Differentiate resistance enzyme types

Low cost implementation

Simple comparative interpretation

Compliance with international standard methodologies

ESBL & AmpC Detection Disc Disc Sets
**EXTENDED SPECTRUM β-LACTAMASE DETECTION**

Extended spectrum beta-lactamases (ESBL) are bacterial enzymes which confer resistance to penicillin and cephalosporin antibiotics. The emergence of ESBL producing pathogens has become increasingly significant in limiting the antibiotic treatment options, representing a serious complication for antibiotic management.

Mast’s range of ESBL detection discs offers laboratories a simple, reliable and low cost means of identification and detection by double disc diffusion, using paired and combination disc sets.

The presence of an ESBL and/or AmpC is easily determined by zone size comparison when simultaneously tested with antibiotic and antibiotic plus inhibitor combinations.

### Interpretation of results

#### D68C

**AmpC & ESBL Detection Set**

**Confirmation of AmpC and/or ESBL production in Enterobacteriaceae**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CPD10</td>
</tr>
<tr>
<td>B</td>
<td>CPD10 + ESBL inhibitor</td>
</tr>
<tr>
<td>C</td>
<td>CPD10 + AmpC inhibitor</td>
</tr>
<tr>
<td>D</td>
<td>CPD10 + ESBL inhibitor + AmpC Inhibitor</td>
</tr>
</tbody>
</table>

**ESBL Positive**

- $Z_D - Z_A = 5$ mm and the differences of each of $Z_B$ and $Z_D$, and $Z_A$ and $Z_C$ are < 4 mm

**AmpC Positive**

- $Z_D - Z_A = 5$ mm and the differences of each of $Z_A$ and $Z_B$, and $Z_C - Z_A$ are < 4 mm

**AmpC and ESBL Positive**

- $Z_D - Z_C = 5$ mm and the difference of $Z_A$ and $Z_B$ is < 4 mm

**AmpC and ESBL Negative**

- All zones differ by ≤ 2 mm

*CPD – Cefpodoxime*
AmpC Detection Set
Confirmation of either chromosomal or plasmid acquired AmpC

AmpC Positive

A  CPD10 + AmpC inducer
B  CPD10 + AmpC inducer + ESβL inhibitor
C  CPD10 + AmpC inducer + ESβL inhibitor + AmpC inhibitors

CPD = Cefpodoxime
Z_{C-C_A} and Z_{C-C_B} ≥ 5mm

AmpC Negative

Z_{A}

All zones differ by ≤ 3mm

Cefpime 30 & Cefpime 30/Clavulanic Acid 10
Confirmation of ESβL production in Enterobacteriaceae with chromosomal AmpC

ESBL Positive

CPM30
CPM30/CLAV10

CPM = Cefepime
CLAV = Clavulanic Acid
Z_2 - Z_1 ≥ 5mm

ESBL Negative

Z_1

All zones differ by ≤ 2mm

Extended Spectrum β Lactamase Set
Confirmation of ESβL production in Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC

ESBL Positive

CAZ30
CAZ30/CLAV10

CTX30
CTX30/CLAV10

CPD30
CPD30/CLAV10

CAZ = Ceftazidime
CLAV = Clavulanic Acid
CTX = Cefotaxime
CPD = Cefpodoxime
Z_5 - Z_1 ≥ 5mm and/or
Z_4 - Z_3 ≥ 5mm and/or
Z_5 - Z_5 ≥ 5mm

ESBL Negative

Z_2

All zones differ by ≤ 2mm
**Extended Spectrum β-Lactamase Set (CPD10)**

**Confirmation of ESβL production in Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC**

**ESBL Positive**

<table>
<thead>
<tr>
<th>Disc Set</th>
<th>CAZ30</th>
<th>CAZ30/CLAV10</th>
<th>CTX30</th>
<th>CTX30/CLAV10</th>
<th>CPD10</th>
<th>CPD10/CLAV1</th>
</tr>
</thead>
</table>

- CAZ = Ceftazidime
- CLAV = Clavulanic Acid
- CTX = Cefotaxime
- CPD = Cefpodoxime

**Z₁ - Z₆: Z₆ - Z₁ ≥ 5mm and/or Z₄ - Z₂ ≥ 5mm**

**ESBL Negative**

- All zones differ by ≤ 2mm

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**Cefotaxime 30 & Cefotaxime 30/Clavulanic Acid 10**

**Confirmation of ESβL production in Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC when both disc sets used concurrently**

**ESBL Positive**

<table>
<thead>
<tr>
<th>Disc Set</th>
<th>CTX30</th>
<th>CTX30/CLAV10</th>
<th>CAZ30</th>
<th>CAZ30/CLAV10</th>
</tr>
</thead>
</table>

- CTX = Cefotaxime
- CAZ = Ceftazidime
- CLAV = Clavulanic Acid

**Z₃ - Z₄ ≥ 5mm and/or Z₁ - Z₂ ≥ 5mm**

**ESBL Negative**

- All zones differ by ≤ 2mm

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**Cefpodoxime 10 & Cefpodoxime 10/Clavulanic Acid 1**

**Confirmation of ESβL production in Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC**

**ESBL Positive**

<table>
<thead>
<tr>
<th>Disc Set</th>
<th>CPD10</th>
<th>CPD10/CLAV1</th>
</tr>
</thead>
</table>

- CPD = Cefpodoxime
- CLAV = Clavulanic Acid

**Z₂ - Z₁ ≥ 5mm**

**ESBL Negative**

- All zones differ by ≤ 2mm
<table>
<thead>
<tr>
<th>Product Code</th>
<th>Contents</th>
<th>Usage</th>
</tr>
</thead>
</table>
| D68C³  4 x 50 discs | A Cefpodoxime 10µg x 1  
B Cefpodoxime 10µg + ESβL inhibitor x 1  
C Cefpodoxime 10µg + AmpC inhibitor x 1  
D Cefpodoxime 10µg + ESβL inhibitor + AmpC inhibitor x 1 | Confirmation of AmpC and/or ESβL production in isolates of Enterobacteriaceae.  
When interpreted as ‘further work required’ use D69C to confirm AmpC production and D63C for confirmation of ESβL production when AmpC is also present. |
| D69C²  3 x 50 discs | A Cefpodoxime 10µg + AmpC inducer x 1  
B Cefpodoxime 10µg + AmpC inducer + ESβL inhibitor x 1  
C Cefpodoxime 10µg + AmpC inducer + ESβL inhibitor + AmpC inhibitors x 1 | Confirmation of AmpC production in isolates of Enterobacteriaceae with either plasmid acquired or chromosomal AmpC.  
Can be used when interpreted as ‘further work required’ on D68C for confirmation of AmpC production. |
| D63C³  6 x 50 discs | Cefepime 30µg x 3  
Cefepime 30µg + Clavulanic acid 10µg x 3 | Confirmation of ESβL production in isolates of Enterobacteriaceae with chromosomal AmpC e.g. *Enterobacter* spp., *Citrobacter freundii*, *Morganella morgani*, *Providencia* spp., *Hafnia alvei*, *Serratia* spp.  
Can be used when interpreted as ‘further work required’ on D68C for confirmation of ESβL production when AmpC is also present. |
| D52C³  6 x 50 discs | Ceftazidime 30µg x 1  
Ceftazidime 30µg + Clavulanic acid 10µg x 1  
Cefotaxime 30µg x 1  
Cefotaxime 30µg + Clavulanic acid 10µg x 1  
Cefpodoxime 30µg x 1  
Cefpodoxime 30µg + Clavulanic acid 10µg x 1 | Confirmation of ESβL production in isolates of Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus mirabilis*, *Salmonella* spp., *Shigella* spp.  
Applicable to CLSI methodology. |
| D67C³  6 x 50 discs | Ceftazidime 30µg x 1  
Ceftazidime 30µg + Clavulanic acid 10µg x 1  
Cefotaxime 30µg x 1  
Cefotaxime 30µg + Clavulanic acid 10µg x 1  
Cefpodoxime 10µg x 1  
Cefpodoxime 10µg + Clavulanic acid 10µg x 1 | Confirmation of ESβL production in isolates of Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus mirabilis*, *Salmonella* spp., *Shigella* spp.  
Applicable to CLSI, BSAC and DIN methodology |
| D62C³  6 x 50 discs | Cefotaxime 30µg x 3  
Cefotaxime 30µg + Clavulanic acid 10µg x 3 | Confirmation of ESβL production in isolates of Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus mirabilis*, *Salmonella* spp., *Shigella* spp.  
Applicable to CLSI methodology. |
| D64C³  6 x 50 discs | Ceftazidime 30µg x 3  
Ceftazidime 30µg + Clavulanic acid 10µg x 3 | Confirmation of ESβL production in isolates of Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus mirabilis*, *Salmonella* spp., *Shigella* spp.  
D62C & D64C must be used concurrently  
Applicable to CLSI methodology. |
| D66C⁷  6 x 50 discs | Cefpodoxime 10µg x 3  
Cefpodoxime 10µg + Clavulanic acid 1µg x 3 | Confirmation of ESβL production in isolates of Enterobacteriaceae with no chromosomal de-repressed or inducible AmpC e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus mirabilis*, *Salmonella* spp., *Shigella* spp.  
Applicable to BSAC and DIN methodology |

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**Product Code**  
**Contents**  
**Usage**

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<thead>
<tr>
<th>United Kingdom</th>
<th>Germany</th>
<th>France</th>
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<tr>
<td>Mast Group Ltd.</td>
<td>Mast Diagnostica GmbH</td>
<td>Mast Diagnostic</td>
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<td>Mast House</td>
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<td>e-mail: <a href="mailto:info@mast-diagnostic.fr">info@mast-diagnostic.fr</a></td>
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