

Evaluation of the efficiency of a vehicle disinfection arch with
in situ generated chlorine

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Abstract

In the context of the global pandemic caused by SARS - CoV2, a large number of sectors that carry out land transport in trucks or other vehicles have been forced to adopt extra security actions such as vehicle disinfection arches to prevent the spread of the virus during logistics procedures.

In a collaboration agreement, our work has consisted to evaluate a vehicle disinfection arch developed by a Catalan company. The disinfection of the arch was obtained using a saline electrolysis system that *in situ* generates chlorine radicals (biocidal agent) from common salt and water. Furthermore, the wastewater generated in the vehicle disinfection process was collected and re-used, reducing the economic and environmental impact of this activity.

The disinfection potential of the disinfection arch against 3 bacterial models was tested (*E. coli*, *S. aureus* and *Geobacillus stearothermophilus* spores).

For *S. aureus*, the reduction efficiency was higher than 99.9% for all samples at 2 and 5 ppm. For *E. coli*, the reduction efficiency was complete (100%) at 5 ppm and 2 ppm, except for only two samples at 2 ppm, although a higher than 90% efficiency was also obtained (91% and 96.8%). At 5 ppm the efficiency for spore disinfection was below 40%, but a higher 90% efficiency was obtained at 11 ppm for *Geobacillus stearothermophilus*.

Considering that the efficiency against *E. coli* and *S. aureus* is higher than 99.9% with 5 ppm, the disinfectant arch could work at that concentration to achieve a safe disinfection for all vehicles.

Keywords: Vehicle disinfection, chlorine disinfection, disinfection arch, saline electrolysis.