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Assessment of the efficacy of the plasma disinfection procedures in the "Air Sanitizer blue taction" and "Hand Sanitizer HS 100" device series from WK Med Tec GmbH, Bückeburg

The above-mentioned devices "Air Sanitizer blue taction" and "Hand Sanitizer HS 100" include a plasma source as an active component, which converts the ambient air into a conductive plasma state by means of electrical discharges in the area of the electrodes.

In this state, components of the gas mixture air in the form of oxygen and water vapour react to form short-lived, disinfectant-active substances, mainly as hydroxyl radicals. These plasma reaction products lead to a physical oxidation of organic structures, especially in microorganisms (viruses, bacteria, fungi and parasites).
This achieves a disinfection effect, while at the same time higher structures, such as plant and animal tissues, are not affected.

In this constellation, the plasma disinfection process is used for room air optimisation in the form of "Air sanitizer blue taction" and for hygienic hand disinfection in the form of "Hand Sanitizer HS 100".

Extensive studies by various laboratories show a significant microbiocidal (germ-killing) effect with regard to bacteria and viruses.
With regard to viruses, the pathogen "SARS CoV 2", which came into focus during the COVID 19 pandemic in 2020, was given priority.

Currently, in June 2022, there are indications of a further pandemic development of another pathogen. Here, one does not assume the scope of the SARS CoV 2 pandemic, since the transmission and contagiousness of the pathogen are significantly lower.

Irrespective of the significance of such developments, it should be considered at this point in what way the plasma disinfection process in the "Air Sanitizer blue taction" and "Hand Sanitizer HS 100" devices is also effective against the currently relavant pathogen.

The Monkeypox virus is currently considered to be the pathogen with the relevance of a pandemic occurrence.

Monkeypox virus is a virus of the genus "Orthopoxviridae" and thus belongs to the smallpox viruses.

The virus is an enveloped DNA virus and is mainly transmitted by smear infections, whereby the contact time with the virus excretor must be longer than 3 to 5 minutes. Furthermore, it can be assumed that the virus is a zoonosis which, when transmitted to humans as zoo-anthroponosis, infects humans as a false host. Therefore, from the point of view of the virus, the transition to humans is not the typical transmission route anyway.

Against this background, the contagiousness of the Monkeypox virus is much lower compared to the SARS - CoV2 - virus; mainly for this reason and the fact that the transmission of the Monkeypox virus is less aerogenic, but rather transmitted via direct contact and smear infections and that a relevant contact time is required for transmission.

Like the SARS-CoV2 virus, the Monkeypox virus is also an enveloped virus, which means that the presence of a virus envelope made of membrane fats of the virus-infected and virus-releasing cell causes a high sensitivity to inactivation and disinfection procedures.

Therefore, since the effectiveness of the plasma disinfection procedure has been proven by means of a virus inactivation test or an inactivation test of bacterial analogue indicator germs, it can in principle also be postulated that an identical sufficient effectiveness is also given against the Moneypox virus.

In order to substantiate this hypothesis, a direct virus inactivation test was carried out as a cooperation between Dr. Schmelz GmbH Malsfeld, Umwelthygiene Marburg GmbH and Universitätsmedizin Marburg, Medizinische Mikrobiologie.

An equivalent virus to the Monkeypox virus was used as the test germ (Orthopoxvirus vaccinia). This virus is practically non-infectious and can therefore be used for such inactivation experiments under laboratory conditions.

An Orthopoxvirus vaccinia suspension in a biological buffer solution was used for testing. The virus was applied under clean room conditions to sterile stainless steel test specimens 16*160mm, roughness depth 100µm. Apart from the biological buffer, no other organic load was used.

The test specimen was then exposed to the plasma disinfection process. For this purpose, the procedure in Hand Sanitizer HS 100 was used as an example.

30 seconds exposure, 30 seconds drying, application of operating water for Hand Sanitizer HS 100.

The test specimen is then washed off with bioloigical buffer solution and the approximate viral load is determined in the suspension by real-time PCR.

The result before disinfection treatment is compared with the result of test specimens after treatment with the disinfection procedure. From the subtraction of the decadic logarithms, the logarithmic reduction factor can be calculated.

As a result, the following was determined as the mean value of a triple repetition of the determination of the inactivation performance:

Viral load before treatment per specimen:	18300 KbE	log 4,26
Viral load after treatment per specimen:	5 KbE	log 0,70
Logarithmic reduction factor:		log 3,56

The orienting study represented here shows a reduction performance of 3,56 in the application of the Hand Sanitizer HS 100 process with regard to the reduction of surface microorganisms using the example of Orthopoxvirus vaccinia. This is an equivalent virus of the Monkeypoxvirus, so that an efficacy of theof the plasma of the of the plasma reduction procedure is also given against the monkeypox virus. Since the analogue plasma source is also used for the "Air Sanitizer Blue taction", the statements made here apply equally to the "Air Sanitizer Blue taction".and are to be considered as applicable.

If you have any questions, you can reach me at 0175 / 9150334 or 05661 / 4875.

Kind regards,

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