	Streptomycin	0.002-32	0137B01	0137B05	0137B10	0137B30
BMIC	Sulbactam	0.016-256	0138B01	0138B05	0138B10	0138B30
BMIC	Sulfamethoxazole	0.064-1024	0139B01	0139B05	0139B10	0139B30
BMIC	Tedizolid	0.002-32	0140B01	0140B05	0140B10	0140B30
BMIC	Teicoplanin	0.016-256	0141B01	0141B05	0141B10	0141B30
BMIC	Telavancin	0.002-32	0142B01	0142B05	0142B10	0142B30
BMIC	Telavancin	0.016-256	0143B01	0143B05	0143B10	0143B30
BMIC	Telithromycin	0.016-256	0144B01	0144B05	0144B10	0144B30
BMIC	Temocillin	0.064-1024	0145B01	0145B05	0145B10	0145B30
BMIC	Tetracycline	0.016-256	0146B01	0146B05	0146B10	0146B30
BMIC	Tiamulin	0.002-32	0147B01	0147B05	0147B10	0147B30
BMIC	Ticarcillin	0.016-256	0148B01	0148B05	0148B10	0148B30
BMIC	Ticarcillin/Clavulanic acid	0.016/2-256/2	0149B01	0149B05	0149B10	0149B30
BMIC	Tigecycline	0.016-256	0150B01	0150B05	0150B10	0150B30
BMIC	Tilmicosin	0.002-32	0151B01	0151B05	0151B10	0151B30
BMIC	Tobramycin	0.016-256	0152B01	0152B05	0152B10	0152B30
BMIC	Tobramycin	0.064-1024	0153B01	0153B05	0153B10	0153B30
BMIC	Trimethoprim	0.002-32	0154B01	0154B05	0154B10	0154B30
BMIC	Trimethoprim	0.016-256	0155B01	0155B05	0155B10	0155B30
BMIC	Trimethoprim-sulfamethoxazole	0.002-32	0156B01	0156B05	0156B10	0156B30
BMIC	Trimethoprim-sulfamethoxazole	0.016-256	0157B01	0157B05	0157B10	0157B30
BMIC	Vancomycin	0.016-256	0158B01	0158B05	0158B10	0158B30
BMIC	Vancomycin	0.002-32	0159B01	0159B05	0159B10	0159B30
BMIC	Vancomycin/Teicoplanin	0.5-32/0.5-32	0160B01	0160B05	0160B10	0160B30
BMIC	Vancomycin-Cefoxitin	0.5-32/0.5-32	0161B01	0161B05	0161B10	0161B30

PACKAGE SIZE

1 x 5 strips packed separately in foil sachets with a desiccant, in a carton box with instructions for use
1 x 10 strips packed separately in foil sachets with a desiccant, in a carton box with instructions for use
1 x 30 strips packed separately in foil sachets with a desiccant, in a carton box with instructions for use

INTRODUCTION

Testing with BMIC™ strips provides MIC values in µg/ml, indicating the amount of antibiotic that inhibits the growth of microorganisms under specified, standardized in vitro culture conditions. The strip is designed to achieve the highest repeatability of results, although slight variations in the obtained MIC value are possible, within plus or minus one twofold dilution (even with perfectly replicated test procedures). It should be noted that the indicated value is a minimum value; therefore, to effectively inhibit growth, an amount at least one value higher should be used. Many helpful insights can be found in the recommendation prepared by CLSI and EUCAST.

PURPOSE

The BMIC™ test is designed to determine the MIC (Antibacterial Minimum Inhibitory Concentration) value, which is the minimum concentration of an antibiotic that inhibits the growth of microorganisms. The strips have a gradient of antibiotic applied, and a clear scale with markers allows for reading the MIC value in a twofold scale. The test is conducted on Petri dishes with a standardised agar medium, with the incubation time and conditions depending on the species being tested. BMIC™ allows for the examination of all species of microorganisms cultured on plates; the method of conducting the test may need to be adjusted. The test provides preliminary results, and further studies may be required to confirm the obtained results.

PRINCIPLE OF THE METHOD

BMIC™ strips are based on a combined method of microdilution and diffusion. Innovative strips, which have a defined constant gradient of antibiotic on their surface, allow for reading the MIC value on a twofold scale. The scale is designed to enable easy reading of both main values (twofold gradient) and intermediate values. On the top side, the strip in the logo area contains a two- or three-letter code of the antibiotic name; below this area is a clear scale with values expressed in µg/ml. The strips are sized to be used on standard Petri dishes (90mm and 150mm). It is possible to use two or more strips on one plate. The strip is designed to interact with the surface of the plate against the inoculated microorganisms and inhibit their growth proportionally to the resistance of the microorganism. Susceptibility can be determined by reading the MIC value in µg/ml from the scale, which is indicated by the elliptical-shaped inhibition zone; its narrow end intersects the scale on the strip at a specific point indicating the value. Detailed information on reading the values is provided below. The strips are designed to maintain durability and reproducibility of the obtained results. The user should verify the values obtained with a control strain to ensure accuracy. MIC values for specific strains and antibiotics are updated and included in recommendations prepared by EUCAST and CLSI.

STORAGE

1. Store the strips in their original packaging at the temperature indicated on the packaging (-20..8°C or -20°C). For long-term storage, temperatures below -20°C (+/- 2°C) are recommended.
2. Strips with the shortest expiration date must be used first.
3. Immediately before testing, bring the strips to room temperature (20°C; +/- 2°C). Do not heat the products with external heat sources; bring them to room temperature by taking the strips out of the freezer/refrigerator in advance.
4. Protect from moisture. The sealed packaging provides sufficient protection. An opened package with unused strips should be placed back into a sealed bag (container) along with a desiccant. Such a product should be used immediately, no later than a few days after opening. It must be stored under refrigeration (6°C; +/- 2°C) or frozen (-20°C; +/- 2°C).
5. Strips must be stored in a dry environment.
6. Do not use strips after expiry date.
7. If incorrect inhibition zones are observed during testing with control strains, verify the testing procedure. Incorrect results can be caused by poor storage, quality of the medium, or procedural errors.

PERFORMING THE TEST

After removing from the bulk packaging, check if the individual packages are not damaged. Do not use a strip if the packaging is damaged; use a new strip from undamaged packaging instead. Verify the expiration date and do not use strips that have passed their expiration date.

Before using the product, bring it to room temperature (see storage instructions). Remove the strips well in advance (approximately 30-60 minutes before testing). Check if moisture from the surroundings has settled on the outer packaging; if so, remove it with a paper towel. Contact with wet surfaces or direct exposure to liquids on the strip may cause improper functioning. A soaked strip should not be used; use a new one instead. Strips stored at room temperature can be used immediately.

Open the package by tearing at the top; the edge has a marker for easy opening. Remove the strip using tweezers, trying to grasp it in the logo area. Avoid touching the scale area; the antibiotic gradient is applied on its reverse side, and touching it may cause product malfunction. The tweezers should be dry and not soaked in sterilization solutions, or they should be dried before use. Other application tools can be used according to their usage instructions. You can touch the top side of the strip. The strip's special design protects the antibiotic gradient from interacting with the top side of the strip. After laying the strip, smooth it gently by sliding the tweezers along its top side; this will align its position and ensure optimal adhesion to the plate surface.

Lay out the strips according to the test purpose, one, two, or more. When applying multiple strips, arrange them so that no edge of one strip touches another, leaving at least a 2 cm gap in the lower area of the strip (arranging them in a star pattern). If laying multiple strips side by side along a line, maintain a minimum gap of 3 cm between them. Arranging multiple strips with gradients of different antibiotics next to each other may complicate MIC value readings due to uneven microbial growth, synergy, or antagonism. Consider pharmacological interactions when analyzing the results obtained.

NOTES

BMIC™ strips are intended for professional use, in vitro diagnostic only.
BMIC™ strips should be used strictly according to the instructions and only for their intended purpose.
Strict adherence to aseptic procedures and personal protection measures is essential, following applicable regulations, especially when working with pathogenic microorganisms.
Waste generated from tests should be considered hazardous due to the presence of microorganisms and antibiotics. It is imperative to strictly follow regulations for the disposal of such waste, considering the potential for microorganisms to develop antibiotic resistance.
Materials from tests should not be stored longer than necessary, and measures should be taken to prevent the spread of resistant, potentially resistant, or antibiotic-resistant microorganisms into the environment.

PROCEDURE

Materials provided

5, 10, or 30 BMIC™ test strips individually packed in sachets with desiccant

Instructions for use

Materials required but not provided
Petri dishes with a minimum diameter of 90mm and special agar for the type of microorganisms being studied; detailed instructions are provided in Table 1
Suspension medium for preparing the inoculum; details are provided in Table 1
Sterile, non-toxic, moderately flexible swabs, tubes, scissors, pipette, tips, spreaders, and other small laboratory equipment
Densitometer
McFarland standards 0.5 and 1
Incubator (35°C; +/- 2°C), incubator with controlled CO2 atmosphere, or anaerostat depending on the strain being studied; details in Table 1
Reference strains

Culture medium
Adjust the culture medium to the specific microorganism being studied; details are found in Table 1. Ensure that the agar plates are uniform, providing suitable growth as per quality control for the plates; the agar must adhere well to the entire surface of the plates and their side walls. Bring the plates to room temperature before inoculation; do not heat them with an external heat source. Verify the expiration date; for comparative studies, use the same batch of plates for all tested samples. Follow the manufacturer's recommendations.

Preparation of Inoculum
Prepare the inoculum using the guidelines from Table 1. Use the standard method for preparing the inoculum according to EUCAST recommendations: pick several colonies from a pure, fresh culture to prepare the inoculum at the appropriate density compared to the standard. The inoculum should be prepared no earlier than 15 minutes before inoculation. Immediately before seeding, mix it to ensure uniformity and proper density for seeding. Inoculum tends to settle.

Inoculation
Place a sterile, flexible, non-toxic swab into the prepared inoculum by rotating it several times in the suspension. Remove excess solution by pressing the head (cotton swab) against the inner edge of the tube. Adjust the method according to the plates being seeded (size). Inoculate the plate with gentle, fluid movements to evenly cover the entire surface. After covering the plate, rotate it by 60° and repeat the seeding with the same swab; then repeat the process by rotating the plate another 60°. After spreading the suspension on the plate surface three times, gently circle around the plate's edge. Allow the plates to absorb the solution - wait approximately 15 minutes before placing the strips to ensure the plate surface is dry. The manufacturer recommends this seeding method, but other automatic or manual methods (spreading with a spreader) may also be used; however, ensure these methods provide a uniform lawn across the entire plate surface.

Warning:
The turbidimetric method does not guarantee the proper density of live cells in the inoculum. Perform a microbial count to verify the correct number of live cells in the inoculum. Properly prepared inoculum and seeding allow for homogeneous, consistent growth of microorganisms on the plate, enabling accurate reading of MIC values.

Application
Ensure that the inoculated plates are dry before application. Open the test sachet according to the instructions in the PERFORMING THE TEST section. Determine the best position on the plate, keeping in mind that the strips require a surface area of approximately 6 cm by 4 cm. Place one or a maximum of two strips containing the same antibiotic gradient on 90 mm plates. On 150 mm plates, you can place from one to six strips; the manufacturer recommends a maximum of 4 to 6 strips. Adjust the number of strips accordingly based on the expected size of the growth inhibition zones. If a large growth inhibition zone is expected (organism sensitive to the antibiotic), reduce the number of strips.

Strips can be applied using tweezers or other systems that apply suction or vacuum for handling, following the manufacturer's instructions. Ensure that the strip adheres well to the plate surface; if necessary, gently smooth the top of the strip with tweezers. If a strip improperly falls onto the agar surface, it may leave a mark that will be observed after incubation. Such a plate should be discarded or marked, and the user should assess whether they can correctly read the MIC value. If a strip is placed with the scale side facing the agar surface, correct results will not be obtained. Such a strip should be lifted and placed correctly with the scale side facing upwards. Such a plate should be discarded or left for the user's assessment after incubation. The result may be difficult to read or incorrect. The manufacturer recommends repeating the test using a new inoculated plate and a new strip.

Incubation
Incubate the plates upside down according to the requirements of the tested microorganisms; guidelines are provided in Table 1. Follow the accepted standard methods of incubation.

Notes
Plates with agar used for testing may vary in parameters such as calcium and magnesium ion content, pH, even from the same supplier. Ion content and pH can affect the size of MIC values obtained. Use only verified suppliers and the same batch for control tests.
Read results after a specified incubation time; readings taken too early or too late may yield inaccurate results. Monitor the incubation time.
Incorrect incubation temperature, temperature instability, or interruptions in incubator operation may lead to erroneous results. Monitor the operation of the incubation devices; before reading results, ensure the device operated steadily during incubation.
Keep the user manual and refer to it if in doubt, or consult with the manufacturer.
Always conduct controls using reference strains, compare obtained results with available standards, and repeat the test if there are doubts. Users should validate the method for their specific needs and according to required standards.

Reading the results

BMIC™ BioMaxima strips have been specially designed for easy result interpretation. However, training and experience are required for more challenging or debatable cases. The innovative strips feature a scale and markers along the strip edge to facilitate reading. The result indicates the boundary between the zone of growth inhibition (surface without visible turbidity, single colonies – growth-free zone of microorganisms) and the surface where growth is observed. The arbitrary boundary line runs below the strip, with its ends touching the scale on both sides of the strip. This location indicates the MIC value for a given strain and antibiotic. Major values are placed on the scale for medical diagnostic purposes. The strip allows for intermediate values reading for research purposes or more accurate diagnostics. Intermediate values are read if the boundary between zones falls in the dark field between light fields. Major values are read if the boundary ends in a light area. For medical diagnostic purposes, if the boundary falls in a black area, read the value from the light field above the intermediate value (inflate the reading). If no elliptical or circular growth inhibition zone is observed, and even a minimal zone cannot be observed, read the maximum result indicated on the strip and indicate that the strain of microorganism is resistant to the antibiotic, express its resistance with the ">" symbol, and indicate the maximum value on the strip. If a large zone of growth inhibition is observed around the strip in such a way that the entire strip is surrounded by this zone, it means that the strain is sensitive to the antibiotic, indicate that the minimum inhibitory concentration is less than the minimum value on the strip. Several types of strips with different scales are available for different antibiotics, pay attention to the values placed on the strip. If single colonies resistant to the antibiotic are observed within the growth inhibition zone, indicate the value at which no colonies are present (total growth inhibition zone). Live microorganisms can exhibit different types of growth and characteristics of the obtained "lawn," therefore various types of deformations of the zone may occur in the form of funnels along the scale, or a thin layer of growth along the scale, in most cases they should be ignored. If the values read on both sides of the strip are different, indicate the higher value. In case of doubt, repeat the test. Consider the purpose of the study, as some antibiotics exhibit bacteriostatic properties, which cause partial growth inhibition zone to appear. Depending on the purpose, correctly indicate the MIC value. For bacteriostatics, indicate the MIC value at 80% of the growth inhibition zone, where the first significant reduction - growth limitation is observed by the naked eye. Bactericidal MIC values for a given antibiotic should be determined by indicating the boundary of total growth inhibition.

Interpretation of results

The interpretation of results should be performed by trained and experienced personnel. BMIC™ strips provide quantitative data, so values should be precisely indicated along with information on whether a particular strain is resistant or sensitive. Information regarding resistance is available in publicly accessible tables prepared by CLSI® and EUCAST. For control purposes, reference strains recommended by these organizations should be used. The tables specify values at which a strain should be considered resistant or sensitive. Tests have been designed to accurately indicate MIC values for reference strains. For medical diagnostic purposes, intermediate values should not be indicated but rounded up to the nearest higher value.

WASTE MANAGEMENT

All waste generated from tests using BMIC™ should be considered potentially infectious material. It should be noted that the strips contain antibiotics, and their use with microorganisms can lead to the development of resistance mechanisms against these antibiotics. Therefore, all waste should be disposed of immediately after the tests are completed to prevent them from entering the environment. It is the responsibility of laboratories to adhere to waste disposal regulations, implement appropriate procedures, and ensure compliance with them.

REFERENCES

1. World Health Organization Expert Committee on Biological Standardization. Requirements for antibiotic susceptibility test: 1.: WHO Technical reports series No 610. Geneva: WHO, 1977.
2. European Committee on Antimicrobial Susceptibility Testing Breakpoint tables for interpretation of MICs and zone diameters. Version 14.0, January, 2024.
3. Clinical and Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing; latest edition. CLSI supplement M100.
4. Clinical and Laboratory Standards Institute. Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; latest edition.CLSI standard M07.
5. Clinical and Laboratory Standards Institute. Methods for Dilution Antimicrobial Susceptibility Testing of Anaerobic Bacteria; Approved Standard, latestedition. CLSI document M11.

Table 1

Media, temperature, conditions and time of incubation recommended by EUCAST

Testing microorganisms	Medium	Incubation temperature	Incubation conditions	Incubation time
Enterobacterales	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Pseudomonas spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Stenotrophomonas maltophilia	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Burkholderia pseudomallei	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Acinetobacter spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Staphylococcus spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Enterococcus spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16-20 h; 24 h for glycopeptide
Aeromonas spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h

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Achromobacter xylosoxidans	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Bacillus spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 18 h
Vibrio spp.	MH Agar (MH)	35 o C ± 1	Aerobic	16 – 20 h
Streptococcus spp. A,B,C,G Group	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Streptococcus pneumoniae	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Streptococcus spp. Viridans group	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Haemophilus influenzae	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Moraxella catarrhalis	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Listeria monocytogenes	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Pasteurella multocida	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5 % CO2	16 – 20 h
Campylobacter jejuni and coli	MH+5% KK+20 mg/l NAD (MH-F)	41 o C ± 1	microaerophilic conditions	24 h, up to 40-48 h
Corynebacterium spp.	MH+5% KK+20 mg/l NAD (MH-F)	35 o C ± 1	5% CO2	16 – 20 h, up to 40-44 h
Aerococcus sanguinicola and urinae	MH+5% KK+20 mg/l NAD (MH-F))	35 o C ± 1	5% CO2	16 – 20 h, up to 40-44 h
Kingella kingae	MH+5% KK+20 mg/l NAD (MH-F))	35 o C ± 1	5% CO2	16 – 20 h, up to 40-44 h
Brucella melitensis	MH+5% KK+20 mg/l NAD (MH-F))	35 o C ± 1	5% CO2	46 – 50 h
Anaerobes	Fastidious Anaerobic Agar (FAA)	35-37 o C ± 1	Anaerobic conditions	16 – 20 h

CE

Explanation of symbols

⚠	Caution, consult accompanying documents		Consult instructions for use		Manufacturer
IVD	For in vitro diagnostic use	LOT	Batch code	REF	Catalog number
	Temperature limitation		Use by		

TD-7-BMIC *Version 1.2/2024-12-16*

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