

## Results of study on the inactivation of air-borne viruses with Soluva Air V Universal

The above-named study was conducted with Hygiene institute biotec GmbH. This is essentially a summary of the original study, as some technical details are non-disclosable.

### Project description:

Soluva® Air V Universal by Heraeus Noblelight GmbH is a UV-C air-disinfection system. In this study the inactivation of RNA surrogate viruses was analyzed by means of a one-time passage through the system. The used virus surrogate is an ssRNA virus with a 4kB genome. In comparison, the pandemic causing SARS-CoV-2 virus is also an encapsulated ssRNA virus. Regarding the inactivation of the virus in air the following D90 values (dose that is necessary for a 90% inactivation) are known from literature:

Coronavirus 18 – 30 J/m<sup>2</sup>

Surrogatvirus 60 – 350 J/m<sup>2</sup>.

The research on SARS-CoV-2 is still ongoing and factors such as humidity and temperature can influence the inactivation, but, nevertheless, the reaction of the pathogen to UV-C radiation is comparable with that of the surrogate.

### Material and Methods:

Initially, a lysate of the surrogate virus of a high concentration is cultivated. To enable a controlled environment to effuse the virus, Soluva® Air V Universal was placed in a fully closed plastic tent structure. The quantified lysate was then effused with fumigation. The absolute number of virus was determined with differential measurement of weight and a recalculation of the applied titer.

The air sampling was conducted with a membrane filter including an air sampler at 6m<sup>3</sup>/h for 10 minutes. The used membranes were then dissolved in buffer and the amount of collected viruses was analyzed with a serial dilution and an agar-assay. To quantify the inactivation rate of the surrogate virus due to UV-C radiation with Soluva® Air V Universal the experiment was conducted with and without active UV-C in the system to exclude additional factors such as ventilation effects.

### Results:

To confirm the inactivation of surrogate viruses with Soluva® Air V Universal, an experiment was conducted in which surrogate viruses were spread as an aerosol with a fumigator and the radiation-exposed viruses were collected after a one-time passage through the system. For the collection after the one-time passage, membrane filters were applied and processed afterwards. In this experiment series a lysate of MS2 > 10<sup>13</sup> PFU/ml was effused. After the one-time passage of Soluva® Air V Universal without active UV-C 3,85 · 10<sup>06</sup> PFU/m<sup>3</sup> were measured. After a one-time passage Soluva® Air V Universal with active UV-C no active viruses could be detected. Considering a detection threshold of 50 PFU/m<sup>3</sup> a reduction of active viruses in ≥2,98 log scale was achieved. Therefore, the conclusive inactivation rate is ≥ 99,91 %.

### Assessment:

The Soluva® Air V Universal is a system for UV-C inactivation of air-borne microorganisms. The system is intended for local traffic systems for ceiling mounting in order to continuously decontaminate the air with UV radiation in recirculation mode. The performed experiments showed a very high inactivation rate of the applied surrogate virus. A reduction ≥ 2,98 log was confirmed which equals an inactivation rate of ≥ 99,91%.