Low Background Black Glass of UV Transilluminator

MATERIAL

- Dolphin-Doc image system (Wealtec)
- MD series UV transilluminator with low background black glass (Wealtec)
- λDNA/HindIII DNA marker (Wealtec)
- Mini-GES electrophoresis system (Wealtec)

PROCEDURE

1. Make 1.2% agarose gel with TBE buffer.
2. Prepare the 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 constant voltage 50 V for 2 hours by using Elite 200 power supply.
5. Stain the gel with EtBr solution (5 µg/mL) for 60 minutes.
6. Observe the agarose gel with/without low background black glass in the Dolphin-Doc system paired with amber and close up filter.
7. Lens setting: Iris = 2, Zoom = 20, and Focus = 1.6.

8. Exposure time of 1 and 10 seconds.
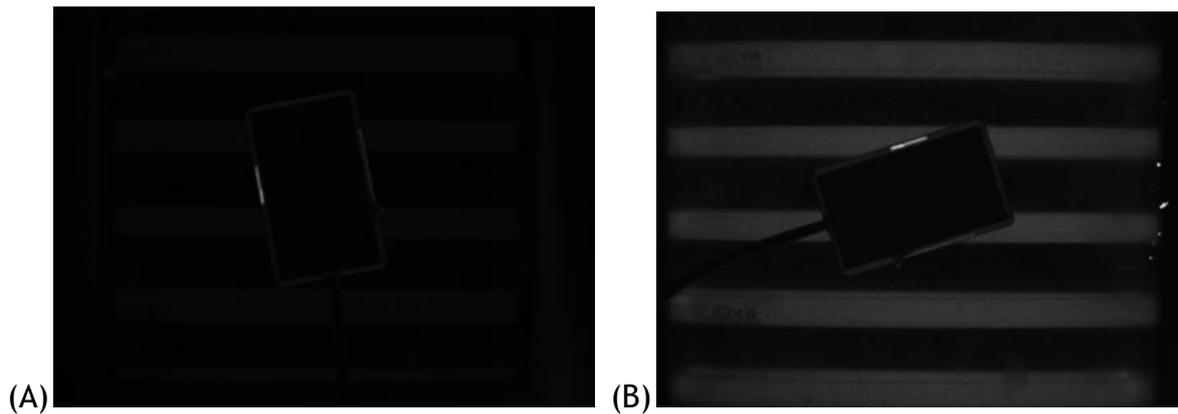9. Measure and record the UV output intensity of the UV transilluminator at the same time.

RESULT

Figure 1. *Direct observation (A) with low background black glass and (B) with regular UV transilluminator filter.*
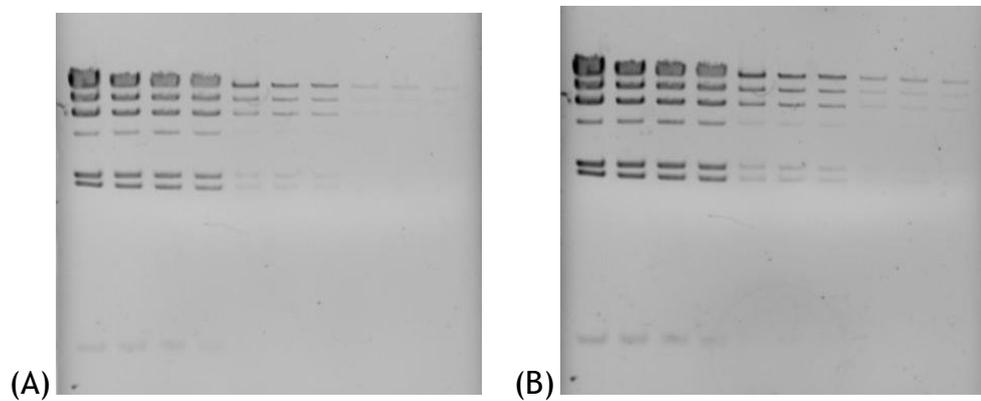

Figure 2. *Observation of agarose gel (A) with low background black glass and (B) with regular UV transilluminator filter.*

DISCUSSION

Argon light tubes without fluorescence coating can emit a very broad bandwidth ultraviolet (UV) light emission with the peak height at 254 nm and range from 10 to 400 nm. With suitable phosphorescents coating inside the light tubes, UV light can be absorbed and reemitted again to have the wavelength in the specific range. However, the light emitted from the light tube still has broad bandwidth and is always coupled with the heat production. Both of them will interfere with the observation of the experiment result which use of the dyes needs UV light to excite. Filters are always needed in order to block the undesirable light source to form an intensified specific wavelength light so that users can get a more clear observation with the UV light source.

Composition of the filter and materials that are added play a great deal of effect on the wavelength of the output light. In order to get more specific band observation and lower undesired light interference in the gel documentation, Wealtec announces the lowest background emission black glass filter for the MD series UV transilluminators. As in Figure 1, using the low background black glass, the infrared light caused by the light tubes heat produced during operation will be blocked. Even after long term exposure with more heat production, there will be no infrared light observation in the image. Besides blocking of the infrared light, the other aspect that needs to be considered is the intensity of the UV light. According to the UV intensity measurement, adding of the filter will lower the intensity of the illumination. However, in Figure 2, comparing the use of the same UV transilluminator with the low background black glass and normal filter, the intensity of the bands are similar with short time expose under Dolphin-Doc image system observation. While narrowing down the iris and extending the exposure time of the observation, infrared images from the light tubes will form a strong background and interference in observed bands.

Eliminating the interference of the infrared light to get a better observation result, Wealtec provides the low background black glass as filter on the MD series UV transilluminator. With this well performed apparatus, users can get their gel documentations more clearly and much easier.

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