

## SARS-COV-2 AND THE SONOTHERMAL DISINFECTION OF SINK DRAINS WITH THE “MOVEOSIPHON ST24”

Sink drains under washbasins in patient rooms and clinical sanitary areas are well-known open pathogen reservoirs. Pathogens can be released into the sink drain when washing the hands or the body.

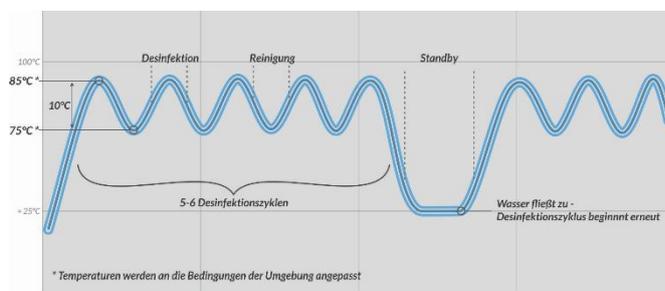
Water flowing into the sink drain produces infectious aerosols on the surface of the trap liquid. Those aerosols can transmit pathogens to the hands of staff, patients or the immediate surroundings. Furthermore, the biofilm on the inner wall of the drain trap provides ideal conditions for the survival and multiplication of germs.<sup>1-6</sup>

Corona viruses can be released from infected patients into sink drains and survive there for weeks.<sup>7</sup> Inside those aerosols the pathogens are detectable for several hours and remain in an infectious state.<sup>8</sup>

The involvement of sink drains in the spread of viruses was already reported in the context of the SARS epidemic in 2003<sup>9</sup> and recently, the new Corona virus SARS-CoV-2 has been detected in patient toilets in a hospital in Wuhan.<sup>10</sup> Therefore, the disinfection of sink drains in clinical sanitary areas is a necessary preventive measure to inhibit the virus spread.

Chemical disinfection measures show a very good effectiveness against SARS-CoV-2 viruses but can only solve the problem temporarily (as well as the replacement of an old with a new standard drain trap) as recontamination takes place within a few hours or days. Whereas the replacement of a contaminated sink drain by a MoveoSiphon ST24 removes the germ reservoir permanently and safely.

The automatic disinfection system kills the germs in the trap liquid continuously by the high temperature and electro-mechanical vibration prevents biofilm formation inside the drain. The graphic below illustrates the operating principle of the MoveoSiphon:



During the thermal disinfection the MoveoSiphon heats up to set temperature which is max. 95°C/203°F.

Viruses remain relatively stable at low temperatures whilst they are vulnerable to heat. Even at temperatures of 55-70 C°/131-158°F (humid heat) denaturation of the virus envelope takes place and the virus loses its infectiousness. Generally, enveloped viruses are less resistant to heat than non-enveloped viruses.<sup>11</sup> SARS CoV-2 viruses are enveloped viruses with an RNA that is covered by a protein containing lipid envelop.

The temperature and duration of the MoveoSiphon’s disinfection cycles provide continuously the conditions that are essential for an effective inactivation of the virus. In addition to this the vibration cleaning of the MoveoSiphon prevents permanently the development of biofilm and therefore excludes possible interactions of viruses with the biofilm, even though if little is in fact known about that.

- <sup>1</sup> von Saene et al., *Epidem. Inf.* 1989, 102: 231-238
- <sup>2</sup> Döring et al., *Zbl. Hyg.* 1991, 191: 494-505
- <sup>3</sup> Sissoko et al., *Hygiene&Medizin* 2004, 29 (12): 451-455
- <sup>4</sup> Sissoko et al., *Hygiene&Medizin* 2005, 30 (4): 72-76
- <sup>5</sup> Kramer et al., *Krankenhaus- und Praxishygiene* 2011, 2. Aufl., Verlag Urban&Fischer, München
- <sup>6</sup> Döring et al., *Epidem. Inf.* 1993, 110: 427-436
- <sup>7</sup> Casanova et al., *Water Research* 2009, 43: 1893-1898
- <sup>8</sup> Doremalen et al., doi: 10.1056/NEJMc2004973
- <sup>9</sup> Lee Shiu Hung, *J R Soc Med.* 2003, 96 (8): 374-378
- <sup>10</sup> Yuan Liu et al., *Aerodynamic Characteristics and RNA Concentration of SARS-CoV-2 Aerosol in Wuhan Hospitals during COVID-19 Outbreak.* Preprint BioRxiv.
- <sup>11</sup> Böhm (2002), Dissertation FU Berlin