

Plasma Bioscience Research Center  
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## Plasma Bioscience Research Center

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**PLASQAIR Test Report**

Requested by	Company(name)	Bioplatech Co.,Ltd.
	Address	45, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea
Test Agent	Product Name	PLASQAIR BPT-VA1000
	Manufacturer	Bioplatech Co.,Ltd.
	Product No.	8-809990-035144
Test Organization	Doc Issue No.	2021-PBRC-006
	Name of Test Laboratory	Kwangwoon Univ. Plasma Bioscience Research Center
	Address	101, Dasanjae 20, Kwangwoon-ro, Nowon-gu, Seoul, Republic of Korea
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Tested by	Receipt Date	April 16th, 2021
	Test duration	May 14th, 2021 ~ June 4th, 2021
	Contents of Examination	Coronavirus Test
	Research Director	Eun Ha Choi
Tested by	Research Analysis	Ihn Han
	Research Execution	Ihn Han, Mahmuda Akter

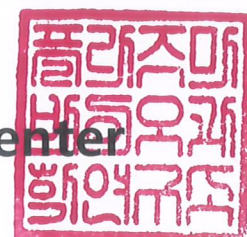
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**June 7<sup>th</sup>, 2021**

**Kwangwoon University**  
**Director of Plasma Bioscience Research Center**

PBRC(Plasma Bioscience Research Center)

Kwangwoon University 01897, Seoul, Republic of Korea

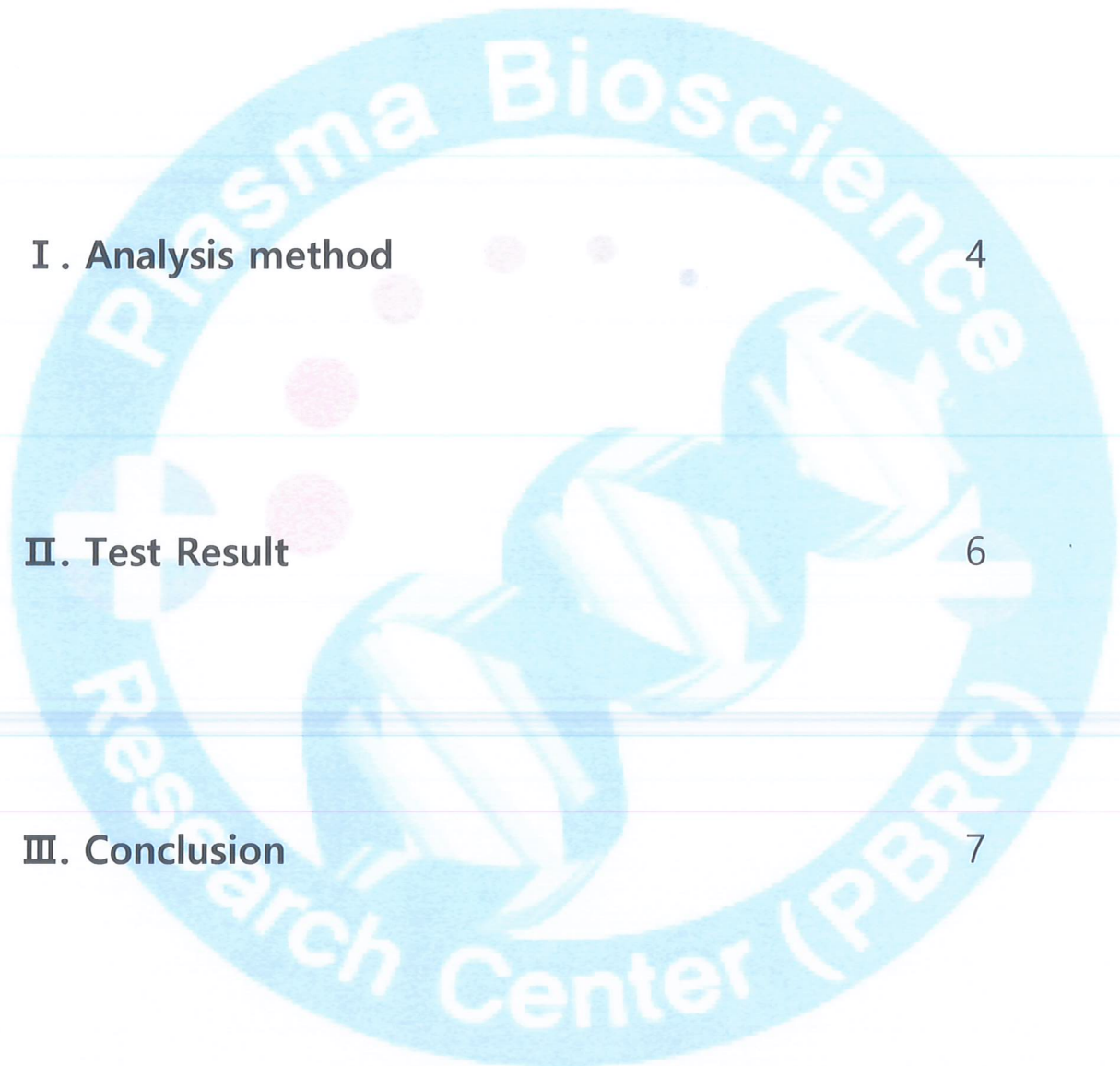


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## I . Analysis methods

<b>1. STUDY TITLE</b>	<b>EVALUATION OF INACTIVATION EFFICACY OF A PLASMA FURIFIER AGAINST CORONA VIRUS – Human alpha-Coronavirus 229E (HVoV-229E)</b>
<b>2. STUDY IDENTIFICATION</b>	<b>PBRC Project No.PBRC-20210416-02</b>
<b>3. TEST STRAIN</b>	<b>Alpha Coronavirus, strain 229E</b>
<b>5. HOST CELL LINE</b>	<b>MRC-5 cells</b>
<b>6. VIRUS PROVIDER</b>	<b>Korea Disease Control and Prevention Agency</b>
<b>7. TEST DEVICE</b>	<b>PLASQAIR (Model No. BPT-VA1000)</b>
<b>8. EXPOSURE(CONTACT) TIME</b>	<b>30 minutes, 1 hour, 4 hours</b>
<b>9. CHAMBER SPACE</b>	<b>2m<sup>3</sup> (2m×1m×1m)</b>
<b>10. TEST GROUP</b>	

- 1) Group 1. Test group. The MRC-5 cells were infected with Alpha Coronavirus and placed into chamber then operated PLASQAIR for 30 mins in the test chamber.
- 2) Group 2. Test group. The MRC-5 cells were infected with Alpha Coronavirus and placed into chamber then operated PLASQAIR for 1 hour in the test chamber.
- 3) Group 3. The MRC-5 cells were infected with Alpha Coronavirus and placed into chamber then operated PLASQAIR for 4 hours in the test chamber.
- 4) Control group. Placed infected MRC-5 with Alpha Coronavirus in the test chamber for 30 mins, one hour and 4 hours each without operation of PLASQAIR device.

## 11. TEST METHOD

- 1). Test Method of Test group. MRC-5 cells were seeded at a density of  $1 \times 10^4$  cells/well on 96 well plates. After 24 hours, cells were infected virus stain with different dilution factor (from  $10^{-1}$  to  $10^{-8}$ ) and then operated the PLASQAIR in the test chamber for the certain time. For this test, each culture medium in 96 well plates contain 100ul.
- 2). Test Method of control group. That is same with the method of test group except for not operating PLASQAIR.
- 3). Cultivated the plate in a cell culture  $CO_2$  incubator for 8 days to analyze the cell Morphology.
- 4). Median Tissue culture infectious dose (TCID<sub>50</sub>) was estimated by evaluating CPE (Cytopathic effect) for 8 days.



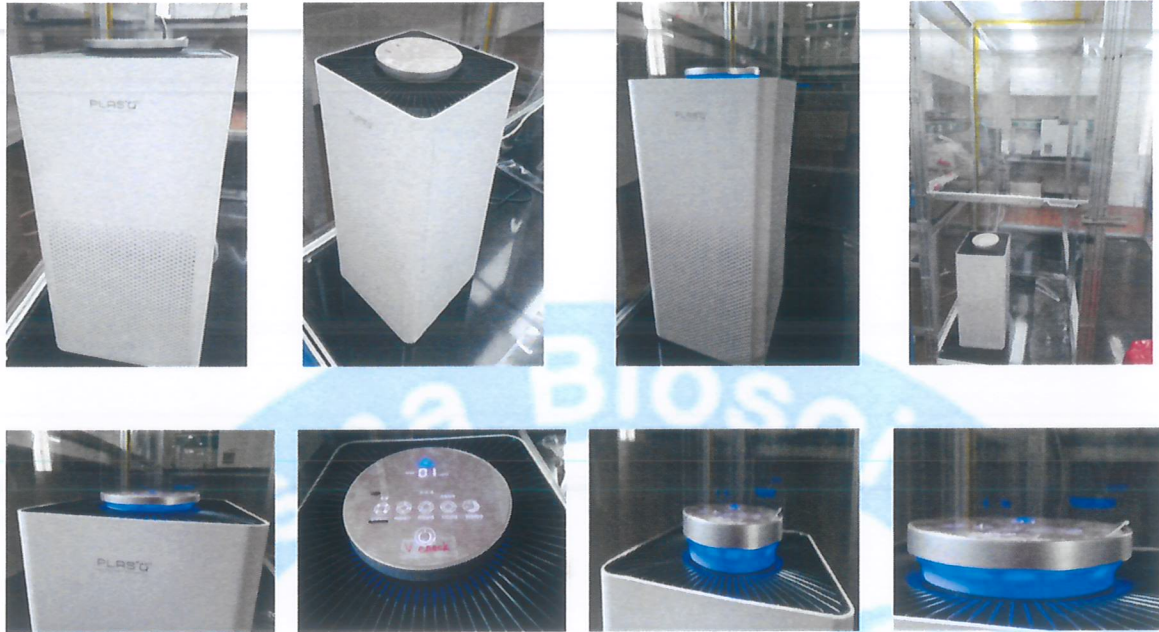


Figure 1. Plasqair in the Test Chamber

## II. Test Result

### Analyzed inactivation ratio of Coronavirus by operating PLASQAIR

<b>CHALLENGE ORGANISM</b>	<b>Coronavirus (229E Virus Strain)</b>
<b>HOST CELL LINE</b>	<b>MRC-5 (Human lung fibroblast cells)</b>
<b>CHAMBER SPACE</b>	<b>2m<sup>3</sup> (2m×1m×1m)</b>
<b>CELL LINE WELL</b>	<b>MRC-5, 1x10<sup>4</sup> cells/well, 96 well plates</b>
<b>TEST AGENT NAME</b>	<b>PLASQAIR BPT-VA1000</b>

<b>Test Result</b>			
<b>Test items</b>	<b>Operated time of Test Device</b>	<b>Result Value (TCID50)</b>	<b>Inactivation ratio</b>
Group1 Control group	-	10 <sup>-6.9</sup> /ml	-
Group1 Test group	30 mins	10 <sup>-5.9</sup> /ml	90%
Group2 Control group	-	10 <sup>-6.7</sup> /ml	-
Group2 Test group	1 hour	10 <sup>-5.1</sup> /ml	97.5%
Group3 Control group	-	10 <sup>-6.8</sup> /ml	-
Group3 Test group	4 hours	10 <sup>-3.7</sup> /ml	99.9%

### III. Conclusion

1. We observed that 90.0% of coronavirus (229E) was inactivated after operating PLASQAIR sterilizer for 30 minutes as a test result of inactivation experiment of infected MRC-5 with Coronavirus(220E) by using PLASQAIR.
2. We observed that 97.5% of Coronavirus (229E) was inactivated after 1 hour of operating PLASQAIR sterilizer as a test result of inactivation experiment of infected MRC-5 with Coronavirus(229E) by using PLASQAIR.
3. We observed that 99.9% of Coronavirus (229E) was inactivated after 4 hours of operating PLASQAIR sterilizer as a test result of inactivation experiment of infected MRC-5 with Coronavirus(229E) by using PLASQAIR.

