Revised: March 22, 2013

Product Information

PMA-Lite™ LED Photolysis Device

Catalog Number: E90002

Specifications

Dimensions (WxDxH)	8.25 x 6.25 x 2.625 in. (21 x 15.9 x 6.7 cm)
Weight	3 lb. 10.7 oz. (1.66 kg)
Frequency Range	50~60Hz
Power Range	100~240VAC
Maximum Power	60W
LED Output Wavelength	465-475nm

Product Description

PMA-Lite™ LED Photolysis Device is specifically designed for photoactivation of propidium monoazide (PMA™) and other similar dyes. It can also function as a general photolysis device to provide continuous illumination to 1.5-2 mL-sized vials in a controlled manner. The device can hold up to 18 vials. Multiple LED lights are positioned to provide even and maximal illumination from both the sides and bottom to all vials. An internal fan is used to reduce the heat generated from the lights to ensure near room temperature photolysis. The device has a timer that can be set for 10, 15, 20 or 30 minutes of continuous photolysis.

Features:

- Provides even and maximal illumination to up to 18 1.5-2 mL-sized vials.
- Internal fan to ensure a temperature of <37°C.
- Four timer settings for 10, 15, 20 or 30 minutes of continuous illumination.
- Long-lasting LED lights with 465-475 nm emission for efficient activation of PMA™, EMA or other similar azido dyes.
- Unit has 120/240V internal converter and is provided with a universal outlet adaptor for customers outside of North America.

Figure 1. PMA-Lite™ LED Photolysis Device.

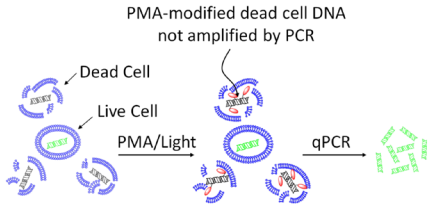

Figure 2. Principle of PMA modification for quantitation of viable bacteria by qPCR. The cell membrane-impermeable PMA™ dye selectively inhibits amplification of DNA from dead bacteria, permitting selective quantitation of viable bacteria. See Figures 4 and 5 for example data.

Application Notes

PMA™ is a high affinity photoreactive DNA binding dye developed by Biotium. The dye is weakly fluorescent by itself but becomes highly fluorescent upon binding to nucleic acids. It preferentially binds to dsDNA with high affinity. Upon photolysis using the PMA-Lite™ LED Photolysis Device, the photoreactive azido group on the dye is converted to a highly reactive nitrene radical, which readily reacts with any hydrocarbon moiety at the binding site to form a stable covalent nitrogen-carbon bond, thus resulting in permanent DNA modification. The dye is cell membrane-impermeable and thus can be used to selectively modify only DNA from dead cells with compromised membrane integrity, while leaving DNA from viable cells intact. PMA™ inhibits PCR amplification of modified DNA templates, making the dye useful in the selective detection of viable pathogenic cells by quantitative real-time PCR (Figure 2). Since Biotium first developed PMA™ dye, there have been numerous publications on the use of the dye in pathogenic bacterial detection related to food and water safety, medical diagnosis and biodefense (see Selected References).

Protocol for use

The following is a protocol for using the PMA-Lite™ LED Photolysis Device to treat cultured laboratory strains of bacteria with PMA. Treatment of complex biological or environmental samples such as feces or soil may require optimization of sample dilution for PMA and light treatment. Please see the Product Information sheets for our PMA products (catalog numbers 40013 and 40019) for detailed experimental protocols.

1. Turn the PMA-Lite™ LED Photolysis Device over and use the switches to set the length of time for photolysis (Figure 3). We recommend using 15 minutes photolysis time as a starting point and optimizing photolysis time as needed. Different cell types or sample types may require shorter (as few as 5 minutes) or longer photolysis times.
2. Place samples (in clear 1.7 mL microcentrifuge or 2 mL screw top tubes) in the PMA-Lite™ LED Photolysis Device. The adaptor is useful for positioning 1.7 mL microcentrifuge tubes for the most optimal light exposure.
3. Turn the PMA-Lite™ LED Photolysis Device on using the switch on the back of the unit. A blue light around the Restart button will flash to indicate that photolysis is in progress.
4. The blue light becomes steady when photolysis is complete. Turn the unit off and remove samples for further processing or use the Restart button to begin the photolysis cycle again on fresh samples.

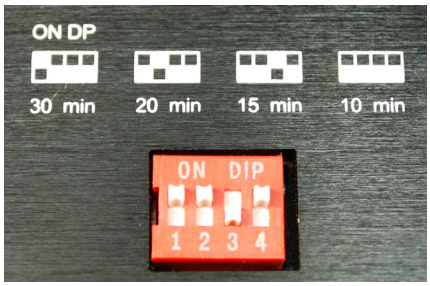

Figure 3. Switch positions for corresponding LED photolysis times. Black squares indicate the position of the switches. With the switch setting shown in this image, photolysis will occur for 15 minutes.

Sample data

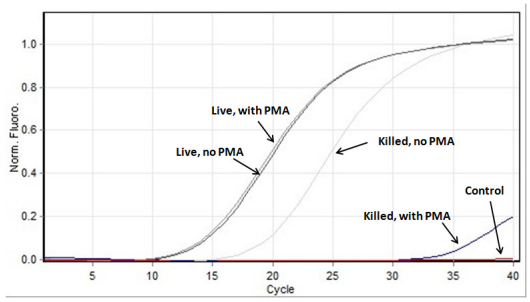

Figure 4. Real time PCR amplification curve of DNA from live or heat-killed *E. coli* +/- PMA subjected to 15 minutes of photolysis with the PMA-Lite™ LED Photolysis Device. Real time PCR was performed with primers against a region of the 16S rRNA gene.

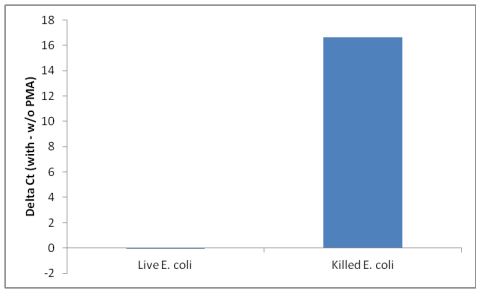

Figure 5. Heat-killed *E. coli* incubated with PMA and photolysed with the PMA-Lite™ LED Photolysis Device show a greatly increased Delta Ct value over PMA treated live E. coli. After real time PCR analysis, Ct values were calculated for duplicate samples. Average Ct values for untreated live or dead E. coli were subtracted from average Ct values for treated live or dead E. coli samples.

Related Products

Catalog number	Product
40019	20 mM PMA™ in H_2O, 100 uL
40013	PMA™ (Propidium monoazide), 1 mg
40015	Ethidium monoazide, bromide (EMA), 5 mg
31003	Fast EvaGreen® qPCR Master Mix, 2 X 1 mL
31020	Fast Plus EvaGreen® qPCR Master Mix, 2 X 1 mL
32001	Bacterial Viability and Gram Stain Kit
32000	Live Bacterial Gram Stain Kit, 800 assays
30027	Viability/Cytotoxicity Assay Kit for Bacteria Live and Dead Cells, 100-1000 assays

Please visit our website at www.biotium.com for information on our life science research products, including environmentally friendly EvaGreen® qPCR master mixes, fluorescent CF™dye antibody conjugates and reactive dyes, apoptosis reagents, fluorescent probes, and kits for cell biology research.

Selected References

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Warranty

Biotium warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of purchase. If a defect is present, Biotium will, at its option, repair, replace, or refund the purchase price of this product at no charge to you, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. For your protection, items being returned must be insured against possible damage or loss. Biotium cannot be responsible for damage incurred during shipment of a repair instrument; It is recommend that you save the original packing material in which the instrument was shipped. This warranty shall be limited to the replacement of defective products. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Obtaining Service

Contact Biotium Technical Support at 800-304-5357 or send an email to techsupport@biotium.com and describe the problem(s) you are experiencing. Carry out any suggested modifications or tests. DO NOT ship a device to us without first obtaining a Return Authorization from us. If it is determined by the Biotium Technical Support representative that the device should be returned for repair, a Return Authorization number will be assigned and you will receive instructions for the return. If the device is under warranty, Biotium will repair or replace the unit, and pay for return shipment. If the device is not under warranty, Biotium will give you a cost estimate before repairing the unit. Repair and shipping costs both ways are your responsibility if the device is not under warranty.