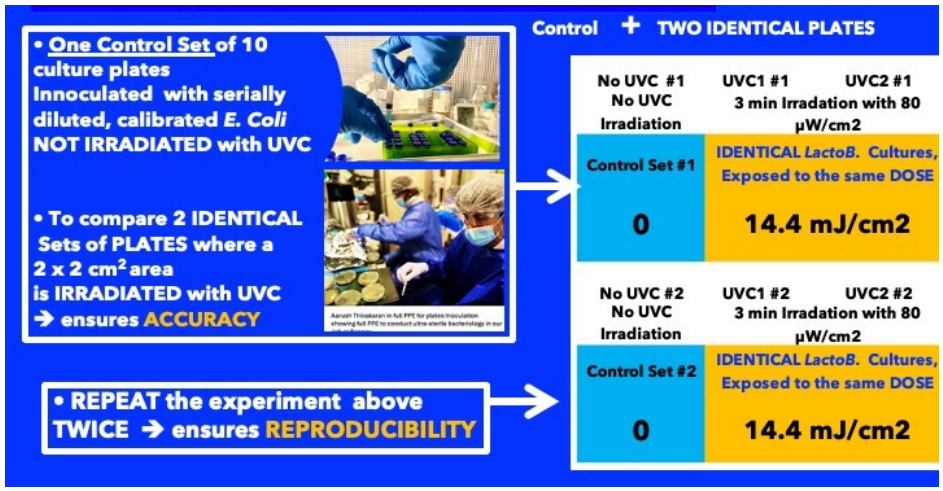
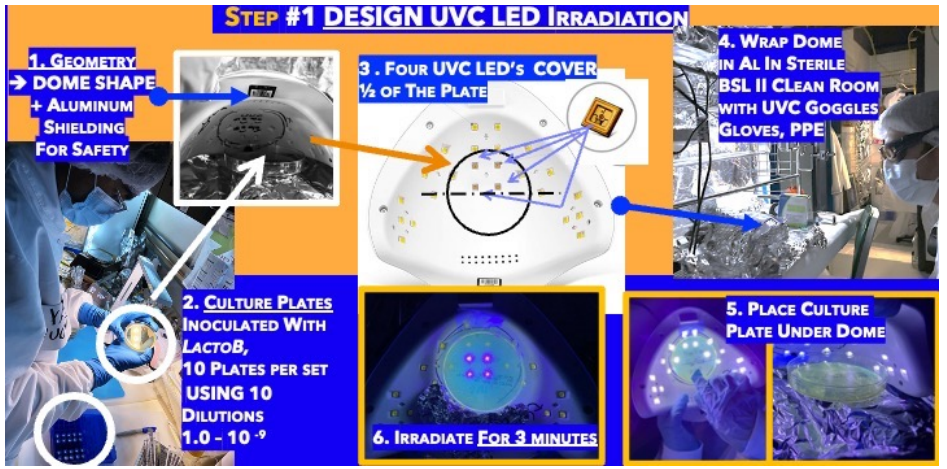
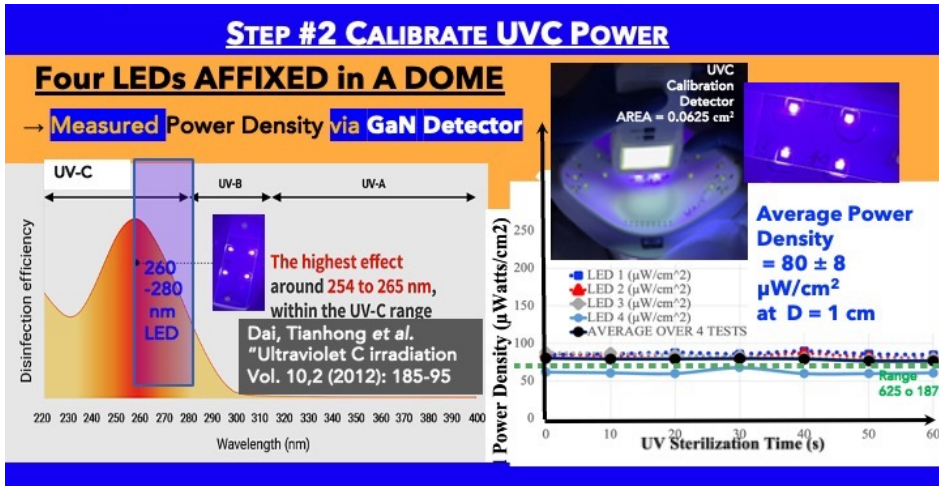
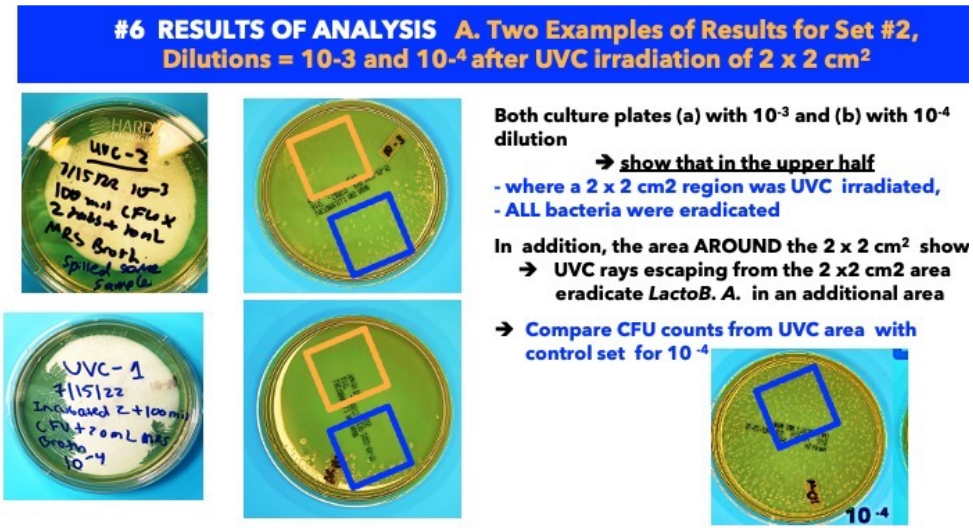

• One Control Set of 10 culture plates Innoculated with serially diluted, calibrated E. Coli NOT IRRADIATED with UVC
• To compare 2 IDENTICAL Sets of PLATES where a 2 x 2 cm² area is IRRADIATED with UVC → ensures ACCURACY
Control + TWO IDENTICAL PLATES
No UVC #1 No UVC Irradiation
UVC1 #1 3 min Irradation with 80 µW/cm2
UVC2 #1
Control Set #1
IDENTICAL LactoB. Cultures, Exposed to the same DOSE
0
14.4 mJ/cm2
No UVC #2 No UVC Irradiation
UVC1 #2 3 min Irradation with 80 µW/cm2
UVC2 #2
Control Set #2
IDENTICAL LactoB. Cultures, Exposed to the same DOSE
0
14.4 mJ/cm2
• REPEAT the experiment above TWICE → ensures REPRODUCIBILITY


STEP #1 DESIGN UVC LED IRRADIATION
1. GEOMETRY → DOME SHAPE + ALUMINUM SHIELDING FOR SAFETY
2. CULTURE PLATES INOCULATED WITH LACTOB, 10 PLATES PER SET USING 10 DILUTIONS 1.0 - 10 -9
3. FOUR UVC LED's COVER ½ OF THE PLATE
4. WRAP DOME IN AL IN STERILE BSL II CLEAN ROOM WITH UVC GOGGLES GLOVES, PPE
5. PLACE CULTURE PLATE UNDER DOME
6. IRRADIATE FOR 3 MINUTES


STEP #2 CALIBRATE UVC POWER
Four LEDs AFFIXED in A DOME
→ Measured Power Density via GaN Detector
UVC Calibration Detector AREA = 0.0625 cm²
UV-C
UV-B
UV-A
Disinfection efficiency
260 -280 nm LED
The highest effect around 254 to 265 nm, within the UV-C range
Dai, Tianhong et al. "Ultraviolet C irradiation Vol. 10,2 (2012): 185-95
220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400
Wavelength (nm)
LED 1 (µW/cm^2)
LED 2 (µW/cm^2)
LED 3 (µW/cm^2)
LED 4 (µW/cm^2)
AVERAGE OVER 4 TESTS
Power Density (µWatts/cm2)
UV Sterilization Time (s)
Average Power Density = 80 ± 8 µW/cm² at D = 1 cm
Range 625 o 187


#6 RESULTS OF ANALYSIS A. Two Examples of Results for Set #2, Dilutions = 10-3 and 10-4 after UVC irradiation of 2 x 2 cm²
UVC-2
UVC-1
Both culture plates (a) with 10-3 and (b) with 10-4 dilution
→ show that in the upper half
- where a 2 x 2 cm2 region was UVC irradiated,
- ALL bacteria were eradicated
In addition, the area AROUND the 2 x 2 cm² show
→ UVC rays escaping from the 2 x2 cm2 area eradicate LactoB. A. in an additional area
→ Compare CFU counts from UVC area with control set for 10 -4
10 -4