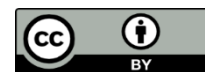


# IMPACT OF UV-C LIGHT TREATMENT ON *LISTERIA MONOCYTOGENES* IN HYDROPONIC LETTUCE AND QUALITY ASSESSMENT

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## ABSTRACT

Controlled agriculture environments, such as hydroponic systems, are a rapidly expanding industry. However, research indicates that these systems can foster microbial growth, highlighting the importance of effective decontamination methods to mitigate the risk of foodborne illnesses. This study evaluated the effect of UV-C light against *Listeria monocytogenes* on hydroponically grown lettuce and seeds. Lettuce leaves were spot inoculated (100 $\mu$ L) with *Listeria monocytogenes* cocktail and exposed to UV-C light (0.28mW/cm<sup>2</sup>) for 10 to 50 seconds in 10-second increments and 1 to 5 minutes in 1-minute increments. UV- treated leaves were stored at 4C° and visually inspected for 5 days. Additionally, the smooth and rough surfaces of lettuce leaves were inoculated and exposed to UV-C light. Lettuce plants growing in a hydroponic system were spot inoculated with *Listeria* 15 days after germination and treated with UV-C light for 50s every day between days 16-25. Lettuce seeds (n=40) were inoculated with *Listeria* and exposed to UV-C light (0.28mW/cm<sup>2</sup>) prior to germination for 0–40 min and the rate of germination (%) was measured. Seeds treated with UV-C did not present significant impact on germination percentage ( $P<0.05$ ). Significant reductions in *Listeria* levels in seeds were observed after 20- and 40-min treatment ( $0.94\pm0.32$  log CFU/g). UV-C light significantly reduced *Listeria* levels on lettuce leaves within 40 and 50s  $0.92 \pm 0.22$  and  $1.14 \pm 0.22$  log CFU/g respectively and remained similar up to four min treatment. *Listeria* reduction was significantly different ( $P<0.05$ ) between the smooth and rough surfaces of lettuce leaves. No significant ( $P>0.05$ ) effect was found on the color, and the weight, irrespective of the UV-C time exposure. UV-C treatment decreased *Listeria* levels in the hydroponic system after two days of treatment ( $3.85\pm1.09$  log CFU/g). UV-C could be a potential intervention strategy to minimize the food safety risk of fresh produce in a hydroponic system.

**Keywords:** UV-C light treatment, hydroponic systems, lettuce

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