

FINAL REPORT

Bacterial Survival on Glass and Laminated Wood Surfaces Exposed to
PURE-LIGHT Coated LED Light Bulbs

Order Number: 371725740

PREPARED FOR

PURE-LIGHT Technologies LLC
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2/8/2018

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CERTIFICATE OF ANALYSIS

CLIENT: PURE-LIGHT TECHNOLOGIES, LLC.

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PROJECT: BACTERIAL SURVIVAL ON GLASS AND LAMINATED WOOD SURFACES EXPOSED TO PURE-LIGHT COATED LED LIGHT BULBS

PRODUCT: COATED LED LIGHT BULBS

SAMPLE RECEIVED: 11/2017

REPORT DATE: 2/7/2018

CHALLENGE BACTERIA:

- *ESCHERICHIA COLI* 25922
- *SALMONELLA ENTERICA* 14028
- METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* 43300



I. EXPERIMENTAL SUMMARY

Glass slide and laminated wood flooring coupons were inoculated in triplicate with a suspension of *Escherichia coli*, *Salmonella enterica*, and methicillin-resistant *Staphylococcus aureus* (MRSA). The slides and wood flooring samples were exposed to PURE-LIGHT coated LED light bulbs and tested at 24 and 72 hour intervals to determine organism survival/reduction. Control slides and coupons (not exposed to light bulbs) were also tested at 24 hour and 72 hour intervals for comparison purposes.

II. PROCEDURE

Glass slide coupons were disinfected by soaking them in a 70% ethanol solution for 15 minutes, and allowing them to air dry in a biological safety cabinet. The laminated wood flooring coupons were disinfected by cleaning the surface with wipes containing quaternary ammonium compounds. Once dry, the slides and wood flooring coupons were inoculated in triplicate with suspensions of *E. coli*, *S. enterica*, and MRSA. The slides were placed in a secure location and exposed to 6 PURE-LIGHT coated LED light bulbs for 24 and 72 hours respectively. The glass slide coupons were set on a counter approximately 5 feet from the surface of the lights. The wood flooring coupons were set on the floor of the room approximately 8 feet from the lights. At the 24 and 72 hour intervals the inoculated slide and wood flooring coupons were collected and plated using serial dilution technique onto Trypticase Soy Agar (TSA) medium to determine organism survival/reduction.

III. EXPERIMENTAL RESULTS

Initial (time zero) inoculum levels for all coupons

Salmonella – 170,000,000 per coupon

MRSA – 200,000,000 per coupon

E. coli – 200,000,000 per coupon



24 Hour Recovery**Wood Flooring**

Test Organism	Treatment	CFU per sample (average)	Log Reduction	Percent Reduction
<i>Salmonella</i>	Control (No light)	3,000,000		
	PURE-LIGHT coated LED	4,000,000	-0.12	-33.3
MRSA	Control (No light)	3,100,000		
	PURE-LIGHT coated LED	800,000	0.59	74.2
<i>E. coli</i>	Control (No light)	1,100,000		
	PURE-LIGHT coated LED	700,000	0.20	36.4

Glass Surface

Test Organism	Treatment	CFU per sample (average)	Log Reduction	Percent Reduction
<i>Salmonella</i>	Control (No light)	4,300,000		
	PURE-LIGHT coated LED	2,900,000	0.17	32.6
MRSA	Control (No light)	7,400,000		
	PURE-LIGHT coated LED	4,900,000	0.18	33.8
<i>E. coli</i>	Control (No light)	3,000,000		
	PURE-LIGHT coated LED	2,100,000	0.15	30.0



72 Hour Recovery

Wood Flooring

Test Organism	Treatment	CFU per sample (average)	Log Reduction	Percent Reduction
<i>Salmonella</i>	Control (No light)	2,090,000		
	PURE-LIGHT coated LED	890,000	0.37	57.4
MRSA	Control (No light)	2,150,000		
	PURE-LIGHT coated LED	430,000	0.70	80.0
<i>E. coli</i>	Control (No light)	210,000		
	PURE-LIGHT coated LED	14,000	1.18	93.3

Glass Surface

Test Organism	Treatment	CFU per sample (average)	Log Reduction	Percent Reduction
<i>Salmonella</i>	Control (No light)	1,670,000		
	PURE-LIGHT coated LED	880,000	0.28	47.3
MRSA	Control (No light)	6,850,000		
	PURE-LIGHT coated LED	1,330,000	0.71	80.6
<i>E. coli</i>	Control (No light)	1,030,000		
	PURE-LIGHT coated LED	55,000	1.27	94.7

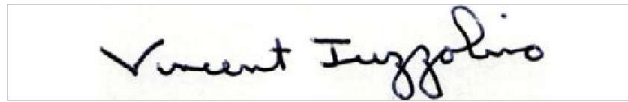
$$\text{Percent Reduction} = \frac{(\text{Control} - \text{Treated}) \times 100}{\text{Control}}$$

$$\text{Log Reduction} = \log_{10} \frac{\text{Control}}{\text{Treated}}$$



IV. CONCLUSIONS/OBSERVATIONS

The greatest bacterial reduction was seen after 72 hours of treatment compared to 24 hours. *E. coli* was reduced by 94.7% on glass and 93.3% on the wood surface after 72 hours of treatment. MRSA was reduced by 80.6% and 80.0% on glass and wood after 72 hours. *S. enterica* was also reduced but by a smaller degree; 47.3% on glass and 57.4% on wood after 72 hours of treatment.

A rectangular box containing a handwritten signature in black ink that reads "Vincent Iuzzolino".

Vincent Iuzzolino, M.S.
Microbiology Laboratory Director

