

# BioZone™ Destroys H5N1 Viruses



- A reduction of 5.7 logs (99.9998%) in less than 0.44 seconds

## The effectiveness of BioZone™ technology in destroying H5N1 virus



**Introduction:** This is a summary of the tests performed to measure the effectiveness of BioZone™ technology in destroying airborne H5N1 avian influenza virus. The complete report is available upon request.

**Laboratory:** The tests were performed by The Centre National de la Recherche Scientifique (CNRS, The National Scientific Research Centre under the authority of France's Ministry of Research ) in bio safety level 3 laboratory in Lyon, France - one of the World Health Organization (WHO) collaborative center for Avian and human influenza viruses.

**Method:** 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 photo plasma-based BioZone™ technology for 0.44 seconds, after which the second samples were collected from the outlet. The concentration was then calculated using the "Reed and Muench" statistical method.

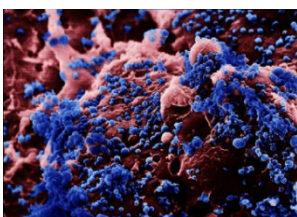
**Results:** The tests show that BioZone™ technology destroys the strain of H5N1 virus, reaching 5.7 logs (99.9998%) reduction rate in less than 0.44 seconds.

## About BioZone Scientific International

**Company:** With over a decade of experience in its field, BioZone Scientific International (BSI) researches, develops and manufactures technology-based solutions for microbial contaminant and VOC originated hygiene and odor problems in human environments. BSI develops best-in-class solutions for specific applications in close collaboration with its customers and distributors.

BioZone solutions, based on multi-faceted technology, are extremely efficient in eradication airborne and surface micro organisms such as viruses and bacteria, mold spores, yeasts and algae as well as volatile organic compounds (VOC). Solutions range from general use products to application specific products, for uses such as public restrooms and ice machines.

Destroys  
99.9998%  
of H5N1





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## **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.

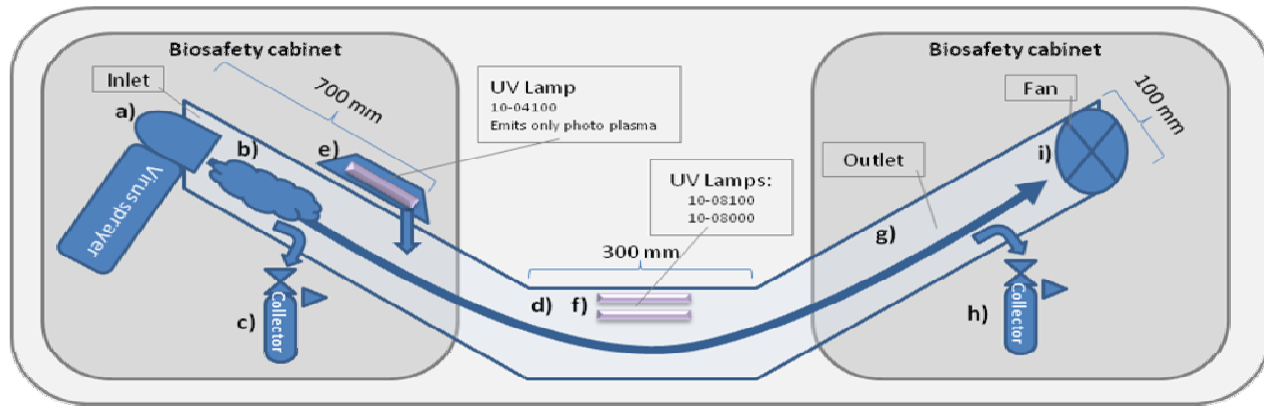
**Construction:** The tight security measures for handling H5 avian influenza virus necessitated a specific construction for the Device Under Test (DUT) as illustrated in figure 1, the apparatus was composed of the following main parts:

- 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

Ref. DE082\_2007

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 %      |
| 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.

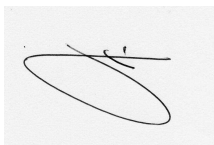
### Test F

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**

