Efficacy of Two HORTILED Fixtures

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Efficacy of Two HORTILED Fixtures

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We tested the efficacy of the Full Spectrum and Red-Blue HORTILED TOP LED fixtures manufactured by PL Light. Both fixtures had an 80° light distribution.

The efficacy of the fixtures was measured using flat plane integration as described by Nelson and Bugbee (2014)¹ (see adjacent photo). The fixtures were suspended at 0.65 m above the floor in a 3 × 3 m room with flat black walls. The photosynthetic photon flux density (PPFD, μmol · m⁻² · s⁻¹) was measured with a recently calibrated quantum sensor (LI-COR model 190R). Measurements were made 2.5 cm apart near the center, increasing to 10 cm near the edge, and extrapolated to infinity using an exponential decay function.

Results

<table>
<thead>
<tr>
<th>Fixture Color</th>
<th>Input (V/A/W)</th>
<th>Measured PPF (μmol/s)</th>
<th>Extrapolated PPF (μmol/s)</th>
<th>Total Output PPF (μmol/s)</th>
<th>Efficacy (μmol/J)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red-Blue</td>
<td>120/2.60/313</td>
<td>771.9</td>
<td>26.2</td>
<td>798.1</td>
<td>2.55</td>
</tr>
<tr>
<td>Full Spectrum</td>
<td>120/2.80/336</td>
<td>642.5</td>
<td>25.2</td>
<td>667.7</td>
<td>1.99</td>
</tr>
</tbody>
</table>

The fixtures both had a power factor of 1.00.

Spectral Output for the two fixtures is shown below (measured at 0.65 m).

Conclusions

The efficacy of the Red-Blue fixture (2.55) was 94.4% of the 2.7 μmol/J efficacy listed on the manufacturer’s website. This is the highest LED efficacy we have measured to date. It surpasses the Philips red/blue Toplight fixture by 4 % (2.55/2.45).

The efficacy of the Full Spectrum light was not listed on the manufacturer’s website. This efficacy (1.99) is 3 % less than a white light fixture from Fluence Bioengineering, which we measured at 2.05 umol J⁻¹ in April 2017.