





october, 23th 2007

Laboratoire de Virologie et Pathologie Humaine – **FRE CNRS 3011**  
Faculté de Médecine RTH Laennec

## **The effectiveness of BioZone™ technology in destroying H5N2 virus**

**Introduction:** This report depicts the results of tests performed to measure the effectiveness of BioZone™ technology in destroying airborne H5 avian influenza virus.

**Summary:** The tests show that BioZone™ technology destroys the strain of H5 avian flu virus used, reaching up to 5,7 logs (99,9998%) reduction rate in less than 0.44 seconds.

**Method:** The tests were performed by CNRS Lyon FRE 3011 in biosafety level 3 laboratory under Dr Vincent Moules authority. Influenza strain A/Finch/England/2051/91 H5N2 (316.000.000 viruses/ml) was sprayed as an aerosol into an inlet leading into a purification chamber. The first samples were collected from the inlet before the aerosol entered the purification chamber. In the chamber the virus aerosol was subjected to UV light and/or photo plasma based BioZone™ technology, after which the second samples were collected from the outlet. The concentration was then calculated using the "Reed and Muench" statistical method. The test was performed seven times, varying the active components of BioZone™ technology every time.

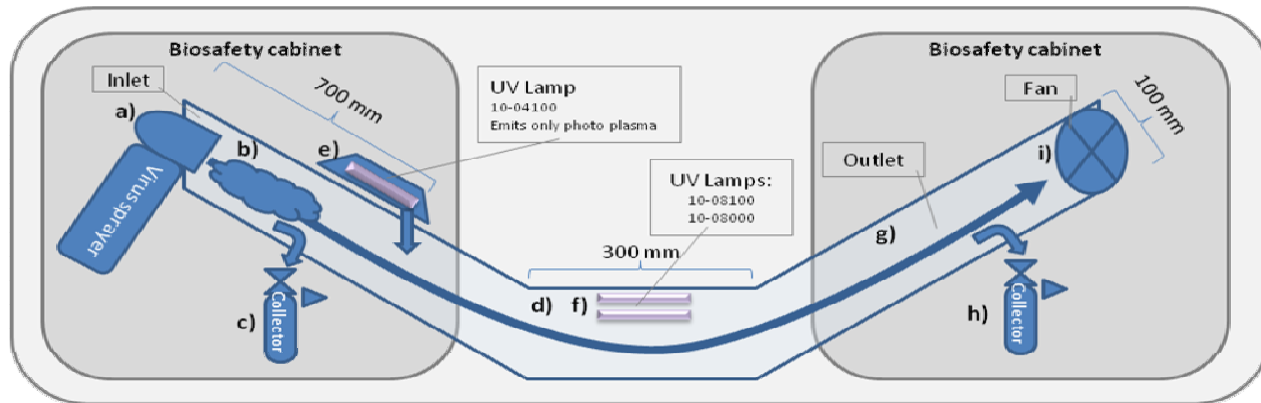
**Notes:** Sampling was performed twice (from the inlet) before the virus aerosol entered the chamber and twice (at the outlet) after the virus aerosol had passed through the chamber. When testing the BioZone™ unit, the virus aerosol was only subjected to photo plasma and not to the UV light.

**Construction:** The tight security measures for handling H5 avian influenza virus necessitated a specific construction for the Device Under Test (DUT) as illustrated in figure 1, the apparatus was composed of the following main parts:

- a) virus sprayer
- b) inlet pipe
- c) inlet collector
- d) purification chamber
- e) BioZone™ unit with one 10-04100 type BioZone™ lamp\*
- f) one type 10-08100 and one 10-08000 type BioZone™ lamp\*
- g) outlet pipe
- h) outlet collector
- i) fan

\* standard 8 Watt, BioZone™ lamps

Figure 1



**Prevailing conditions:**

1. Flow velocity: 0.9m/s
2. Pipe diameter: 100mm
3. Flow rate: 25m<sup>3</sup>/s
4. Reaction time : 0.44s

**Summary of the results:**

Test	Lamp type			Virus count (n/ml)						Rates	
				Sample set alpha		Sample set beta		Average			
	10-08100	10-08000	10-04100 (BioZone Unit)	Before	After	Before	After	Before	After	Survival	Log Reduction
A <sup>1</sup>	-	-	-	316228	12589	794328	7943	555278	10266	1.8489 %	1,73 Log <sup>2</sup>
B	on	on	on <sup>3</sup>	501187	<1 <sup>5</sup>	501187	<1 <sup>5</sup>	501187	<1 <sup>5</sup>	0.0002 %	5,70 Log
C	on	on	-	158489	<1 <sup>5</sup>	158489	<1 <sup>5</sup>	158489	<1 <sup>5</sup>	0.0006 %	5,22 Log
D	on	-	-	7943	<1 <sup>5</sup>	2512	13	5228	7	0.1300 %	2,89 Log
E	-	on <sup>4</sup>	-	158489	25	125893	63	142191	44	0.0310 %	3,51 Log
F <sup>6</sup>	-	-	on <sup>3</sup>	3981	50	79433	158	41707	104	0.2501 %	2,60 Log
G <sup>1</sup>	-	-	-	63096	6310	63096	6310	63096	6310	10.0000 %	1,00 Log

1. A blind test with no UV light or photo plasma produced into the virus aerosol stream.
2. The results were rendered void due to an error in collecting the samples.
3. The BioZone™ unit did not emit any UV light to the stream, only photo plasma.
4. No photo plasma was emitted to the stream, only UV light
5. Concentration was under the detection level
6. Photo plasma concentration was 0.05ppm in the stream.

**Description:**

Test A

This test was a blind test with no UV light or photo plasma produced into the virus aerosol stream. However, the results were rendered void due to an error in collecting the samples.

Test B

Both lamps (10-08100 and 10-08000) were on producing UV light and photo plasma into the virus aerosol stream. In addition, the BioZone unit (with one 10-04100 lamp) was on producing only photo plasma into the virus aerosol stream.

Test C

Both lamps (10-08100 and 10-08000) were on producing UV light and photo plasma into the virus aerosol stream. The BioZone unit was off.

Test D

Only the 10-08100 lamp was on producing UV light and photo plasma into the virus aerosol stream. The 10-08000 lamp and the BioZone unit (with one 10-04100 lamp) were off.

Test E

A type of 08-0000 lamp that does not generate photo plasma was used producing only UV-light into the virus aerosol stream. The 10-08100 lamp and the BioZone unit (with one 10-04100 lamp) were off.

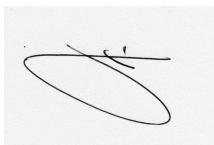
Test F

Only the BioZone unit (with one 10-04100 lamp) was on producing photo plasma, but no UV light into the virus aerosol stream. The photo plasma concentration was 0.05ppm in stream. Both lamps (10-08100 and 10-08000) were off.

Test G

This test was a blind test with no UV-lights or photo plasma produced into the virus aerosol stream.

**Professeur Bruno LINA**



**Docteur Vincent MOULES**

