

The EUCAST disk diffusion method for anaerobic bacteria

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AST of anaerobic bacteria

- Agar dilution is the reference method for AST of anaerobic bacteria (EUCAST and CLSI)
- **EUCAST methods**
 - Agar dilution on FAA with 5% defibrinated horse blood (FAA-HB)
 - Disk diffusion on FAA-HB
- **CLSI methods**
 - Agar dilution on Brucella Blood Agar with hemin and vitamin K (BBA)
 - Broth microdilution in Brucella broth (*Bacteroides* spp. only)
 - No disk diffusion method

Correlation between agar dilution MICs on FAA-HB and BBA

Benzylopenicillin

212 isolates of various species

		Brucella																
		<0.008	0.016	0.03	0.06	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	≥512
FAA	<0.008	12	11	2														
	0.016	11	12	15	1													
	0.03	30	1	10	7													
	0.06	9	1	4	10	12												
	0.125				2	21	5											
	0.25					3	7	1										
	0.5							1	1									
	1								2	1	1							
	2								1	5	2							
	4										2	2						
	8										1	2	2					
	16													1				
	32														1			
	64																	
	128																	
	256																	
≥512																		

Identical MICs

MICs 1 dilution higher or lower

Lower MICs on BBA for some *F. necrophorum*, probably due to poorer growth on BBA.

Disk diffusion methodology

Inoculum	McF 1.0 (0.9-1.1)
Medium	Fastidious Anaerobe Agar with 5% mechanically defibrinated horse blood (FAA-HB)
Incubation	Anaerobic environment 35-37°C, 16-20 h
Reading of zones	Read zone diameters from the front of the plate See specific Reading Guide for anaerobic bacteria

AST of bacteria

IVDR

Media preparation

MIC determination

Disk diffusion methodology

Disk diffusion implementation

Breakpoint tables

Quality Control

Strains with defined susceptibility

Calibration and validation

www.eucast.org

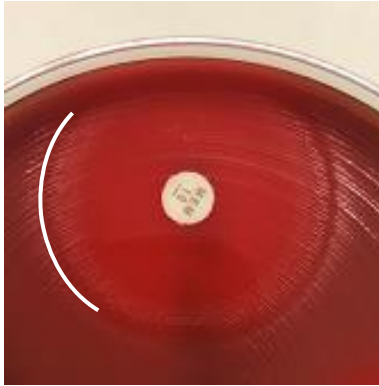
- [Disk diffusion manual v 13.0](#) (1 January, 2025)
- [Disk diffusion - Slide show v 13.0](#) (1 January, 2025)
- [Disk diffusion - Reading guide v 11.0](#) (1 January, 2025)
- [Anaerobic bacteria - disk diffusion methodology v 2.0](#) (2 January 2023). QC recommendations are now included in the general [QC document](#).
- [Anaerobic bacteria - disk diffusion reading guide v 2.0](#) (2 January 2023). Disk diffusion breakpoints for anaerobic bacteria are valid for FAA with 5% mechanically defibrinated horse blood as the only additive.

Important aspects of methodology

- Dry plates before inoculation
- *Bacteroides* spp. and *C. perfringens*
 - Remove excess fluid from the cotton swab before inoculation to avoid over-inoculation
- *Prevotella* spp., *F. necrophorum* and *C. acnes*
 - Do not remove excess fluid, and spread the inoculum evenly over the entire agar surface, ensuring that there are no gaps between streaks
- Limit the number of disks on each plate to allow good growth and to avoid overlapping of zones
- Follow the specific reading instructions

Reading of zones

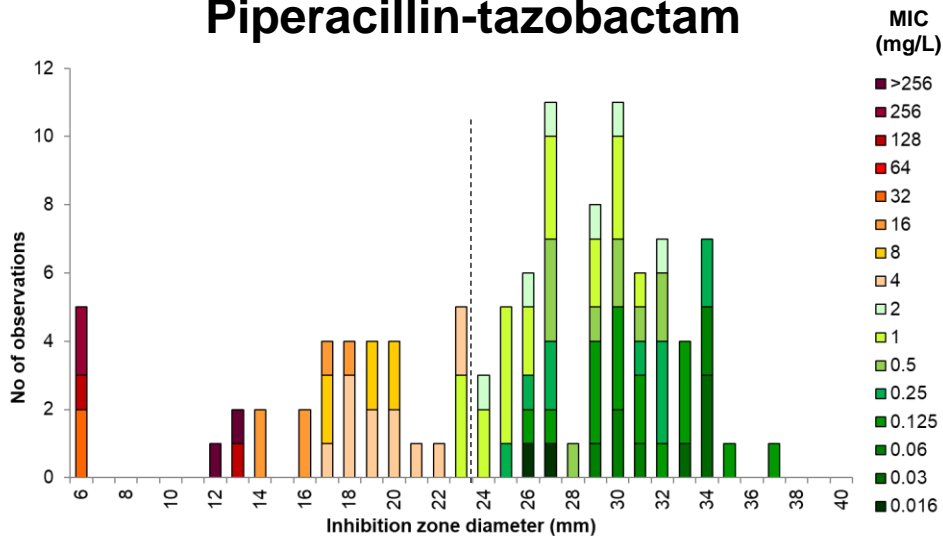
Specific instructions



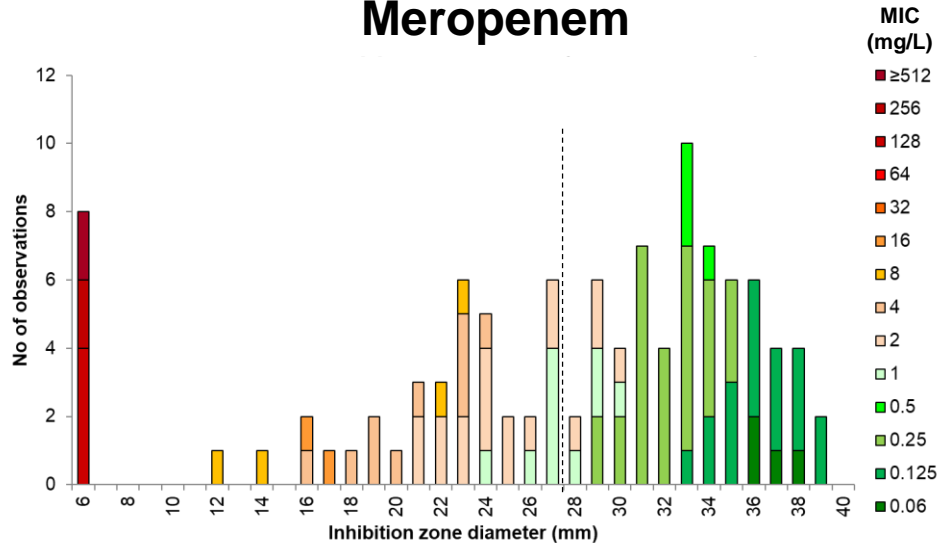
- Ignore any faint haze within the inhibition zone and read the most obvious zone. **Tilt the plate towards you to better define the obvious zone edge.**
- Ignore haemolysis and swarming and read inhibition of growth.
- Isolated colonies within the inhibition zone should be taken into account. **For clindamycin, it is particularly important to examine zones carefully for colonies growing within the zone.**

Correlation between disk diffusion and agar dilution *Bacteroides* spp.

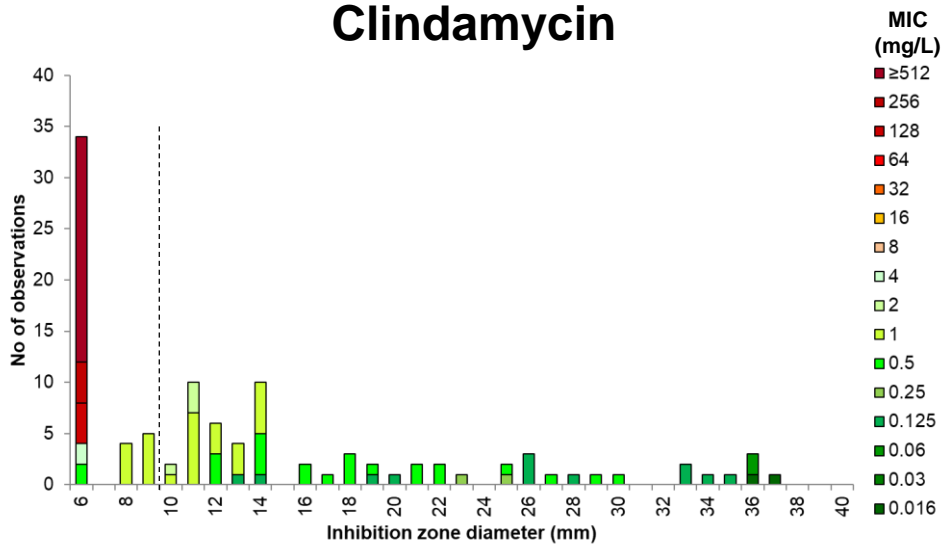
Piperacillin-tazobactam



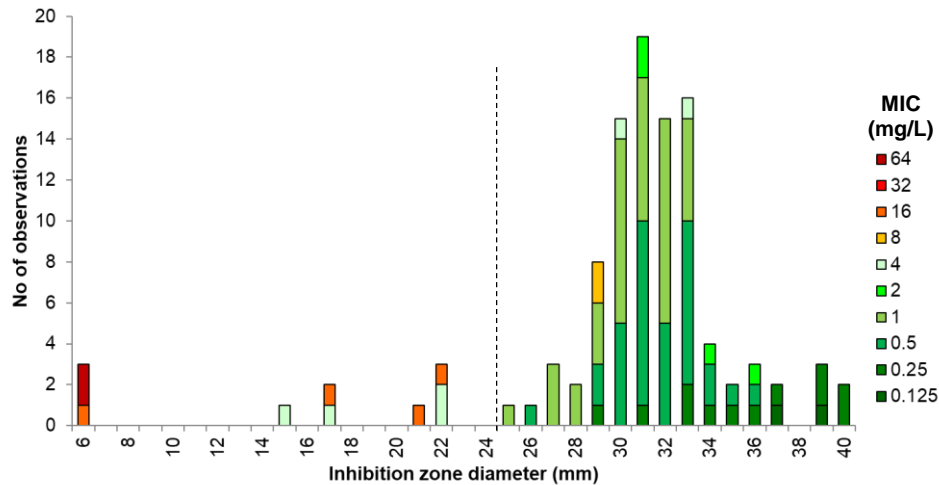
Meropenem



Clindamycin



Metronidazole



EUCAST Breakpoint Tables v 15.0, January 2025

Anaerobic bacteria

Expert Rules and Expected Phenotypes

Guidance documents

For species not listed below, see EUCAST Guidance Document on how to test and interpret results when there are no breakpoints

EUCAST Clinical Breakpoint Tables v. 15.0, valid from 2025-01-01

For abbreviations and explanations of breakpoints, see the Notes sheet

MIC determination (agar dilution)
Medium: Fastidious Anaerobe Agar + 5% defibrinated horse blood (FAA-HB)
Inoculum: 10⁵ CFU/spot
Incubation: Anaerobic environment, 35-37°C, 42-48h
Reading: Unless otherwise stated, read MICs at the lowest concentration of the agent where a noticeable difference is seen in visible growth between the test and control plate.
Quality control: *Bacteroides fragilis* ATCC 25285 and *Clostridium perfringens* ATCC 13124.
 For control of the inhibitor component of beta-lactam inhibitor combinations, see EUCAST QC Tables.
 See disk diffusion methodology for how to monitor the anaerobic atmosphere with *Clostridium perfringens* DSM 25589.

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Fastidious Anaerobe Agar + 5% defibrinated horse blood (FAA-HB). The plates should be dried prior to inoculation (at 20-25°C overnight or at 35°C, with the lid removed, for 15 min).
Inoculum: McFarland 1.0
Incubation: Anaerobic environment, 35-37°C, 18±2h
Reading: Unless otherwise stated, read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light. See pictures below and the EUCAST Reading Guide for disk diffusion of anaerobic bacteria for further information.
Quality control: *Bacteroides fragilis* ATCC 25285 and *Clostridium perfringens* ATCC 13124. For control of the inhibitor component of beta-lactam inhibitor combination disks, see EUCAST QC Tables.
Clostridium perfringens DSM 25589 with a metronidazole 5 µg disk to monitor the anaerobic atmosphere.

Bacteroides spp.

Breakpoints for *Bacteroides* spp. are also valid for *Parabacteroides* spp. and for *Phocaeicola dorei/vulgatus* (previously named *Bacteroides dorei/vulgatus*).

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Ampicillin-sulbactam	2 ¹	2 ¹		10-10	25	25		Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method. 1. For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L. 2. For susceptibility testing purposes, the concentration of clavulanic acid is fixed at 2 mg/L. 3. Isolates susceptible to ampicillin-sulbactam and amoxicillin-clavulanic acid may be resistant to piperacillin-tazobactam. 4. For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L. 5/A. For information on how to use breakpoints in brackets, see https://www.eucast.org/eucastguidancedocuments/ . B. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.
Amoxicillin-clavulanic acid	2 ²	2 ²		2-1	14	14		
Piperacillin-tazobactam ³	2 ⁴	2 ⁴		30-6	24	24		
Ertapenem	(2) ⁵	(2) ⁵		10	(23) ^A	(23) ^A		
Imipenem	1	1		10	29	29		
Meropenem	1	1		10	28	28		
Clindamycin	(4) ⁵	(4) ⁵		2	(10) ^{A,B}	(10) ^{A,B}		
Metronidazole	4	4		5	25	25		

Prevotella spp.

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Benzylpenicillin	0.5 ¹	0.5 ¹		1 unit	20 ^A	20 ^A	Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method. 1/A. Isolates susceptible to benzylpenicillin can be reported susceptible to all beta-lactam agents with breakpoints (including those with Note) without further testing. Isolates resistant to benzylpenicillin should be tested for susceptibility to individual agents. 2. At very low concentrations of ampicillin, amoxicillin and piperacillin when in inhibitor combinations, the <i>in vitro</i> antimicrobial activity of the fixed concentration of inhibitor (2 mg/L for clavulanic acid and 4 mg/L for sulbactam and tazobactam) is such that artefactually low MIC values may be obtained. Therefore no breakpoints can be given. This does not affect disk diffusion where the concentration of the inhibitor decreases proportionally with the concentration of the agent. B. Susceptibility can be inferred from ampicillin. C. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.	
Ampicillin	0.5 ¹	0.5 ¹		2	25 ^A	25 ^A		
Ampicillin-sulbactam	Note ^{1,2}	Note ^{1,2}		10-10	33 ^A	33 ^A		
Amoxicillin	0.25 ¹	0.25 ¹			Note ^{A,B}	Note ^{A,B}		
Amoxicillin-clavulanic acid	Note ^{1,2}	Note ^{1,2}		2-1	24 ^A	24 ^A		
Piperacillin-tazobactam	Note ^{1,2}	Note ^{1,2}		30-6	26 ^A	26 ^A		
Ertapenem	0.5 ¹	0.5 ¹		10	29 ^A	29 ^A		
Imipenem	0.125 ¹	0.125 ¹		10	35 ^A	35 ^A		
Meropenem	0.25 ¹	0.25 ¹		10	34 ^A	34 ^A		
Clindamycin	0.25	0.25		2	31 ^C	31 ^C		
Metronidazole	4	4		5	22	22		

Fusobacterium necrophorum

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Benzylpenicillin	0.125 ¹	0.125 ¹		1 unit	25 ^A	25 ^A		<p>Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method.</p> <p>1/A. Isolates susceptible to benzylpenicillin can be reported susceptible to all beta-lactam agents with breakpoints (including those with Note) without further testing. Isolates resistant to benzylpenicillin should be tested for susceptibility to individual agents.</p> <p>2. For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.</p> <p>3. For susceptibility testing purposes, the concentration of clavulanic acid is fixed at 2 mg/L.</p> <p>4. For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.</p> <p>B. Susceptibility can be inferred from ampicillin.</p> <p>C. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.</p>
Ampicillin	0.5 ¹	0.5 ¹		2	27 ^A	27 ^A		
Ampicillin-sulbactam	0.5 ^{1,2}	0.5 ^{1,2}		10-10	33 ^A	33 ^A		
Amoxicillin	0.5 ¹	0.5 ¹			Note ^{A,B}	Note ^{A,B}		
Amoxicillin-clavulanic acid	0.5 ^{1,3}	0.5 ^{1,3}		2-1	23 ^A	23 ^A		
Piperacillin-tazobactam	0.5 ^{1,4}	0.5 ^{1,4}		30-6	32 ^A	32 ^A		
Ertapenem	0.06 ¹	0.06 ¹		10	35 ^A	35 ^A		
Imipenem	0.125 ¹	0.125 ¹		10	36 ^A	36 ^A		
Meropenem	0.03 ¹	0.03 ¹		10	35 ^A	35 ^A		
Clindamycin	0.25	0.25		2	30 ^C	30 ^C		
Metronidazole	0.5	0.5		5	30	30		

Clostridium perfringens

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Benzylpenicillin	0.5 ¹	0.5 ¹		1 unit	15 ^A	15 ^A		<p>Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method.</p> <p>1/A. Isolates susceptible to benzylpenicillin can be reported susceptible to all beta-lactam agents with breakpoints (including those with Note) without further testing. Isolates resistant to benzylpenicillin should be tested for susceptibility to individual agents.</p> <p>2. For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.</p> <p>3. For susceptibility testing purposes, the concentration of clavulanic acid is fixed at 2 mg/L.</p> <p>4. For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.</p> <p>B. Susceptibility can be inferred from ampicillin.</p> <p>C. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.</p>
Ampicillin	0.25 ¹	0.25 ¹		2	23 ^A	23 ^A		
Ampicillin-sulbactam	0.25 ^{1,2}	0.25 ^{1,2}		10-10	27 ^A	27 ^A		
Amoxicillin	0.25 ¹	0.25 ¹			Note ^{A,B}	Note ^{A,B}		
Amoxicillin-clavulanic acid	0.25 ^{1,3}	0.25 ^{1,3}		2-1	23 ^A	23 ^A		
Piperacillin-tazobactam	0.5 ^{1,4}	0.5 ^{1,4}		30-6	24 ^A	24 ^A		
Ertapenem	0.5 ¹	0.5 ¹		10	24 ^A	24 ^A		
Imipenem	0.5 ¹	0.5 ¹		10	25 ^A	25 ^A		
Meropenem	0.125 ¹	0.125 ¹		10	25 ^A	25 ^A		
Vancomycin	2	2		5	12	12		
Clindamycin	0.25	0.25		2	19 ^C	19 ^C		
Metronidazole	4	4		5	16	16		

Cutibacterium acnes

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Benzylpenicillin	0.06 ¹	0.06 ¹		1 unit	24 ^A	24 ^A		<p>Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method.</p> <p>1/A. Isolates susceptible to benzylpenicillin can be reported susceptible to all beta-lactam agents with breakpoints (including those with Note) without further testing. Isolates resistant to benzylpenicillin should be tested for susceptibility to individual agents.</p> <p>2. At very low concentrations of ampicillin, amoxicillin and piperacillin when in inhibitor combinations, the <i>in vitro</i> antimicrobial activity of the fixed concentration of inhibitor (2 mg/L for clavulanic acid and 4 mg/L for sulbactam and tazobactam) is such that artefactually low MIC values may be obtained. Therefore no breakpoints can be given. This does not affect disk diffusion where the concentration of the inhibitor decreases proportionally with the concentration of the agent.</p> <p>B. Susceptibility can be inferred from ampicillin.</p> <p>C. Susceptibility to ceftriaxone can be inferred from the cefotaxime disk diffusion test.</p> <p>D. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.</p>
Ampicillin	0.25 ¹	0.25 ¹		2	23 ^A	23 ^A		
Ampicillin-sulbactam	Note ^{1,2}	Note ^{1,2}		10-10	33 ^A	33 ^A		
Amoxicillin	0.25 ¹	0.25 ¹			Note ^{A,B}	Note ^{A,B}		
Amoxicillin-clavulanic acid	Note ^{1,2}	Note ^{1,2}		2-1	24 ^A	24 ^A		
Piperacillin-tazobactam	Note ^{1,2}	Note ^{1,2}		30-6	27 ^A	27 ^A		
Cefotaxime	NA	NA		5	26 ^{A,C}	26 ^{A,C}		
Ceftriaxone	0.06 ¹	0.06 ¹		30	33 ^{A,C}	33 ^{A,C}		
Ertapenem	0.25 ¹	0.25 ¹		10	28 ^A	28 ^A		
Imipenem	0.03 ¹	0.03 ¹		10	39 ^A	39 ^A		
Meropenem	0.125 ¹	0.125 ¹		10	28 ^A	28 ^A		
Vancomycin	2	2		5	22	22		
Clindamycin	0.25	0.25		2	26 ^D	26 ^D		
Linezolid	2	2		10	34	34		

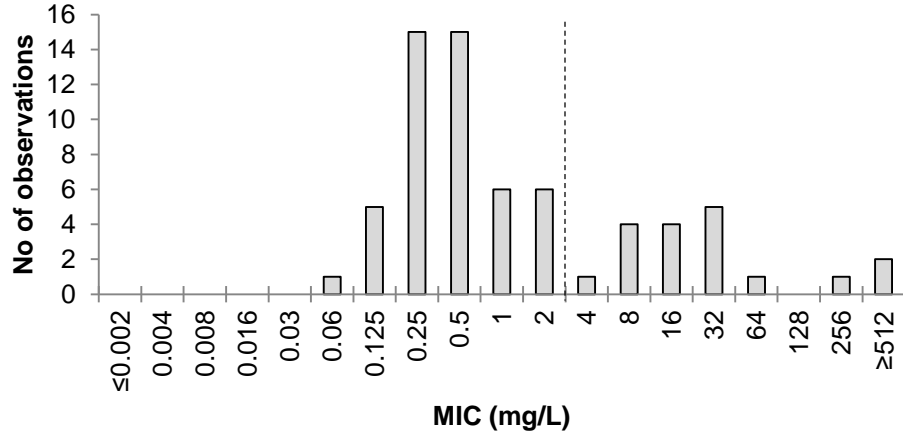
Discrepancies between piperacillin-tazobactam, ampicillin-sulbactam and amoxicillin-clavulanic acid for *Bacteroides* spp.

Methodology is important!

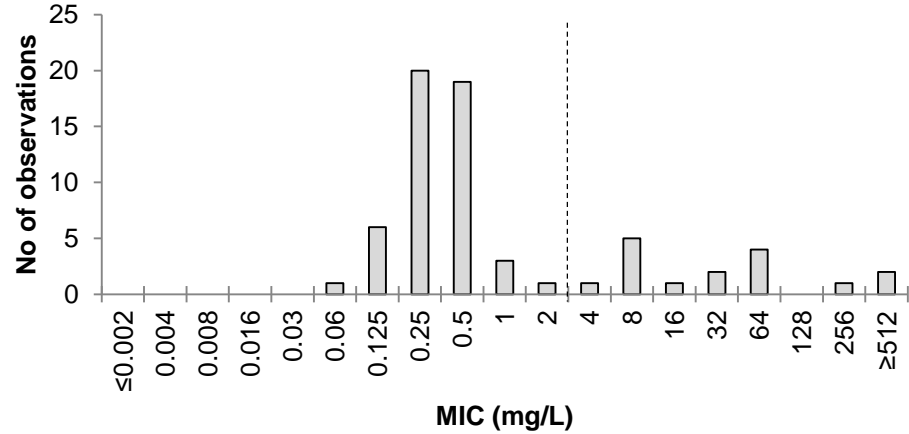
- The EUCAST breakpoints for anaerobic bacteria are based on agar dilution and disk diffusion on FAA-HB
 - Broth microdilution should not be used
 - Gradient tests have not been evaluated
 - Note that some gradient tests (e.g. ampicillin-sulbactam) only are available in 2:1 ratio and not with fixed concentration of the inhibitor as recommended by EUCAST
- For disk diffusion, perform QC to make sure that the materials used produce results in agreement with EUCAST recommendations

Agar dilution MIC distributions

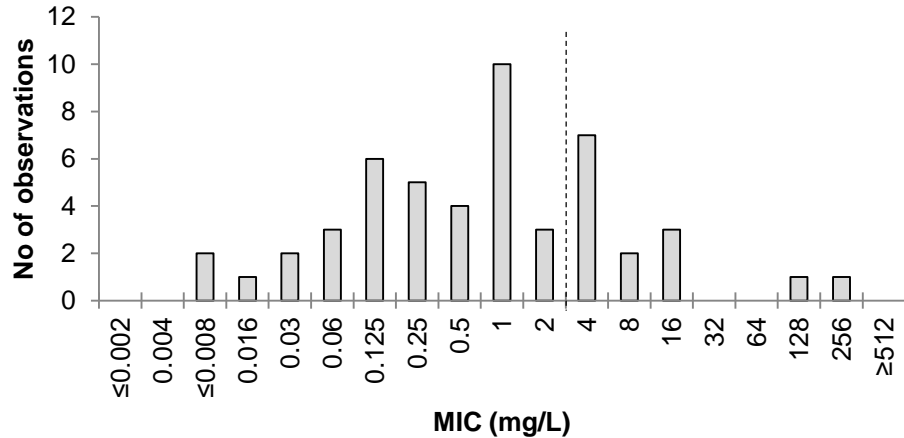
Ampicillin-sulbactam MIC
Bacteroides spp., 66 isolates



Amoxicillin-clavulanic acid MIC
Bacteroides spp., 66 isolates

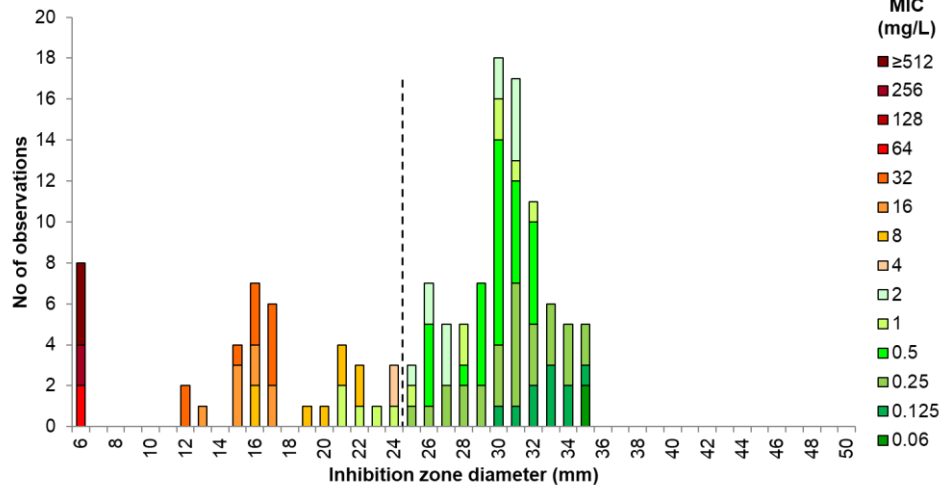


Piperacillin-tazobactam MIC
Bacteroides spp., 50 isolates

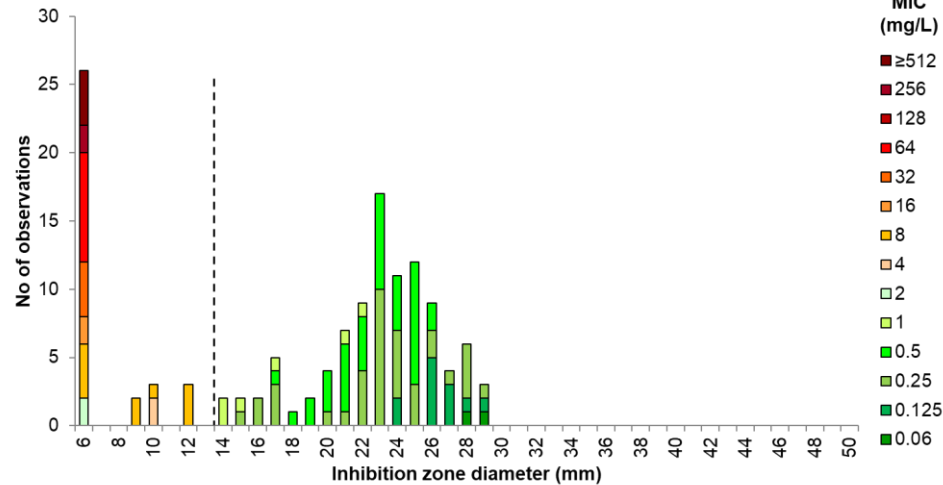


MIC-zone diameter correlations

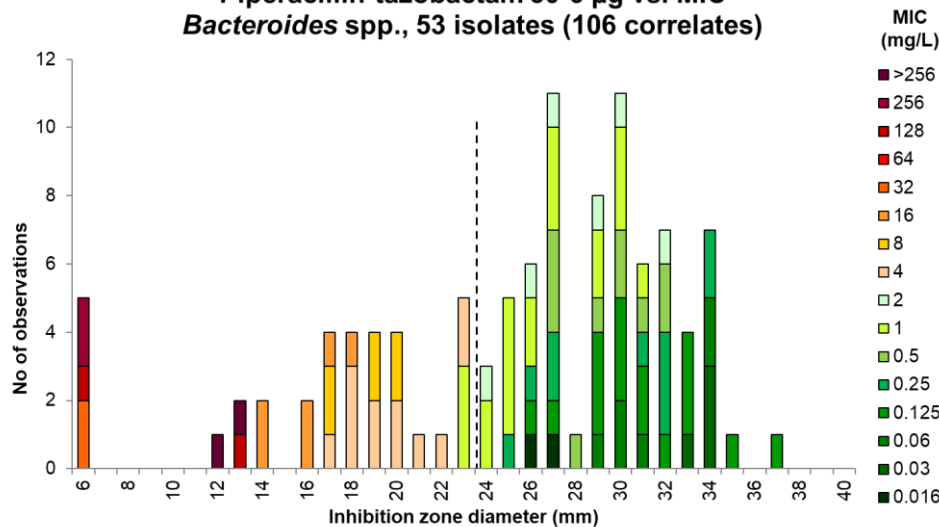
Ampicillin-sulbactam 10-10 µg vs. MIC
Bacteroides spp., 65 isolates (130 correlates)



Amoxicillin-clavulanic acid 2-1 µg vs. MIC
Bacteroides spp., 65 isolates (130 correlates)



Piperacillin-tazobactam 30-6 µg vs. MIC
Bacteroides spp., 53 isolates (106 correlates)



Bacteroides spp.

Ampicillin-sulbactam vs. piperacillin-tazobactam MIC (agar dilution)

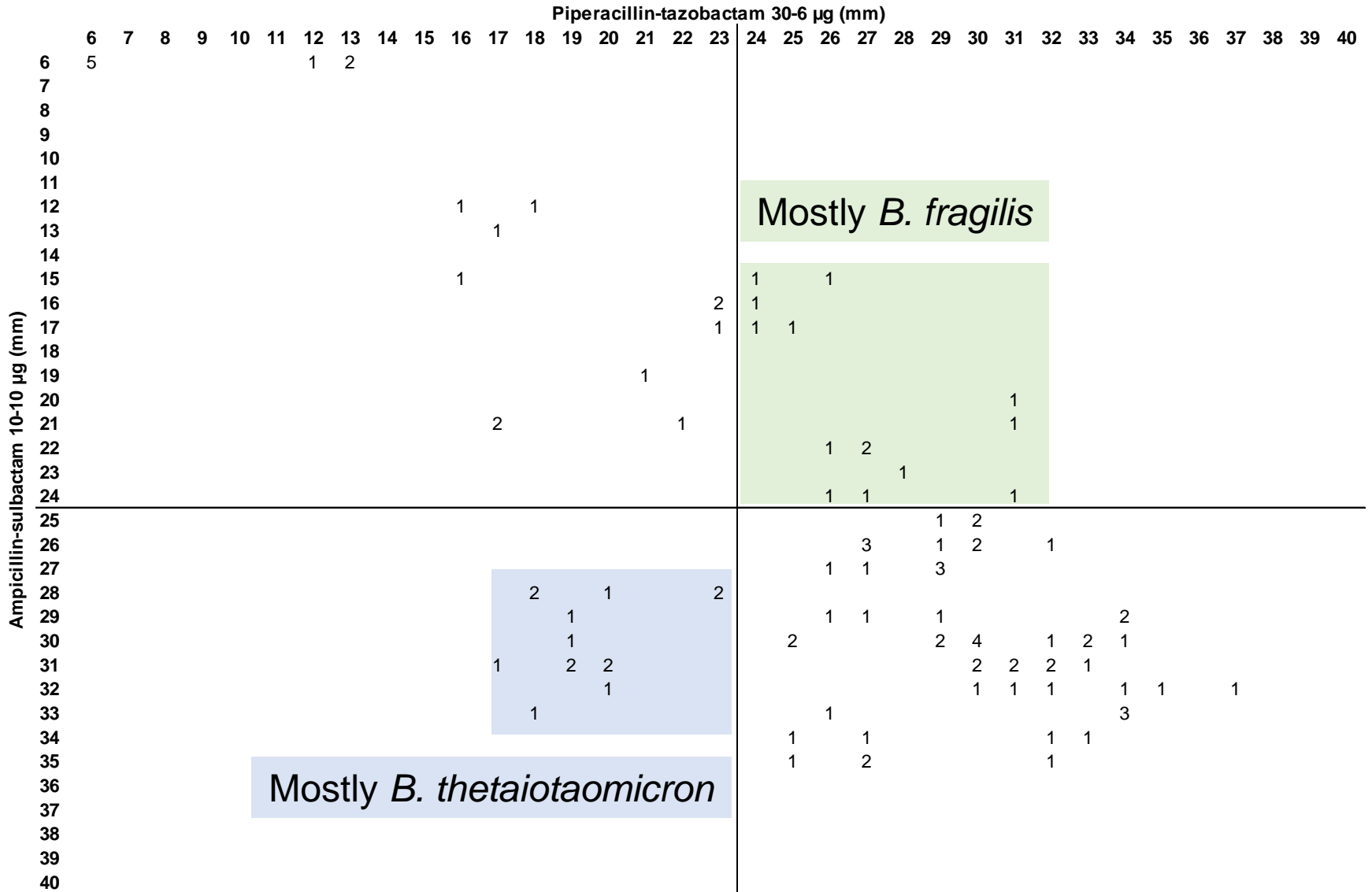
Ampicillin-sulbactam MIC (mg/L)	Piperacillin-tazobactam MIC (mg/L)															
	0.016	0.03	0.06	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	>256
0.016																
0.03																
0.06					1											
0.125		1	1	2			1									
0.25		1	1		2		3		3	1						
0.5			1	4		1	2		1	1						
1						2	1		1	1						
2				1	1	2		2								
4					1											
8	1			1					1							
16								1			1					
32							3				1					
64														1		
128																
256												1				
>256															1	1

Mostly *B. thetaiotaomicron*

Mostly *B. fragilis*

Bacteroides spp.

Ampicillin-sulbactam vs. piperacillin-tazobactam (disk diffusion)



Mostly *B. fragilis*

Mostly *B. thetaiotaomicron*

Bacteroides spp.

Ampicillin-sulbactam vs. amoxicillin-clavulanic acid MIC (agar dilution)

Ampicillin-sulbactam MIC (mg/L)	Amoxicillin-clavulanic acid MIC (mg/L)													
	0.06	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	>256
0.06	1													
0.125		5												
0.25		1	9		1									
0.5			7	3										
1				4		1								
2				5	1									
4					1									
8				1			1			1				
16								1		1				
32								1			1		1	1
64									1					
128														
256											1			
>256											1			1

EUCAST Breakpoint Tables v 15.0, January 2025

Anaerobic bacteria

Expert Rules and Expected Phenotypes

Guidance documents

For species not listed below, see EUCAST Guidance Document on how to test and interpret results when there are no breakpoints

EUCAST Clinical Breakpoint Tables v. 15.0, valid from 2025-01-01

For abbreviations and explanations of breakpoints, see the Notes sheet

MIC determination (agar dilution)

Medium: Fastidious Anaerobe Agar + 5% defibrinated horse blood (FAA-HB)

Inoculum: 10⁵ CFU/spot

Incubation: Anaerobic environment, 35-37°C, 42-48h

Reading: Unless otherwise stated, read MICs at the lowest concentration of the agent where a noticeable difference is seen in visible growth between the test and control plate.

Quality control: *Bacteroides fragilis* ATCC 25285 and *Clostridium perfringens* ATCC 13124.

For control of the inhibitor component of beta-lactam inhibitor combinations, see EUCAST QC Tables.

See disk diffusion methodology for how to monitor the anaerobic atmosphere with *Clostridium perfringens* DSM 25589.

Disk diffusion (EUCAST standardised disk diffusion method)

Medium: Fastidious Anaerobe Agar + 5% defibrinated horse blood (FAA-HB). The plates should be dried prior to inoculation (at 20-25°C overnight or at 35°C, with the lid removed, for 15 min).

Inoculum: McFarland 1.0

Incubation: Anaerobic environment, 35-37°C, 18±2h

Reading: Unless otherwise stated, read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light. See pictures below and the EUCAST Reading Guide for disk diffusion of anaerobic bacteria for further information.

Quality control: *Bacteroides fragilis* ATCC 25285 and *Clostridium perfringens* ATCC 13124. For control of the inhibitor component of beta-lactam inhibitor combination disks, see EUCAST QC Tables.

Clostridium perfringens DSM 25589 with a metronidazole 5 µg disk to monitor the anaerobic atmosphere.

Bacteroides spp.

Breakpoints for *Bacteroides* spp. are also valid for *Parabacteroides* spp. and for *Phocaeicola dorei/vulgatus* (previously named *Bacteroides dorei/vulgatus*).

Antimicrobial agent	MIC breakpoints (mg/L)			Disk content (µg)	Zone diameter breakpoints (mm)			Notes
	S ≤	R >	ATU		S ≥	R <	ATU	
Ampicillin-sulbactam	2 ¹	2 ¹		10-10	25	25		Numbered notes relate to general comments and/or MIC breakpoints. Lettered notes relate to the disk diffusion method. 1. For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L. 2. For susceptibility testing purposes, the concentration of clavulanic acid is fixed at 2 mg/L. 3. Isolates susceptible to ampicillin-sulbactam and amoxicillin-clavulanic acid may be resistant to piperacillin-tazobactam. 4. For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L. 5/A. For information on how to use breakpoints in brackets, see https://www.eucast.org/eucastguidancedocuments/ . B. Examine zones carefully for colonies within zones. Colonies should be taken into account when reading.
Amoxicillin-clavulanic acid	2 ²	2 ²		2-1	14	14		
Piperacillin-tazobactam ³	2 ⁴	2 ⁴		30-6	24	24		
Ertapenem	(2) ⁵	(2) ⁵		10	(23) ^A	(23) ^A		
Imipenem	1	1		10	29	29		
Meropenem	1	1		10	28	28		
Clindamycin	(4) ⁵	(4) ⁵		2	(10) ^{A,B}	(10) ^{A,B}		
Metronidazole	4	4		5	25	25		

3. Isolates susceptible to ampicillin-sulbactam and amoxicillin-clavulanic acid may be resistant to piperacillin-tazobactam.

EUCAST QC Tables v 15.0, January 2025

Bacteroides fragilis ATCC 25285

(NCTC 9343, DSM 2151, CCUG 4856T)

Antimicrobial agent	MIC (mg/L)		Disk content (µg)	Inhibition zone diameter (mm)	
	Target ¹	Range ²		Target ¹	Range ²
Amoxicillin-clavulanic acid ^{3,4}	0.125	0.06-0.25	2-1	26	23-29
Ampicillin-sulbactam ^{4,5}	0.25	0.125-0.5	10-10	31	28-34
Clindamycin	1	0.5-2	2	25	22-28
Ertapenem	0.125	0.06-0.25	10	36	33-39
Imipenem	0.06	0.03-0.125	10	41	38-44
Meropenem	0.06-0.125	0.03-0.25	10	35-36	32-39
Metronidazole	0.5	0.25-1	5	32-33	29-36
Piperacillin-tazobactam ^{4,6}	0.25	0.125-0.5	30-6	32	29-35

Clostridium perfringens ATCC 13124

(NCTC 8237, CIP 103409, DSM 756, CCUG 1795T, CECT 376 T)

Antimicrobial agent	MIC (mg/L)		Disk content (µg)	Inhibition zone diameter (mm)	
	Target ¹	Range ²		Target ¹	Range ²
Amoxicillin	0.016-0.03	0.008-0.06	-	-	-
Amoxicillin-clavulanic acid ^{3,4}	0.016-0.03	0.008-0.06	2-1	31	28-34
Ampicillin	0.016-0.03	0.008-0.06	2	32	29-35
Ampicillin-sulbactam ^{4,5}	0.016-0.03	0.008-0.06	10-10	35	32-38
Benzylpenicillin	0.06	0.03-0.125	1 unit	25	22-28
Cefotaxime	-	-	5	30	27-33
Ceftriaxone	IP	IP	30	34	31-37
Clindamycin	0.06	0.03-0.125	2	23	20-26
Ertapenem	IP	IP	10	34	31-37
Imipenem	IP	IP	10	34	31-37
Linezolid	4	2-8	10	24	21-27
Meropenem	0.008	0.004-0.016	10	36	33-39
Metronidazole	2	1-4	5	23	20-26
Piperacillin-tazobactam ^{4,6}	0.03-0.06	0.016-0.125	30-6	32	29-35
Vancomycin	1	0.5-2	5	17	14-20

Development of breakpoints and disk diffusion criteria for additional species

- *Clostridium ramosum*
- *Clostridium innocuum*
- *Clostridium tertium*
- *Clostridium septicum*
- *Cutibacterium avidum*
- *Fusobacterium nucleatum*
- *Finegoldia magna*
- *Parvimonas micra*
- *Peptostreptococcus anaerobius*
- *Peptoniphilus* spp.

Problems or questions?

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