The EL406™ Microplate Washer Dispenser Combines Thorough Washing and Precise Dispensing in One Space-Saving Instrument Configuration

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Abstract

Efficiency and productivity are increased with BioTek Instruments' new EL406™ Microplate Washer Dispenser. This automation friendly, multi-functional instrument configuration combines thorough washing and precise dispensing in one space-saving instrument configuration. The peristaltic pump dispenser is compatible with both 96- and 384-well microplates. It utilizes rollers that are fixed to a rotating rotor, which is encircled by stretched flexible tubing that has been compressed at the points where the tubing meets the rollers. As the rotor revolves, the fluid is forced to pass through between adjacent rollers. The volume that is pumped is dependent on the distance between the rollers, rotor position, tubing tension, inner diameter of the tubing and the number of rollers activated.

Results

When an appropriate fluid is used, a single pass reliably generates an absorbance of 0.4 OD unit at 562 nm per well in a 96-well microplate (BCA assay), a significant amount of cross-contamination can be reduced. The EL406 washer manifold uses the proven design of the ELx405 Select CW Microplate Washer. It uses BioTek Instruments' patented manifold design to provide thorough washing. The EL406's syringe pump dispenser is compatible with both conventional 96- and 384-well microplates. The microprocessor controlled syringe pump is designed, which is optimized for volume and performance. Different tubing sizes (1 μL, 5 μL, and 10 μL) are used to more closely match desired fluid volumes in different applications. The full peristaltic pump operation mode and low flow rate setting are used to achieve different flow characteristics. The peristaltic pump can be operated with either a microprocessor controlled syringe pump or a peristaltic pump dispenser module. Both the peristaltic pump dispenser and the LC2000™ Syringe Pump Dispenser Module have as small a dead volume as possible. In the manual mode, the peristaltic pump dispenser is controlled by moving a handle. The instrument cannot be used unless the correct part number has been entered through the keypad.

Conclusion

In summary, the EL406™ Microplate Washer Dispenser is capable of thorough dispensing and washing. Different modes provide different functionality. Different tubing sizes provide different volume capacities. The peristaltic pump is compatible with both 96- and 384-well microplates.

Table 2. Dispense accuracy into 96-well microplates.

<table>
<thead>
<tr>
<th>Expected Volume (μL)</th>
<th>Calculated Volume (μL)</th>
<th>% Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 μL</td>
<td>100.0 μL</td>
<td>0.0%</td>
</tr>
<tr>
<td>200 μL</td>
<td>199.0 μL</td>
<td>0.5%</td>
</tr>
<tr>
<td>500 μL</td>
<td>500.0 μL</td>
<td>0.0%</td>
</tr>
<tr>
<td>1000 μL</td>
<td>1000.0 μL</td>
<td>0.0%</td>
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</tbody>
</table>

Figure 1. BioTek EL406 washer dispenser.

Figure 2. Diagram of the BioTek peristaltic pump fluid path.

Figure 3. Diagram of the BioTek syringe pump fluid path.

Figure 4. Before and after washing cells using the EL406 washer manifold.

Figure 5. Primary HeLa/ovine tumor cells seeded into 96-well microplates. After 48 hours, the cells are washed with PBS (3 wash cycles) using the EL406 programmed for 30 seconds per cycle. The Figure 5 inset shows the baseline image. The right panel shows the cell morphology after washing using the EL406.

Figure 6. HeLa/ovine tumor cells seeded into 96-well microplates. After 48 hours, the cells are washed with PBS (3 wash cycles) using the EL406 programmed for 30 seconds per cycle. The Figure 6 inset shows the baseline image. The right panel shows the cell morphology after washing using the EL406.

Figure 7. Primary HeLa/ovine tumor cells washed using the BioTek peristaltic pump dispenser.

Figure 8. Table 2. Dispense accuracy into 96-well microplates.

Figure 9. Dispense precision for the BioTek Syringe Pump Dispenser using multiple solution volumes.