# Intensity/Concentration Correlation of MD-25 UV Transilluminator

## EQUIPMENT

- Dolphin-Doc image system (Wealtec)
- MD-25 UV transilluminator with 312 nm wavelength and 25x25 $cm^2$ of the observation area (Wealtec)
- Series dilutions of λDNA/HindIII DNA marker 50 μg/ 300 μL (Wealtec)
- UVX Radiometer (UVP)
- Mini-GES gel electrophoresis system with Elite 200 power supply(Wealtec)

## PROCEDURE

1. Make 1.2% agarose gel with TBE buffer.
2. Prepare λDNA/HindIII DNA marker series dilutions as followed:
   Solution A : 0.166 μg/μl  Solution B : 0.1 μg/μl
   Solution C : 0.01 μg/μl  Solution D : 0.001 μg/μl
3. Apply the samples as follows to the 1.2% agarose gel in mini-GES system:

| Sample No. | DNA Solution | Volume | Dye Volume | Final DNA amount |
|---|---|---|---|---|
| 1 | Solution A | 10 μl | 2 μl | 1666 ng |
| 2 | Solution B | 10 μl | 2 μl | 1000 ng |
| 3 | Solution B | 8 μl | 2 μl | 800 ng |
| 4 | Solution B | 5 μl | 2 μl | 500 ng |
| 5 | Solution C | 10 μl | 2 μl | 100 ng |
| 6 | Solution C | 8 μl | 2 μl | 80 ng |
| 7 | Solution C | 5 μl | 2 μl | 50 ng |
| 8 | Solution D | 10 μl | 2 μl | 10 ng |
| 9 | Solution D | 8 μl | 2 μl | 8 ng |
| 10 | Solution D | 5 μl | 2 μl | 5 ng |

4. Run the mini-GES system with a constant voltage of 100 V for 1 hour by using Elite 200 power supply.
5. Stain the gel with Ethidium Bromide (EtBr) solution (5 µg/mL) for 10 and 60 minutes.
6. Observe the agarose gel with a different intensity of MD-25 UV transilluminator in the Dolphin-Doc system paired with amber and close up filter.
7. Lens setting: Iris = 8, Zoom = 20, and Focus = 1.5.
8. Exposure time: 3 seconds.
9. Use UV radiometer to measure and record the UV output intensity of the UV transilluminator.

## RESULT

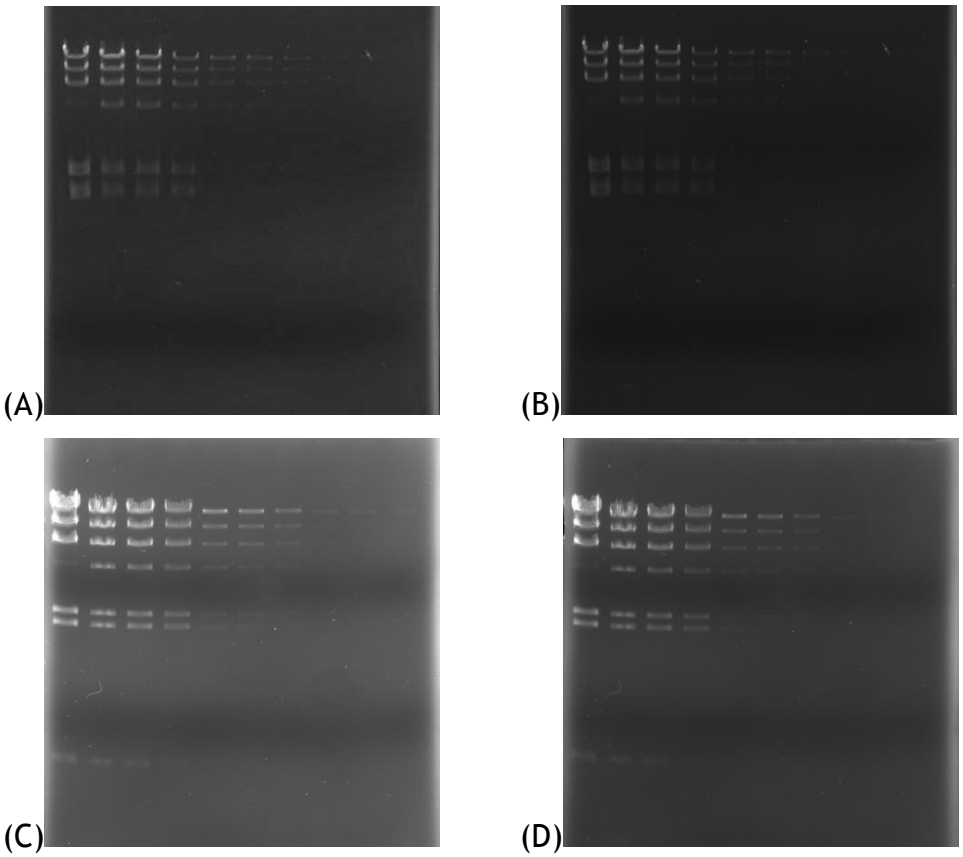


**Figure 1**. *DNA series diluted samples stained with EtBr and observed under (A)(C) 8 mW/cm$^2$ or (B)(D) 6 mW/cm$^2$ output intensity UV transilluminator excitation. Exposure time: 3 seconds. Staining time: (A)(B) 10 and (C)(D) 60 minutes. Samples from left to right are samples No. 1 to 10.*

## DISCUSSION

Wealtec's MD-25 UV transilluminators, equipped with dual output intensity, are all tested with UV radiometer before delivery. With the exact quality control procedures, all UV light output intensity is defined to have over 8 mW/cm$^2$ of the "HI" intensity. The result in *fig.* 1-(A), the lowest amount of total DNA with the brightest band can be observed around 10 ng while staining with EtBr for 10 minutes. This means every UV transilluminator that Wealtec offers is defined to have the best observation ability of the agarose gel in the Dolphin-Doc system which ran with the lowest amount of total DNA, around 10 ng, and stained with EtBr for 10 minutes.

If the UV transilluminator is used over a long period of time, the UV intensity will get lower due to the decay of the argon gas and fluorescence particles inside the light tubes. The gel image will then become more difficult to be observed. Using "LOW" intensity (6 mW/cm$^2$) to mimic the condition of use of over 100 hours, (*fig.*1-B), the observation result is much darker than in *fig.* 1-(A). Although the lowest DNA total amount that can be observed is also around 10 ng, it is more difficult to detect the band. If the UV intensity lowers, it is not guaranteed that users can still observe the same amount of DNA. Perhaps, users can still enhance the observation result by extending the staining time period (*fig.* 1-(C) & (D)), increase the EtBr concentration, enlarge the iris setting, or prolong the exposure time. This can still have its limitations. For the best condition to observe the DNA samples, it is highly recommended to change the UV light tubes when the observation limitation is not shown as well as in *fig.* 1-(B) at "HI" intensity under the same observation condition. In other words, when the "HI" intensity is lower than 6 mW/cm$^2$, it's time to change the UV light tubes. Furthermore, it is necessary to change the entire set of light tubes at the same time. This is to ensure the UV output intensity is equally displayed on the UV filter and to make the detection of image densitometry more reliable.

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