关于杀毒除菌装置「ＲｅＳＰＲ」使铝表面新型冠状病毒（SARS-CoV-2）失去活性的确认

关于 Recomm Co.Ltd(总部:东京都涉谷区,代表取缔役社长 伊藤 秀博)销售的杀毒除菌装置「ＲｅＳＰＲ」,美国 Wisconsin 大学兽医学部的 Osorio 研究所实验结果表明其可以使新冠病毒失去活性,特此公告。

正文

１.《关于杀毒除菌装置「ＲｅＳＰＲ」使铝表面新型冠状病毒（SARS-CoV-2）失去活性的确认》的报告

「ＲｅＳＰＲ」的制造商 ReSPR TECHNOLOGIES INC.(总部:巴拿马共和国,Christophe Suchy、以下简称「ReSPR 公司」为了确认杀毒除菌装置「ＲｅＳＰＲ」对新冠病毒的灭活性,于 2020 年 6 月中旬向美国 Wisconsin 大学兽医学部的 Osorio 研究所委托实验验证。

实验在 9 月中旬确认可以使新冠病毒失去活性之后,又进行了多种不同暴露时长的实验验证,实验从开始一共历时约 5 个月。美国 Wisconsin 大学兽医学部的 Osorio 研究所于 2020 年 12 月 8 日发布了本公告所附的实验报告,同日 ReSPR 公司接收了这份报告,我司本月 11 日接收到此报告书。我司应 ReSPR 公司要求,在该公司公布实验结果后披露信息,今日特此公告.此外,Wisconsin 大学也参与了东京大学、国立国际医疗研究中心、国立传染病研究所的关于猫之间呼吸器的新型冠状病毒的共同研究。

2.关于对业绩的影响

关于2021年9月期相关业绩的影响,正在进一步确认中,如有需要更新的信息,我司会立即公示

（原文）

REPORT:

SARS-CoV-2 inactivation on aluminum surfaces by RESPR HVAC device

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ABSTRACT

Designing effective methods of SARS-CoV-2 inactivation that can be applied in daily human activities can help diminish the transfer and spread of infectious diseases such as COVID-19. RESPR technology has shown to be effective in reducing pathogens and allergens from the air and from surfaces. It is used in devices that release oxidizing particles to purify the air that people inhale. We tested the SARS-CoV-2 inactivation efficacy of a RESPR HVAC device at different exposure times on aluminum surfaces. A plaque assay was used to measure SARS-CoV-2 titers after 8 different exposure time points (from 10 minutes to 2880 minutes) with the presence of the device. The RESPR HVAC device showed a reduction of 99.991% of the SARS-CoV-2 infectious particles on the aluminum surface after 1440 minutes.

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MATERIALS AND METHODS

Materials infection and sample collection

RESPR HVAC device was placed inside a Biosafety cabinet (BSC) and turned on. Sterile aluminum foil pieces of 24mm x 24mm previously disinfected with 70% ethanol and exposed to UV light for 25 minutes, were individually placed in a petri dish inside the BSC and were kept at room temperature. A 200µl inoculum of 1×10^5 PFU of SARS-CoV-2 was placed and extended on each aluminum piece using a micropipette tip. Three replicates were prepared per treatment and enough samples were prepared to evaluate 8 exposure times (15, 30, 60, 120, 360, 720, 1440 and 2880 minutes) (Table 1).

Following each exposure time, 2ml of collection media (DMEM with 2%FBS) was added to each petri dish, making an initial dilution of 1:11, and the aluminum material was washed out by resuspending four to five times using a micropipette; the viral suspension was collected, mixed for homogeneity and aliquoted into 1ml centrifuge tubes. Each collected sample was immediately labeled and stored at -80°C for titration assays.

Table 1. Evaluated treatments

Virus dose	Exposure time (min)	Treatment
$1x10^5$ PFU/200µl	15, 30, 60, 120, 360, 720, 1440 and 2880	RESPR HVAC

Viral-inactivation quantification

The recovered virus suspension was diluted (10-fold, 3 dilutions: 1/10, 1/100, 1/1000) in a mixing plate in duplicate and added to 96 well Vero E6 seeded plates. Plates were incubated for 1 hour at 37°C. Inoculum was discarded and a 2% carboxymethylcellulose overlay was added and incubated for 24 hours at 37°C. Next, the overlay was discarded, plates washed and fixed for 10 minutes at -20°C (using acetone-Methanol solution). Following fixation, plates were washed two times with PBS-T and a primary antibody (IgG Human anti-Coronavirus, 1:2000) was added and incubated overnight at 37°C. The primary antibody was then discarded, and plates were washed twice with PBS-T. A secondary antibody (Goat IgG Anti-Human HRP conjugated, 1:2000) was added and left to incubate for 2 hours at 37°C. After removing the secondary antibody, plates were washed twice with PBS-T and plaques were developed with a Chromogen substrate. Plaques were counted using Immunospot Image analyzer and open-source software Viridot to determine the viral titer. The titer reduction percentage was calculated using the following formula:

$$Percent\ reduction = \frac{(A - B)\ x\ 100}{A}$$

Where: A is the virus titer with no treatment (Control) or the initial titer; and B is the viral titer after treatment.

RESULTS

Viral titers decreased with time as expected, mean values are reported in table 1 and Figure 1; 24 hours after infection (1440 minutes) the titer was reduced up to 45 FFU/mL.

Table 1. Mean titers and standard deviation of SARS-CoV-2 inoculum collected at different time points (from 0 to 2880 minutes) after infection from 24mm x 24mm aluminum foil pieces exposed to a RESPR HVAC device.

Time (m)	Mean (FFU/mL)	DS
0	5060	479.4789
15	3740	396.6106
30	3410	939.8404
60	2456.67	1045.482
120	1246.67	228.9833
360	110.333	127.0171
720	57.67	63.50853
1440	45.333	0
2880	10.67	0

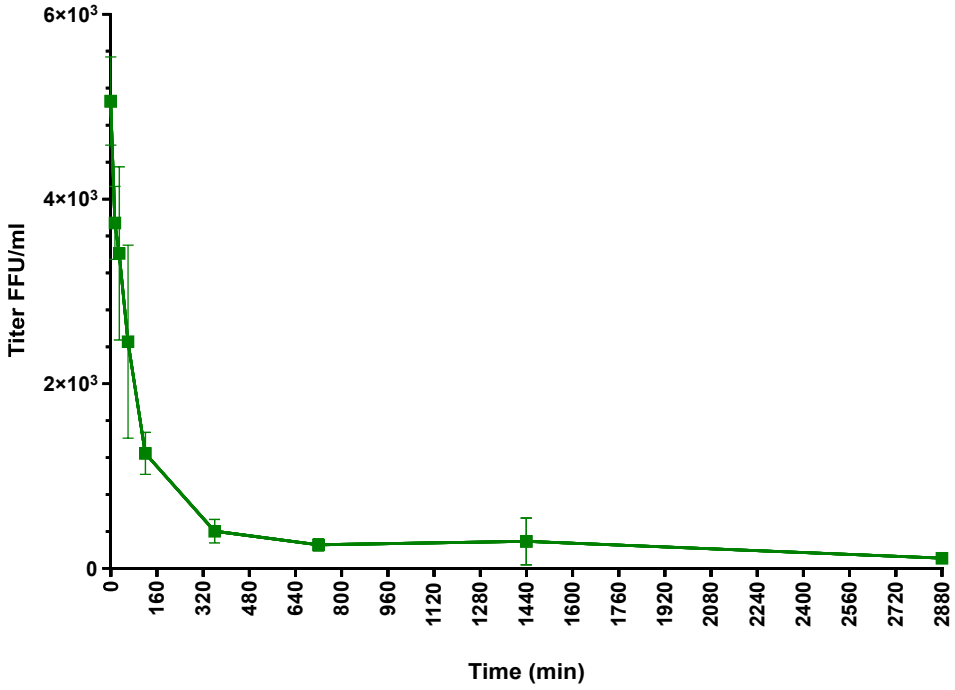

Figure 1. Mean titers and standard deviation of SARS-CoV-2 inoculum collected at different time points (from 0 to 2880 minutes) after infection from 24mm x 24mm aluminum foil pieces exposed to a RESPR HVAC device.

The total reduction of SARS-CoV-2 titer, calculated in relation to the initial inoculum ($\bar{x}$=5.06x10^3 PFU/ml), reached 99.991% after 1440 minutes of exposure (Figure 3).

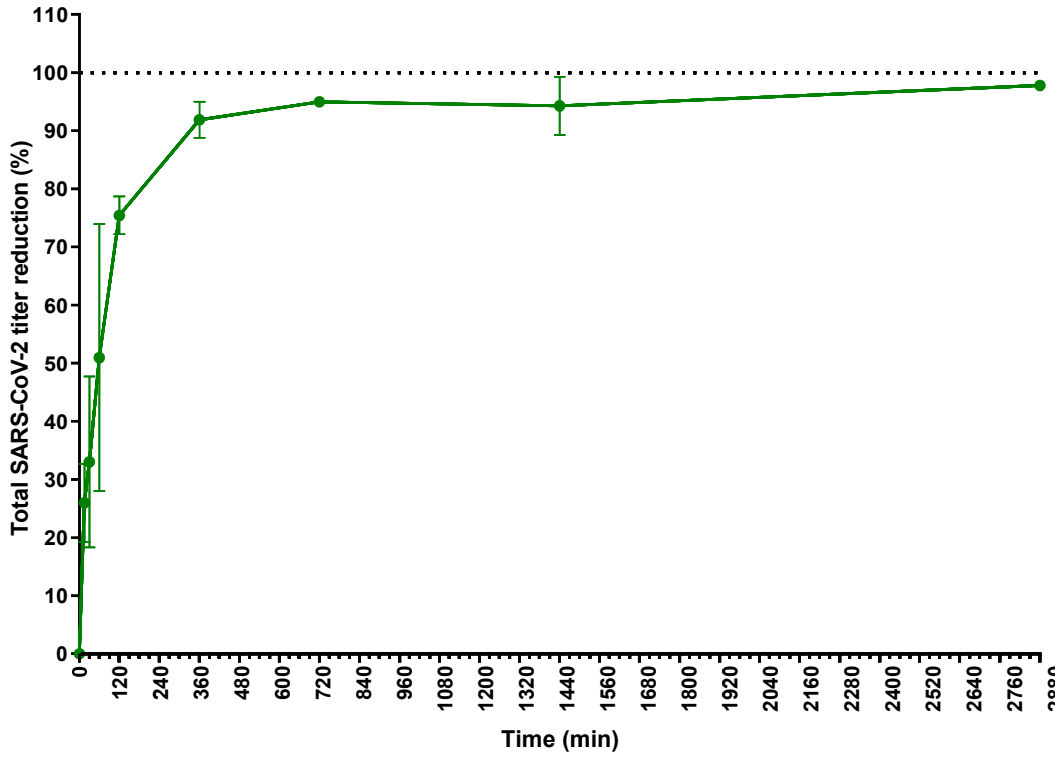

Figure 3. Total reduction (%) of SARS-CoV-2 inoculum collected at different time points (from 0 to 2880 minutes) after infection from 24mm x 24mm aluminum foil pieces exposed to a RESPR HVAC device.

CONCLUSIONS

While using the RESPR HVAC device, a maximum reduction of 99.991% of SARS-CoV-2 infectious particles on an aluminum surface was reached after 1440 minutes of exposure. More than 97.8% of this reduction was detected 360 minutes after the initial exposure.