Application Bulletin

UVP-AB-220

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Using the UV/Blue Light Converter Plate and Transilluminators

UV Transilluminatiors are the most popular equipment for detecting nucleic acids. Yet, the transilluminator can emit harmful UV rays, potentially damaging to nucleic acids as well as the eyes and skin of the researcher. UVP's innovative UV/Blue Light (Visi-Blue™) Converter Plate, Visi-Blue Transilluminator, and overhead (epi) Visi-Blue illumination light sources are designed to eliminate the problem of UV radiation.

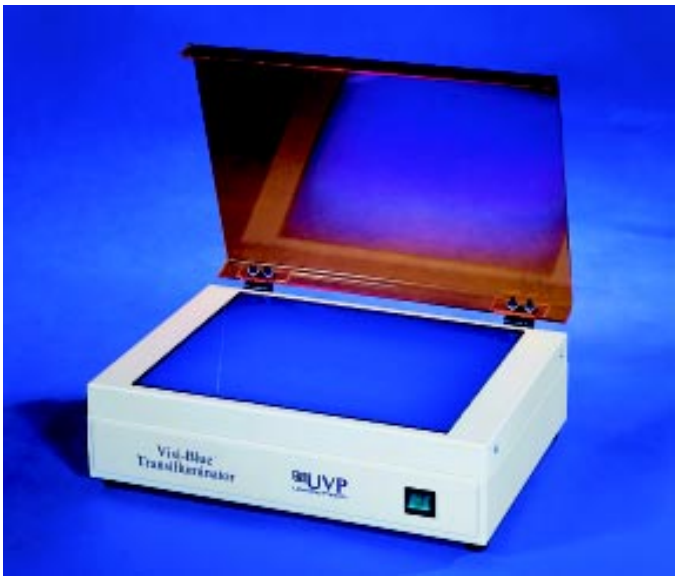
UV Transilluminators generate a light output of between 254 and 365 nm, depending on the UV light source, which is far from the excitation maxima of many popular nucleic acid stains. Long before the introduction of the Visi-Blue Plate, Scientists relied on UV low wavelength excitation of Ethidium Bromide to visualize nucleic acids. With the introduction of SYBR Green (Molecular Probes; Eugene Ore) and other long wavelength excitable nucleic acid stains, UVP Inc. introduced the Visi-Blue Plate and Amber plate combination for non-destructive viewing of nucleic acids. The Visi-Blue plate safely converts the low wavelength UV light from the UVP Transilluminator to longer (blue) wavelengths of light. The Visi-Blue Converter Plate uses an UV activated phosphor coating to safely convert 302, 312 and 365nm UV to a spectrum of between 400nm and 500nm.

When using the Visi-Blue plate to visualize Ethidium bromide, the signal sensitivity decreases 3 fold, however; the Visi-Blue plate can be used to visualize fluorescently stained DNA, RNA, proteins and other biological samples to picogram ranges.

Using blue light instead of UV to view nucleic acids ensures that the DNA will not be nicked or damaged for further downstream processes.

Amber Plate
In most laboratory settings where fidelity of the nucleic acid is crucial for further manipulations, excision of the nucleic acid from a gel is accomplished by using an Amber Plate that is provided. The Amber Plate will cutoff the long wavelengths of blue light emitted from the converter plate allowing visualization and easy manipulation of your samples.

Alternatively, UVP's BioImaging Systems come equipped with Filter sets which include appropriate filters based on your application for image acquisition. Using this option the Visi-Blue plate is simply placed on top of the existing UV transilluminator and capture the image. Like the Amber Plate, the filter set included with the bioimaging system blocks Blue light.



Visi-Blue Transilluminator

Converter Plate
The Visi-Blue converter plate is simply placed on top of the existing UV transilluminator.
Place your Sample directly on top of the converter plate. To first document the image using UVPs BioChemi System or BioDocit.

BioDocit –

1. Place the Ethidium Bromide filter on the lens.
2. Close the darkroom door and acquire the image.

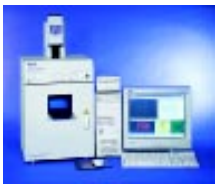
To manipulation your samples –

1. Disable the doorlight switch to keep the Visi-Blue plate illuminated.
2. Place an Amber Plate between your eyes and the sample such that, manipulations are possible.
3. Excise your bands or perform other manipulations.


BioDoc-It System

BioChemi –

1. Dial in the appropriate filter from the filter set.
2. Close the darkroom door and acquire the image.



BioChemi System

To manipulation your samples –

1. Dial the darkroom Light setting switch to the "Always on setting"
2. Slide the transilluminator tray out.
3. Place an Amber Plate between your eyes and the sample such that, manipulations are possible.
4. Excise your bands or perform other manipulations.

Place a Amber Plate between you eyes and the sample such that manipulations are possible. and capture the image. Blue light is blocked by the Filter set included with the bioimaging system.

Visi-Blue Transillumninator

Often used as a standalone Transilluminator, the Visi-Blue transilluminator can be either placed at the bottom of a BioChemi System or out on the benchtop.

1. Place your Sample directly on top of the Visi-Blue transilluminator.
2. Place an Amber Plate between your eyes and the sample such that, manipulations are possible.
3. Excise your bands or perform other manipulations

The Visi-Blue Plate uses a UV light source that excites fluorophors between about 420 and 500 nm. Included in this range are many useful dyes such as AttoPhos™, GelStar, Vistra Green, SYPRO® Orange.

Gel Analysis

A serial dilution of 400 ng to 3 ng of a 1000 bp ladder was loaded onto a 0.8% TAE Agarose gel and electrophoresed 45 minutes at 11 V/cm. The gel (Fig. 1) was stained with SYBR Green and imaged in a BioChemi imaging system using a 302nm UV transilluminator and a VisiBlue plate. Using the SYBR Gold filter, the image was capture using a cooled CCD camera and analyzed with LabWorks™ image analysis software. The analysis shows the detection of DNA bands as little 1 pg is possible using the Visi-Blue plate.

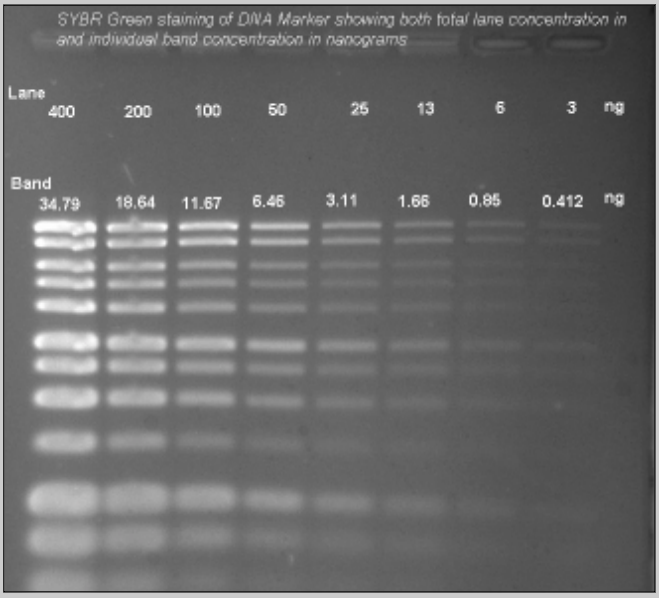
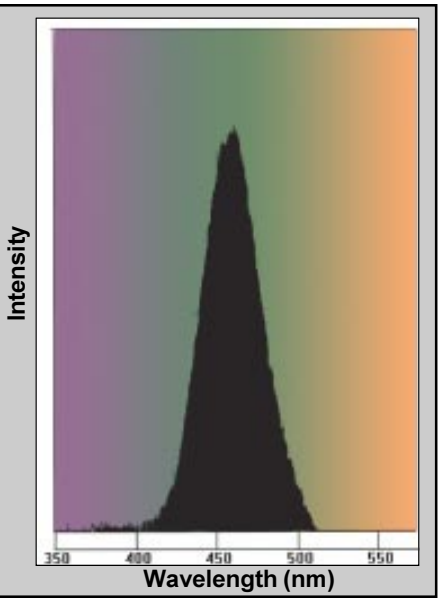


Fig. 1. SYBR Green Gel Analysis

Dye	*Excitation*	*Emission*
Alexa Fluor 434	434	540
Alexa Fluor 488	495	519
ATTO-TAG CBQCA	465	560
ATTO-TAG FQ	486	591
Auramine O-Feulgen	460	550
Calcein	494	517
5-CarboxyFluorescein (5-Fam)	492	518
CFP/YFP FRET	458	527
Cy 2	489	506
Fluorescein	494	518
LysoSensor Green (pH 5.0)	442	505
Oregon Green 488	496	524
GFP Varients (red shifted)	470	585
SYBR Green	497	520
SYBR Gold	495	537

And many others



References

1. Maniatis et al. Molecular cloning: A Laboratory Manual. " Agarose Gel Electrophoresis" Cold Springs Harbor Laboratory Press, 1989.