Optical Density determination using Cedex Bio Analyzers

Monitor the rise of biomass in your fermentation with high reliability and a minimum of manual interaction

Measurement of the optical density (OD), the parameter to monitor the rise of biomass, is both resource intensive and time-consuming. With the fully automated OD assay from Roche, manual sample dilutions are no longer needed. The automated test provides results in minutes without compromised accuracy and precision in microbial fermentation. The photometric absorbance at 583 nm correlates to the concentration biomass in the culture.

**Achieve convenience and safety through tighter control**
The OD assay compares with manual photometric measurements while providing improvements in data quality. Automated dilution and high instrument-to-instrument comparability result in optimal precision.

**Method comparison: Optical Density of E. coli culture**

![Graph showing OD measurements](image)

Figure 1: The Cedex OD measurements show tight inter-instrument alignment and correlate well with 3 manual photometers. (Reference: Genentech data)

**Save time with improved workflow efficiency**
Genentech’s evaluation of the Roche OD assay has shown significantly improved efficiency compared to manual photometric OD readings. These gains in efficiency are estimated to impact both time and needed resources.

**Manual photometer**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reading station(s)</th>
<th>Time to sample 8 bioreactors</th>
<th>Labor hours / year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technicians / read</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 min /</td>
<td></td>
</tr>
</tbody>
</table>

**Cedex OD assay**

- **Manual**
  - 20 min /

**Figure 2:** Estimated efficiency gains based on Genentech’s evaluation of the Cedex OD assay.
Rely on a robust test procedure to make the right decision
The OD test's linearity has been shown with standards of known densities for different sample types:

Achieve a wide and sensitive measuring range
Test range: 0.1 - 360 OD
The wide range enables OD monitoring over the entire fermentation process, while eliminating the need for manual sample dilutions.

The precision of the OD test is typically <5%.
Results were obtained from repeated determinations at 3 different density levels:

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean value OD</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>CV in-run (21 replicates)</td>
<td>1.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>CV inter-run (10 days)</td>
<td>1.9%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

CV = coefficient of variation
Reference: Roche Diagnostics data

Figure 3: Measurements of control beads, E. coli, and Pichia pastoris.
(Reference: Roche Diagnostics data)

Ordering information

<table>
<thead>
<tr>
<th>Product</th>
<th>Pack size</th>
<th>Catalog number</th>
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</thead>
<tbody>
<tr>
<td>OD Bio</td>
<td>4 x 100 tests</td>
<td>07 705 620 001</td>
</tr>
<tr>
<td>OD Bio HT</td>
<td>400 tests</td>
<td>07 705 654 001</td>
</tr>
<tr>
<td>Control OD Level 1</td>
<td>6 x 1 mL</td>
<td>07 766 637 001</td>
</tr>
<tr>
<td>Control OD Level 2</td>
<td>6 x 1 mL</td>
<td>07 766 645 001</td>
</tr>
<tr>
<td>Control OD Level 3</td>
<td>6 x 1 mL</td>
<td>07 766 670 001</td>
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</table>

<table>
<thead>
<tr>
<th>Related products</th>
<th>Catalog number</th>
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</thead>
<tbody>
<tr>
<td>Cedex Bio Analyzer</td>
<td>06 395 554 001</td>
</tr>
<tr>
<td>Cedex Bio HT Analyzer</td>
<td>06 608 116 001</td>
</tr>
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</table>

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