Puristic *Provides hygienic and safe Space!*

Puristic is the portable kit generating chlorine dioxide that is very effective in reducing floating bacteria and virus in living spaces.

Spatial Disinfection Kit

***Eco-Friendly* Disinfectant, Deodorant**

Chlorine Dioxide (ClO_2) Strong & Safe

Reduction of
Bad pathogen, Virus, Fungi
floating in the air

Eco-Friendly Disinfectant Deodorant

Safe

- Material recognized by KFDA, US FDA, WHO, NASA
- Ranked A1 same as Salt, Sugar
- sanitizer used for disinfecting edible water and food

Strong

- Disinfecting power reducing virus up to protozoa compared to existing disinfectants such as chlorine, ozone, bromine chloride, etc.
- 2.5 time stronger than chlorine species
  500K times stronger than alcohol

Eco-friendly

- No DBP (Disinfection By Products such as THMs, HAAs)
- Gas Phase @ STP, Easy Photo dissociation– No residue

De-smelling

- effectively eliminating bad smells caused by ammonia, Hydrogen sulfide, Methyl mercaptan, phenol, etc. by destroying or oxidizing them.

PURISTIC Disinfection Effects

No More Worries with Pathogen, Virus, Bad Smells

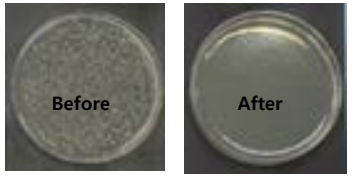
reduction of **floating virus**

reduction of **floating pathogen**

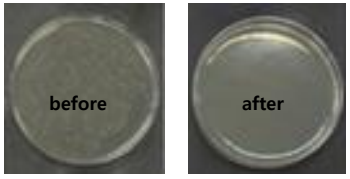
reduction of **floating fungi**

Efficient de-smelling

- **Disinfection experiments : 99.9% effects**
  - Korea conformity Lab (KCL – Org' authorized by governments)



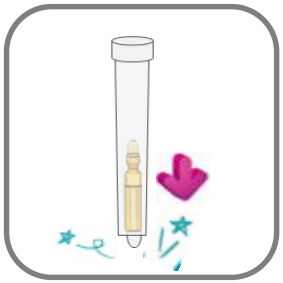
Test result with pneumonia



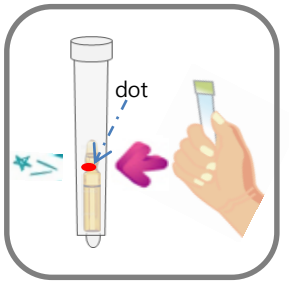
Test result with MRSA(a super bacteria)

Without special equipment, materials

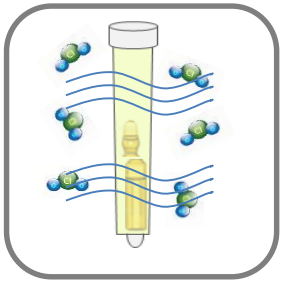
- Easy and Simple to Any user



1. Tap the stick downward to get the inner ampoule down.



2. Snap the stick to break ampoule neck, with positioning the dot upright.

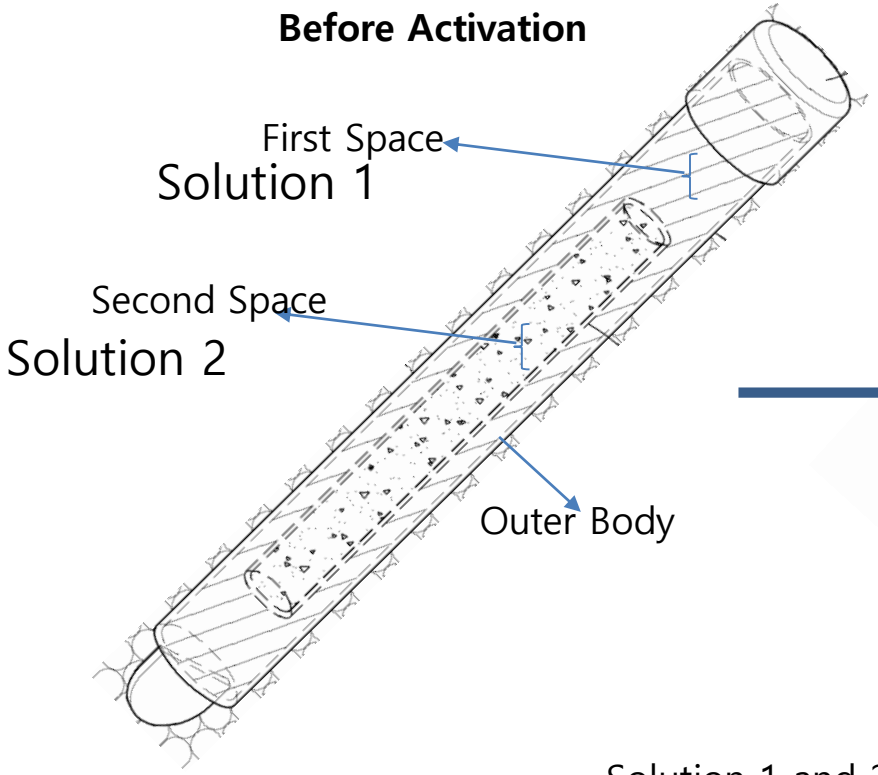


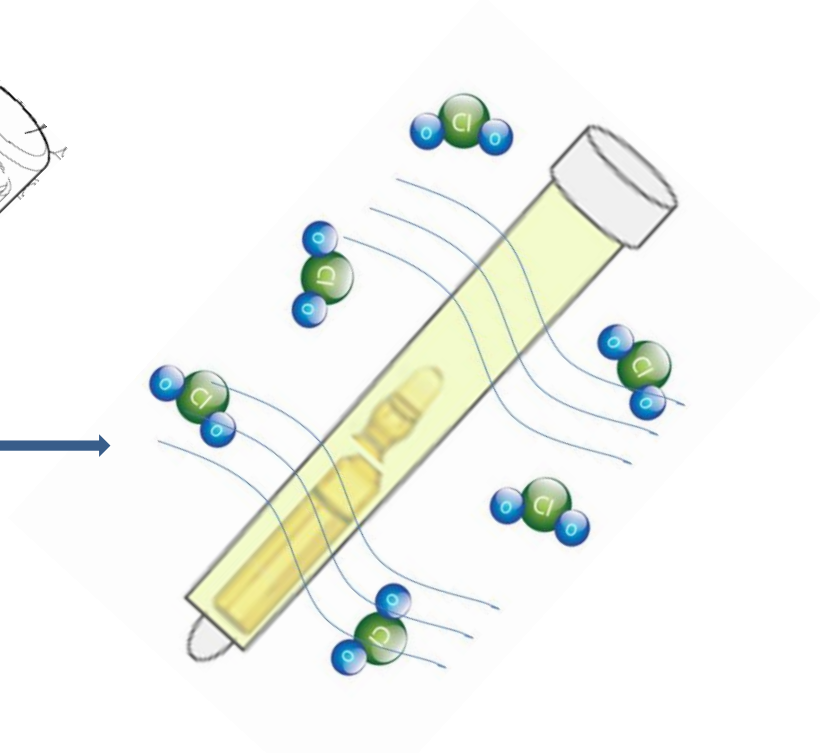
3. Content turns yellow and it begin emitting out ClO_2 slowly through whole surface of the body.

4. Roughly 20 days after, it turns white. Then dispose of it with regular trash.

Puristic *How it was made and works?*

Before Activation





After Activation

Solution 1 and 2 reacts to generate ClO_2
which is solved in liquid as GAS. Over the time,
this gas emits out through the whole outer body.
The material (Made of PE) genuine structure allows emission of ClO_2
going outside from first space.

Puristic Hazardous Concern Inspection Result!

the way to trust KCL **Inspection Report**

1. Inspection results As a Deodorant

1.1 Standards for hazardous ingredient Registered inspection No. : C-A10B-H013001-A150

No.	Properties of inspection	Unit	Limit	Result	Rating
1	Formaldehyde	mg/kg	≤ 25	Not detected (dectection limit 5)	Pass
2	Methanol	mg/kg	≤ 2 000	Not detected (dectection limit 100)	Pass
3	Ethylene oxide	mg/kg	≤ 4 000	Not detected (dectection limit 5.0)	Pass
4	Naphthalene	mg/kg	≤ 2 000	Not detected (dectection limit 1.0)	Pass
5	Chlorine Dioxide	mg/kg	-	Not applicable	-
6	3-iodine-2-propynyl butyl acid Cava	mg/kg	-	Not applicable	-
7	Argentum	mg/kg	-	Not applicable	-
8	Benzene	mg/kg	≤ 1 000	Not detected (dectection limit 0.1)	Pass
9	Glyoxal	mg/kg	≤ 100	Not detected (dectection limit 2)	Pass
10	Trichlorethylene	mg/kg	≤ 4	Not detected (dectection limit 0.05)	Pass

1. Inspection results As a Disinfectant

1.1 Standards for hazardous ingredient Registered inspection No. : C-B01B-H001001-A150

No.	Properties of inspection	Unit	Limit	Result	Rating
1	Formaldehyde	mg/kg	≤ 100	Not detected (dectection limit 5)	Pass
2	Acetaldehyde	mg/kg	≤ 90	23	Pass
3	Chloroform	mg/kg	≤ 30	21.5	Pass
4	Benzene	mg/kg	≤ 60	Not detected (dectection limit 0.1)	Pass

1.2 Appearance

No.	Requirement	Result	Rating
1	No inclusion of any foreign material and other contamination.	No abnormality	Pass
2	Clean appearance and no risky area such as sharp point, etc.	No abnormality	Pass
3	No structural defect and leakage of any content.	No abnormality	Pass
4	Use a proper vessel in accordance with the High Pressure Gas Safety Control Act and no flow state after spraying. (Aerosol products only)	Not applicable	-
5	Adhesive should be eluted from the vessel	Not applicable	-

1.3 Strength and leak of vessel (only for liquid products)

No.	Requirement	Result	Rating
1	No failure of sample after a vessel strength test according to the 'Designation, Safety and Marking Standards for Products with Hazard Concern'	No abnormality	Pass
2	No failure of sample after a vessel leak test according to the 'Designation, Safety and Marking Standards for Products with Hazard Concern'	No abnormality	Pass

Puristic

Safety Test Certification → Sellable in market
by KCL(Government Authorized Organization)

Products with Hazard Concern Inspection Report	▪ Disinfectant C-B01B-H001001-A150 ▪ Deodorizer C-A01B-H013001-A150	Based on Laws of "Chemical material registration and evaluation" - Conforms to Safety Standards

the way to trust KCL **Inspection Report**

Registered inspection No. : C-B01B-H001001-A150 1/4

1. Applicant

Report No. HT15-01705	Receipt date 30 Jul. 2015	Registration Purpose Initiation
Company name PURGOFARM CO.,LTD.	Business registration No. 142-81-31198	Name (Representative) KIM, JONG RAK
Tel. 82-70-4047-8181	Fax. 82-31-359-9280	Email jjlkim@naver.com
Address 4-13, Gyehyangbuk-gil, Jeongnam-myeon, Hwaseong-si, Gyeonggi-do, Korea		

2. Inspection item

Item category Disinfectant	HS code -	Model name Puristic
Manufacturer PURGOFARM CO.,LTD.	Country of origin Republic of Korea	Importer name -
Specification(Capacity, Net) 6 mL	Classification of item category under safety and marking standards Use: Chlorine antiseptic Type: Fumigation type	

3. **Inspection period:** 30 Jul. 2015 ~ 01 Sep. 2015
4. **Inspection method:** Ministry of environment notice No. 2015-86 'Designation, Safety and Marking Standards for Products with Hazard Concern'.
5. **Environmental condition:** Temperature (15 ~ 27) ℃, humidity (35 ~ 55) % R.H.
6. **Overall rating:** Pass (vessel strength test: Pass)
7. **The inspection results and the sample photo:** See the attacments.

Inspected by : Cho, Jin Beom C.J.B | Approved by : Cho, Hoon Sik Cho

Note 1. This report represents the inspection results for the samples only supplied by the applicant according to the requested inspection method.
2. This report is not intended to guarantee quality and/or performance for the entire products.
3. This report can be used only for identifying whether samples meet the Standards for products with hazard concern or not, and any use other than the specified use is prohibited.
4. Any sample which has failed the vessel strength test shall be completed a re-test by the expiration date of the period of grace.

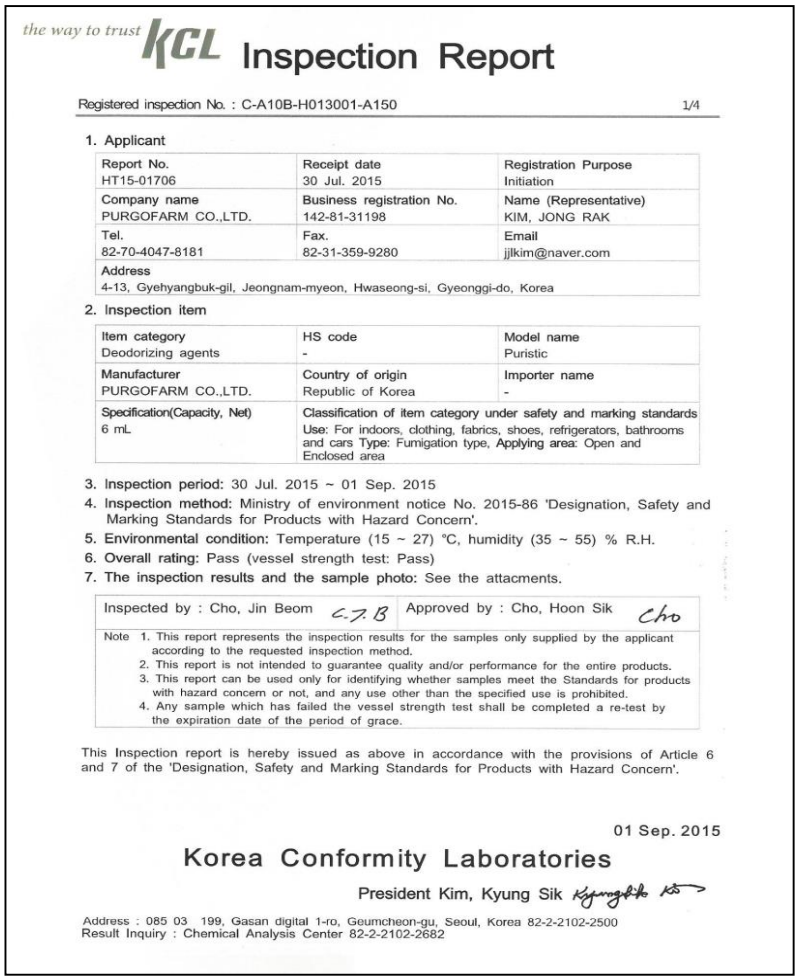
This Inspection report is hereby issued as above in accordance with the provisions of Article 6 and 7 of the 'Designation, Safety and Marking Standards for Products with Hazard Concern'.

01 Sep. 2015

Korea Conformity Laboratories

President Kim, Kyung Sik

Address : 085 03 199, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea 82-2-2102-2500
Result Inquiry : Chemical Analysis Center 82-2-2102-2682



the way to trust KCL **Inspection Report**

Registered inspection No. : C-A10B-H013001-A150 1/4

1. Applicant

Report No. HT15-01706	Receipt date 30 Jul. 2015	Registration Purpose Initiation
Company name PURGOFARM CO.,LTD.	Business registration No. 142-81-31198	Name (Representative) KIM, JONG RAK
Tel. 82-70-4047-8181	Fax. 82-31-359-9280	Email jjlkim@naver.com
Address 4-13, Gyehyangbuk-gil, Jeongnam-myeon, Hwaseong-si, Gyeonggi-do, Korea		

2. Inspection item

Item category Deodorizing agents	HS code -	Model name Puristic
Manufacturer PURGOFARM CO.,LTD.	Country of origin Republic of Korea	Importer name -
Specification(Capacity, Net) 6 mL	Classification of item category under safety and marking standards Use: For indoors, clothing, fabrics, shoes, refrigerators, bathrooms and cars Type: Fumigation type, Applying area: Open and Enclosed area	

3. **Inspection period:** 30 Jul. 2015 ~ 01 Sep. 2015
4. **Inspection method:** Ministry of environment notice No. 2015-86 'Designation, Safety and Marking Standards for Products with Hazard Concern'.
5. **Environmental condition:** Temperature (15 ~ 27) ℃, humidity (35 ~ 55) % R.H.
6. **Overall rating:** Pass (vessel strength test: Pass)
7. **The inspection results and the sample photo:** See the attacments.

Inspected by : Cho, Jin Beom C.J.B | Approved by : Cho, Hoon Sik Cho

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Address : 085 03 199, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea 82-2-2102-2500
Result Inquiry : Chemical Analysis Center 82-2-2102-2682

※ Main Authority : Ministry of Environments, Test Organization: Korea Conformities Laboratories

Puristic : CD Inhalation Toxicity Study !

Akamatsu *et al. Journal of Occupational Medicine and Toxicology* 2012, **7**:2
http://www.occup-med.com/content/7/1/2

JOURNAL OF OCCUPATIONAL MEDICINE AND TOXICOLOGY

Six-month low level chlorine dioxide gas inhalation toxicity study with two-week recovery period in rats

Akinori Akamatsu[1,2*], Cheolsung Lee[1], Hirofumi Morino[1], Takanori Miura[1], Norio Ogata[1] and Takashi Shibata[1]

Abstract

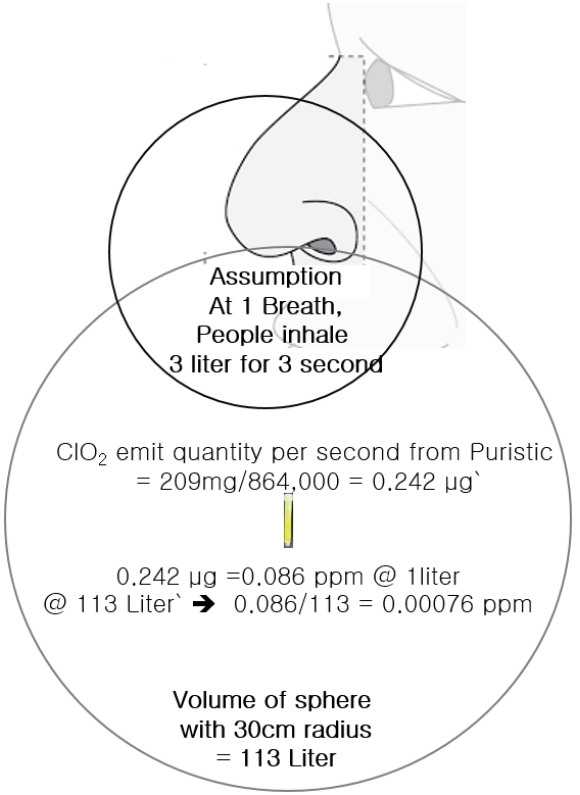
Background: Chlorine dioxide (CD) gas has a potent antimicrobial activity at extremely low concentration and may serve as a new tool for infection control occupationally as well as publicly. However, it remains unknown whether the chronic exposure of CD gas concentration effective against microbes is safe. Therefore, long-term, low concentration CD gas inhalation toxicity was studied in rats as a six-month continuous whole-body exposure followed by a two-week recovery period, so as to prove that the CD gas exposed up to 0.1 ppm (volume ratio) is judged as safe on the basis of a battery of toxicological examinations.

Methods: CD gas at 0.05 ppm or 0.1 ppm for 24 hours/day and 7 days/week was exposed to rats for 6 months under an unrestrained condition with free access to chow and water in a chamber so as to simulate the ordinary lifestyle in human. The control animals were exposed to air only. During the study period, the body weight as well as the food and water consumptions were recorded. After the 6-month exposure and the 2-week recovery period, animals were sacrificed and a battery of toxicological examinations, including biochemistry, hematology, necropsy, organ weights and histopathology, were performed.

Results: Well regulated levels of CD gas were exposed throughout the chamber over the entire study period. No CD gas-related toxicity sign was observed during the whole study period. No significant difference was observed in body weight gain, food and water consumptions, and relative organ weight. In biochemistry and hematology examinations, changes did not appear to be related to CD gas toxicity. In necropsy and histopathology, no CD gas-related toxicity was observed even in expected target respiratory organs.

Conclusions: CD gas up to 0.1 ppm, exceeding the level effective against microbes, exposed to whole body in rats continuously for six months was not toxic, under a condition simulating the conventional lifestyle in human.

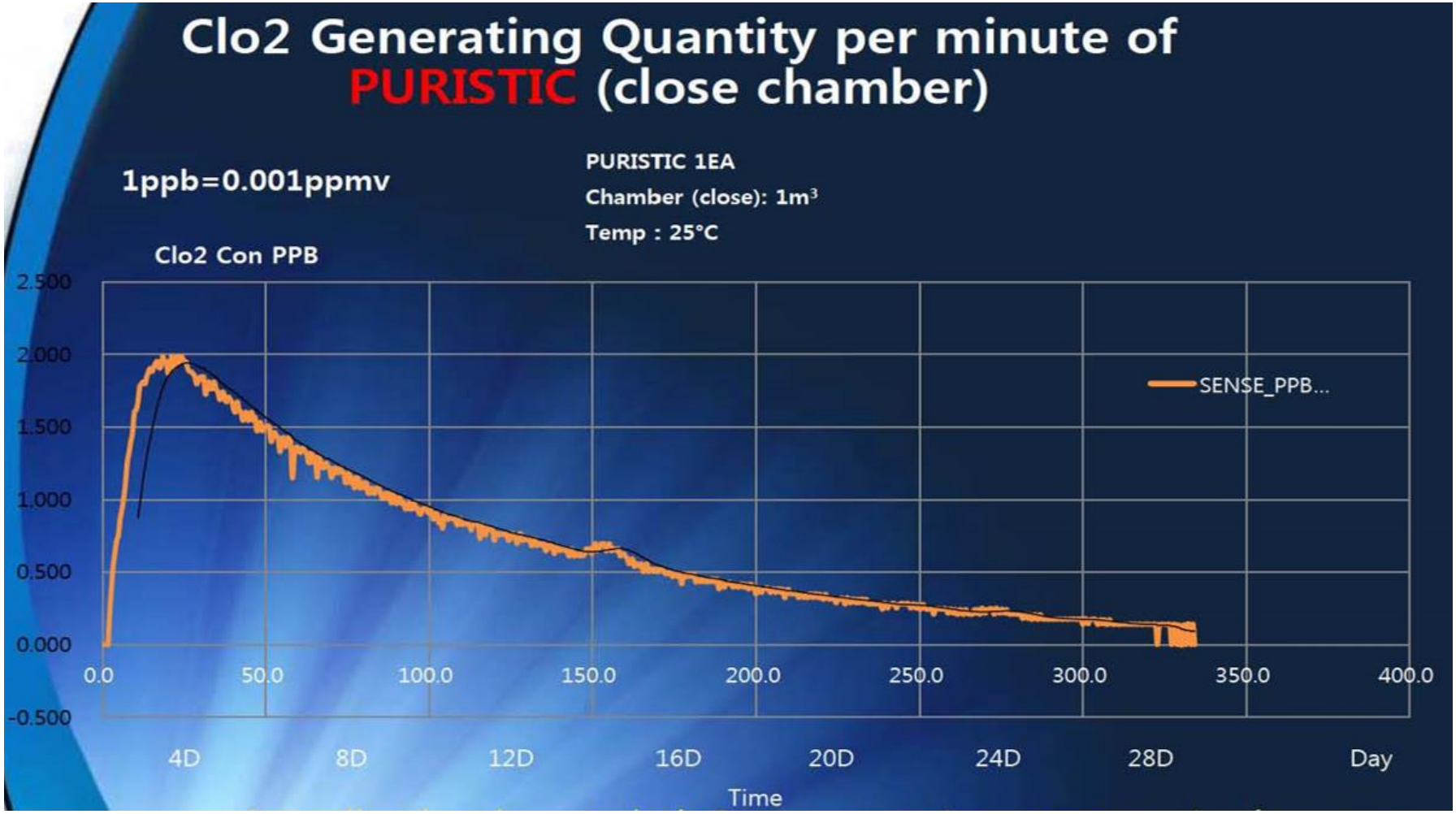
Keywords: Chlorine dioxide, Gas, Inhalation, Long-term, Toxicity, Whole body



Conclusions: CD gas up to 0.1 ppm, exceeding the level effective against microbes, exposed to whole body in rats continuously for six months was not toxic, under a condition simulating the conventional lifestyle in human.

Puristic Actual Measurement Record !

2ppb @ day 2 ~ 0.25ppb @ day 21



Puristic Virucidal , Antiviral effects confirmation

Influenza A (H1N1) Virus test result

2015. Federation Meeting of Korean Basic Medical Scientists

Dual Antiviral and Virucidal Effects of Chlorine Dioxide on Influenza A Virus

Bo-Hye Shin[1], Kyoung Ju Song[2], Jong Rak Kim[2] and Kyongmin Kim[1]
[1]Department of Microbiology, Ajou University School of Medicine, Suwon, Korea
[2]Purgofarm Co.Ltd, Hwasung, Korea

ABSTRACT

Chlorine dioxide, ClO_2, gas is a powerful disinfectant which is 2.5 and 500,000 times more effective than chlorine-based disinfectants and alcohol, respectively. In this study, we examined whether chlorine dioxide inhibits the proliferations of Influenza A viruses and then how effective this chlorine dioxide to kill the influenza A viruses. Chlorine dioxide gas was induced from "farm-e Tok". "Farm-e Tok" is a ready-to-use product, without necessitating ClO_2 gas generator on site. The treated concentration of ClO_2 was 0.016ppmv/min. First, we inoculated influenza A viruses into 11-day old embryonated eggs and incubated one more day at 37°C. Next day, we exposed chlorine dioxide to virus-inoculated experimental eggs but not to virus-inoculated control eggs, and incubated further for 48 hrs at 37°C. At 3 days post-infection, amniotic fluids were collected to harvest Influenza A viruses and titrated by plaque assay on Madin-Darby canine kidney (MDCK) cells. Titer of control viruses reached 6.8×10^8 plaque forming unit (PFU). Whereas, titer of experimental eggs, which were exposed with chlorine dioxide for 2 days, was 1.0×10^5 PFU, demonstrating that chlorine dioxide gas inhibits the proliferation of Influenza A viruses. On the second experiment, we exposed chlorine dioxide gas directly to the aliquots of influenza A viruses to examine the virucidal effect of chlorine dioxide. To start this experiment, we activated chlorine dioxide batch for 11 hrs, then aliquots of viruses were exposed to chlorine dioxide gas for 1, 6, or 12 hrs, respectively and titrated by plaque assay on MDCK cells. Virus titers were about 2,000 times lower after 6 hrs exposure and more than 3-logs lower after 12 hrs exposure, however control virus titers were slightly deceased with 4.6 times after 12 hrs. Taken together, we suggest that chlorine dioxide gas has dual antiviral and virucidal effects on influenza A viruses.

INTRODUCTION

Chlorine Dioxide is ...

ClO_2

- Effective at low dosages
- Disinfection activity is very fast
- Excellent for removing biofilm
- Has 2.6 times the oxidising capacity of chlorine
- Effective over a broad pH range (up to pH 12) with no loss of activity
- Does not chlorinate organics or react with ammonia
- Does not hydrolyse in water to form hyperchlorous or hydrochloric acids.
- Less corrosive than chlorine.
- Highly soluble in water
- No hazardous residues
- Chlorine dioxide residual does not last as long as chlorine.

MATERIALS and METHODS

✓ **Antiviral Effect of Chlorine Dioxide Gas on Propagating Influenza A Viruses in Embryonated Eggs.**

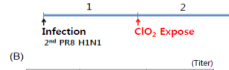
100 µl of H1N1 Influenza A virus was inoculated to 11 day-old embryonated eggs
↓ 2nd H1N1
Incubated one more day at 37°C.
Next day, expose chlorine dioxide gas to virus inoculated eggs
(To evaluate the egg's conditions, non-infected control eggs were incubated for 3 days with and without chlorine dioxide)
↓
3 days post-infection, amniotic fluids were harvested and influenza A viruses were titrated by plaque assay on MDCK cells.

✓ **Virucidal Effect of Chlorine Dioxide gas on Influenza A Virus**

Activate chlorine dioxide batch for 11 hrs before exposure to viruses (Broke the "Farm e-Tok")
↓ 5hr <– activation
Aliquots of H1N1 Influenza A virus in 24 well plate were exposed to chlorine dioxide gas for 1, 6, and 12 hrs
↓ At RT
Titrate Influenza A virus by plaque assay on MDCK cells

RESULTS

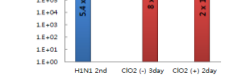
(A) Anti viral effect – on propagating virus in embryonated egg



(B)

(Titer)		
H1N1 2nd	ClO_2 (-) 3day	ClO_2 (+) 2day
5.4×10^8	8×10^8	2×10^6

(C)



(D)

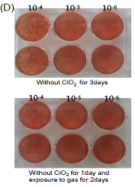
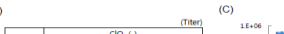


Fig 1. Antiviral effect of chlorine dioxide on propagating influenza A virus in embryonated eggs. Eggs amniotic fluids were harvested and titrated by plaque assay on MDCK cells. Reference virus (H1N1 2nd passage) titer was 5.4×10^8 plaque forming unit (PFU). 3 days after reference virus inoculation, non-exposed control viruses reached to 8×10^8 PFU. Whereas, virus titer was 2×10^6 PFU when chlorine dioxide was exposed to experimental group for 2 days, demonstrating that chlorine dioxide gas may have antiviral effect on Influenza A viruses.

(A) The virucidal effect

ClO_2 Stick (Farm-e Tok) Broken



(B)

(Titer)			
Control	ClO_2 (-)		
	1hr	6hr	12hr
3.7×10^5	2.4×10^5	1.1×10^5	5.1×10^4
	3×10^5	1.3×10^4	2.7×10^2
	1hr	6hr	12hr
	ClO_2 (+)		

(C)

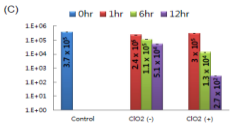


Fig 2. Virucidal effect of chlorine dioxide on Influenza A viruses. Aliquots of Influenza A viruses were directly exposed to the chlorine dioxide gas. We activated chlorine dioxide batches for 11 hrs, then place each batch to the sealed box with aliquot of viruses in it. Viruses will be exposed to chlorine dioxide gas for 1, 6, or 12 hrs, respectively, and titrated by plaque assay on MDCK cells. Titer of control virus, H1N1 3rd, was 3.7×10^5 PFU. Virus titers were decreased about 2,000 times after exposure for 6 hrs and more than 3-logs after exposure for 12 hrs. However non-exposed control virus titers were deceased slightly such as 4.6 times below after 12 hrs. Chlorine dioxide gas was acting as the virucides on influenza A viruses.

CONCLUSION

- ✓ ClO_2 gas is a powerful disinfectant which is 2.5 and 500,000 times more effective than chlorine-based disinfectants and alcohol.
- ✓ ClO_2 gas has antiviral effect on influenza A viruses.
- ✓ Also ClO_2 gas acts as a 'virucide' which it can kill Influenza A viruses.
- ✓ Taken together, we suggest that this chlorine dioxide gas can act as dual antiviral and virucidal agents on influenza A viruses
- ✓ When epidemics of avian flu are emerging, this gas can be used to disinfect contaminated eggs, poultry, and so on. at the same time, this may kill propagating viruses in eggs, if any.

PURGO FARM
아주대학교

Corona Virus test result

2016. The Korean Society of Virology

Virucidal Effect of Gaseous Chlorine Dioxide on Murine Coronavirus A59

Jumi Kim[1], Bo-Hye Shin[1], Kyoung Ju Song[2], Jong Rak Kim[2], Kyongmin Kim[1]

[1]Department of Microbiology, Ajou University School of Medicine
[2]Purgofarm Co. Ltd.

ABSTRACT

Chlorine dioxide, ClO_2, gas is a powerful disinfectant which is 2.5 and 500,000 times more effective than chlorine-based disinfectants and alcohol, respectively. In this study, we examined whether gaseous chlorine dioxide can inactivate murine coronavirus A.59. Chlorine dioxide gas was induced from the Puristic™. Puristic™ is a ready-to-use product, without necessitating ClO_2 gas generator on site. The treated concentration of ClO_2 was 0.16ppmv/min. We exposed chlorine dioxide gas directly to the aliquots of murine coronavirus A.59 to examine the virucidal effect of chlorine dioxide gas. To begin with, we activated chlorine dioxide batch for 11 hrs, then aliquots of viruses were exposed to chlorine dioxide gas for 1, 6, or 12 hrs, respectively and titrated by plaque assays on delayed brain tumor cells. After 6 hrs, the titer of gaseous chlorine dioxide-exposed virus was about 3.5 times lower than that of non-exposed control virus. Compared to 9.5×10^3 plaque forming unit/ml of murine coronavirus A.59 after 12 hrs of non-exposure, there were no viable virus after 12 hrs exposure. It should be noted here that gaseous chlorine dioxide can inactivate murine coronavirus A.59 in 8% normal bovine serum containing viral inoculum, demonstrating that chlorine dioxide gas may act as a virucide even in high concentrations of organic material. Taken together, the gaseous chlorine dioxide may suggest the new paradigm of disinfection system to block the pathogenic viral infections from abroad and the secondary infections, therefore preventing the drastic socie-economic impact by emerging viral infections, which we have learned from MERS outbreak.

MATERIALS and METHODS

(A) Virucidal Effect of Chlorine Dioxide gas on Influenza A virus

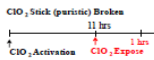
1. Activate chlorine dioxide batch for 11 hrs before exposure to viruses (Broke the "Puristic").
2. Aliquots of H1N1 Influenza A virus in 24 well plate were exposed to chlorine dioxide gas for 1, 6, and 12 hrs.
3. Titrate Influenza A virus by plaque assay on MDCK cells.

(B) Virucidal Effect of Chlorine Dioxide gas on murine coronavirus A59

1. Activate chlorine dioxide batch for 11 hrs before exposure to viruses (Broke the "Puristic").
2. Aliquots of murine coronavirus A.59 in 24 well plate were exposed to chlorine dioxide gas for 1, 6, and 12 hrs.
3. Titrate murine coronavirus A.59 by plaque assay on DBT cells.

RESULTS

(A) Virucidal effect of Influenza A virus



(B)

(Titer)		
Control		3.7×10^5
ClO_2 (-)	1 hrs	2.4×10^5
	6 hrs	1.1×10^5
	12 hrs	5.1×10^4
ClO_2 (+)	1 hrs	2.4×10^5
	6 hrs	1.3×10^4
	12 hrs	2.7×10^2

(C)

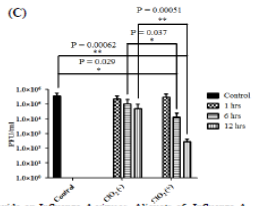


Fig 1. Virucidal effect of chlorine dioxide on Influenza A viruses. Aliquots of Influenza A viruses were directly exposed to the chlorine dioxide gas. We activated chlorine dioxide batches for 11 hrs, then place each batch to the sealed box with aliquot of viruses in it. Aliquoted viruses will be exposed to chlorine dioxide gas for 1, 6, or 12 hrs, respectively, and titrated by plaque assay on MDCK cells. Titer of control virus, H1N1 3rd, was 3.7×10^5 PFU/ml. Compared to non-exposure control virus, virus titers were decreased about 8.3 times after exposure for 6 hrs. Also, Virus titers were reduced about 186 times after 12 hrs exposure. 4 independent experiments were performed and results are shown as mean ± SD (*p<0.05, **p<0.01).

(A) Virucidal effect of murine coronavirus A59

(B)

(Titer)		
Control		3.1×10^8
ClO_2 (-)	1 hrs	1.0×10^8
	6 hrs	1.4×10^7
	12 hrs	9.5×10^3
ClO_2 (+)	1 hrs	1.0×10^7
	6 hrs	4.0×10^6
	12 hrs	0

(C)

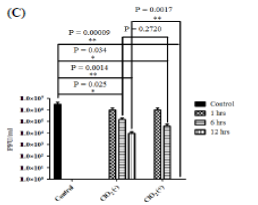


Fig 2. Virucidal effect of chlorine dioxide on murine coronavirus A59. Murine coronavirus A59 were exposed to the chlorine dioxide gas for 1, 6, or 12 hrs, respectively, and then we determined the titer of viruses by plaque assay on DBT cells. Control virus titer was 3.1×10^8 PFU/ml. Virus titers were decreased about 3.5 times after exposure for 6 hrs. There were no viable virus after 12 hrs exposure. 4 independent experiments were performed and results are shown as mean ± SD (*p<0.05, **p<0.01).

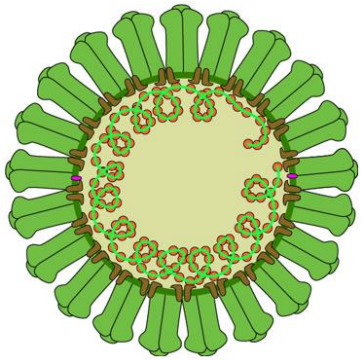
CONCLUSION

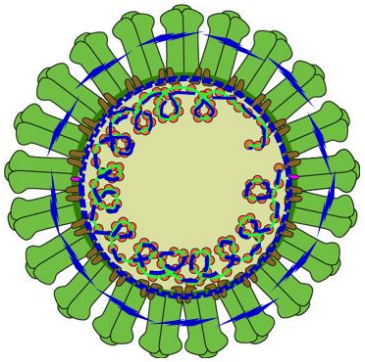
- **After 6 hrs of ClO_2 exposure, the titers of ClO_2-exposed Influenza A virus and murine coronavirus A59 were decreased about 8.3 and 3.5 times, respectively, than those of non-exposed control viruses.**
- **Also after 12 hrs exposure, Influenza A virus titer was 186 times lower than the control.**
- **After 12 hrs exposure, there were no viable murine coronavirus A59 virus after 12 hrs exposure.**
- **Taken together, the gaseous chlorine dioxide may suggest the new paradigm of disinfection system to block the pathogenic viral infections.**

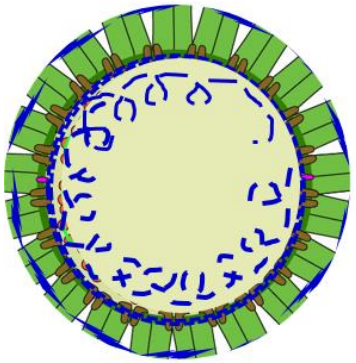
아주대학교 의과대학

Puristic *nascent Oxygen Effects*

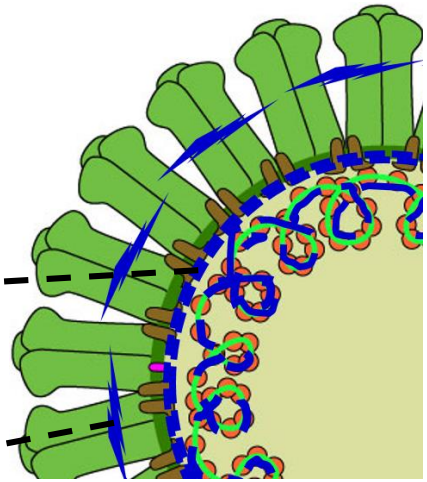
Kiil Virus



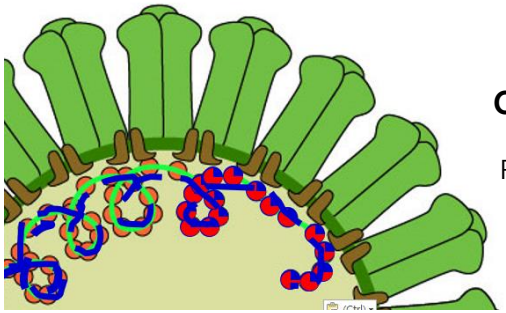




Oxidation of lipids
Swollen Membrane
➔
Loss of Protection of
Protein Coat and Nucleic Acid



Oxidation of polysaccharides
Broken Spikes and
Loss of cell binding power



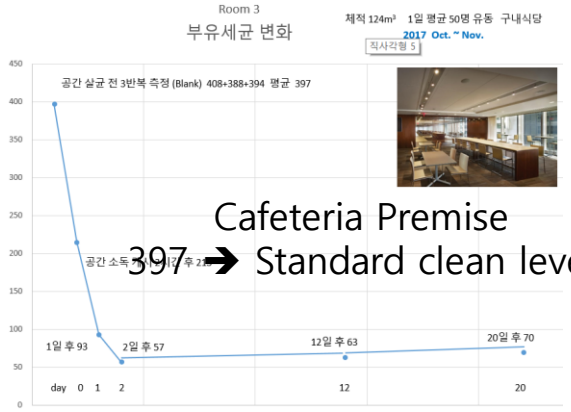
Oxidation of protein
Coat Disruption
Reduced Attaching Power
Disclosure of N Acid

Oxidation of nucleic acid (RNA)
fragmentation into several short chains
PH of **nucleic acid promote**
release of nascent oxygen

Italy - Test result

@ Office room, Meeting room, Cafeteria Premise, Gown Sleeve surface

Office room
319 ➔ Standard clean level



Cafeteria Premise
397 ➔ Standard clean level

Gown Sleeve surface
44 ➔ 2, 3

Meeting room
520 ➔ Standard clean level

Cafeteria Premise
361 ➔ Standard clean level

Equipment
Used for test

- PBI 브랜드
- Air sampling was performed through the use of SAS instrumentation (Surface Air System) PBI brand.
- 펌프를 통해 흡입된 공기가 배지 플레이트에 접촉되면서 공기중 미생물이 부착됨.

- 휴대형 실험
- 가운의 표면 측정지점 10cm x10cm 를 Swab로 문지른 후 교반 진동기를 통해 용출 시켜서 배양

Sampling type	Agent	Analytical method
S.A.S.	Total bacterial count	UNI EN 13098: 2002 + UNI EN ISO 4833-2: 2013
S.A.S.	Molds	UNI EN 13098: 2002 + ISO 21527-2: 2008
S.A.S.	Yeasts	UNI EN 13098: 2002 + ISO 21527-2: 2008
swab	Total bacterial count	ISO 18593: 2004 + UNI EN ISO 4833-1: 2013
swab	Molds	ISO 18593: 2004 + ISO 21527-1: 2008

Agent	Incubation temperature	Incubation time 1
Total bacterial count	30 ° C	3 days
Molds and yeasts	25 ° C	5 days

Experiment done based
on standard scientific procedure

EXPERIMENTATIONS RESULTS on
Puristic (EcoClean)

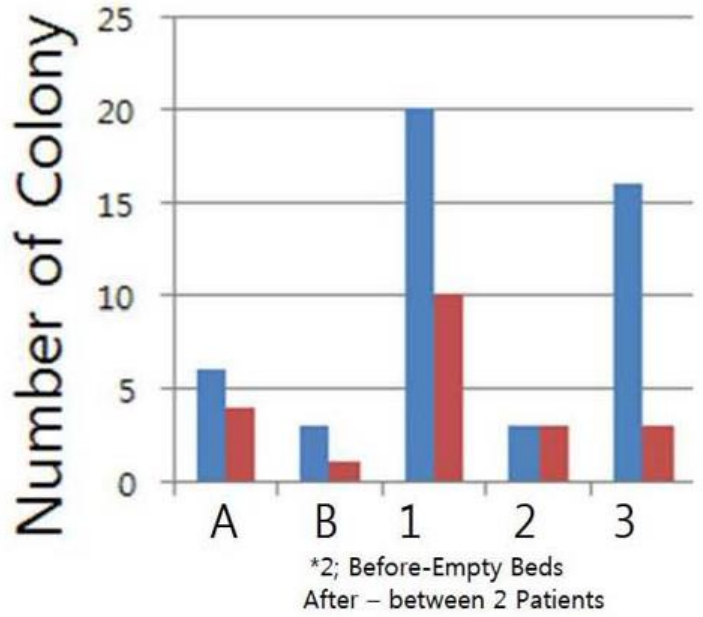
Done by
Dr. Fernando Maurizi
Gruppomaurizi Roma Italy

Puristic Actual Experiment @ ICU of Korean Hospital !

.....General Hospital Study (Korea)

A: Special Isolation Room

B: Near By Entrance to Isolation Room



*2; Before-Empty Beds
After – between 2 Patients

Notwithstanding of In-Patients Occupancy Ratio Increase from 30% to 90%, Floating Bacterial count was decreased

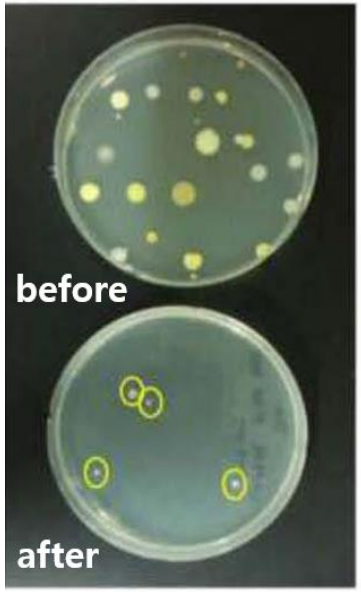
Sector 1

Sector 2

Sector 3

Puristic Actual Experiment @ ICU & Sickroom !

ICU



집중치료실 입구 좌측 4-5 구역

퓨리스틱 설치전 (2015-12-23) 낙하세균 채집 결과

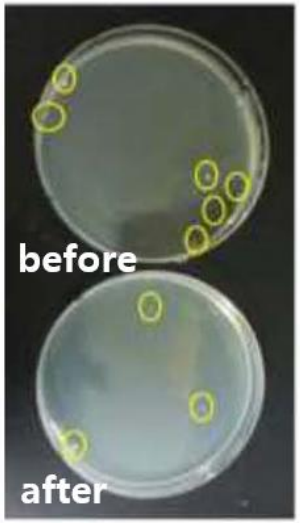
2.4 x 10 cfu/dish

퓨리스틱 설치 후 12일 경과 (2016-1-4) 낙하세균 채집 결과

4 cfu/dish

부유세균 84% 감소 확인!!

Sickroom



일반병실 좌측 2-3구역

퓨리스틱 설치전 (2015-12-23) 낙하세균 채집 결과

6 cfu/dish

퓨리스틱 설치 후 12일 경과 (2016-1-4) 낙하세균 채집 결과

3 cfu/dish

부유세균 50% 감소 확인!!

84% reduction

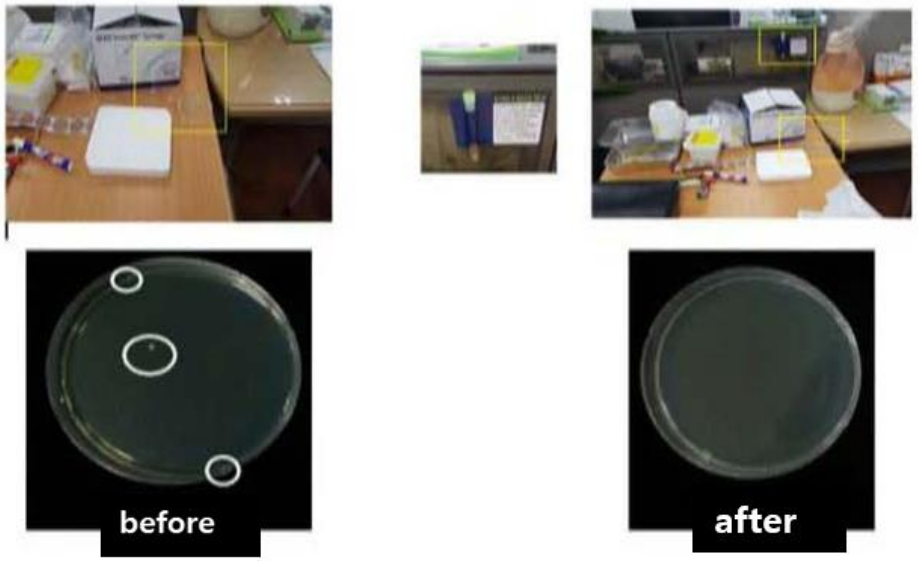
12 Days after

50% reduction

Tuberculosis office & X-ray room

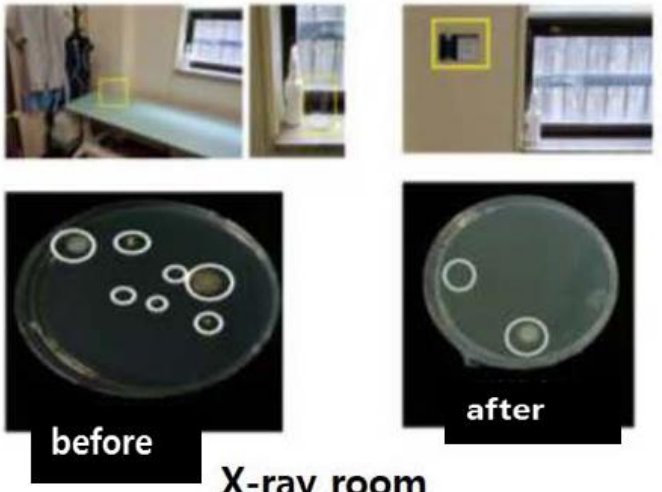
◉ 경기○보건소 결핵실 세균 실험

◈ 퓨리스틱 설치 전 (2016. 01.25) 설치 후 (2016.02.01.) 결핵실 (사람출입보통/외부바람들어옴) 낙하세균 채집 결과



Tuberculosis Office
100% reduction

6 Days after



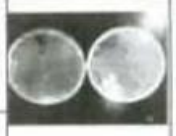
X-ray room
72% reduction

25% reduction of floating Microbial only 1 PURISTIC @ 50 m² space

(Appropriate # is 5ea, 1 ea covers 10 m² space)

▣ (공장 세척실) 미생물 분석결과

실험일자: 2015.05.11 ~ 2015.05.28
실험자:
실험목적: 이산화염소 설치 후 미생물 및 탈취 효과 확인

구분	라인명	공중부유균 · general bacteria (cfu/m³)				공중낙하균 general bacteria (cfu/plate·15min)				비고
		설치전(5/11)		설치후(5/26)		설치전(5/11)		설치후(5/26)		
	○○ 세척실		255 (진균:6) 생산없음		183 생산		1		0.5	* ○○: 11회 생산 ○○○: 9회 생산 (미생물 분석 전날 주/야 모두 생산없음)
	○○○ 세척실		92 (진균:24) 생산		69 (진균:12) 생산		0.5		2 (진균:0.5)	* ○○세척실 문은 작업중에는 닫힘 * ○○○세척실 문은 작업중에 항상 열려있음

▶ 이산화염소 설치 후, 공중부유균은 약 25% 감소효과 확인

- 공중낙하균 검사 기준규격 (참고: 중소업체를 위한 HACCP 적용 지침서)

구분	기준(cfu/plate이하)		
	일반세균수	대장균군	진균수
포장구역	30	음성	10
준청결구역	50	음성	20
일반구역	100	음성	40

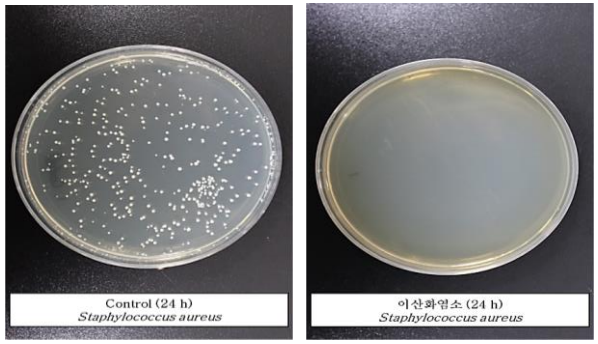
▣ 실험결과: 상단표 기재

Puristic Disinfection effects confirmations

Nam-Seoul Univ', Dept' of Clinical Laboratory science, Molecular Diagnosis Lab Test Results

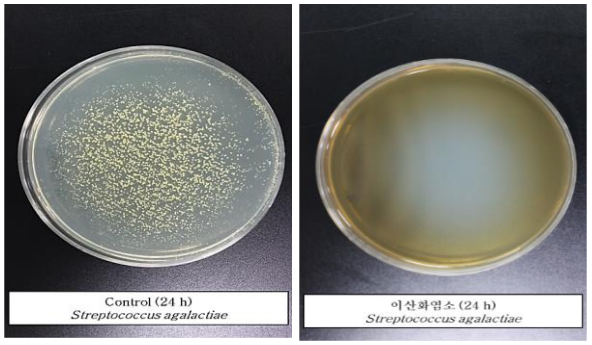
■ *Staphylococcus aureus*

- Foodborne, Pyogenic disease



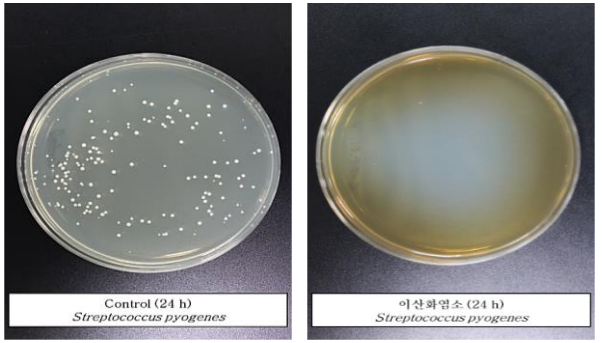
■ *Streptococcus pyogenes*

- Scarlet-fever, Acute glomerulonephritis



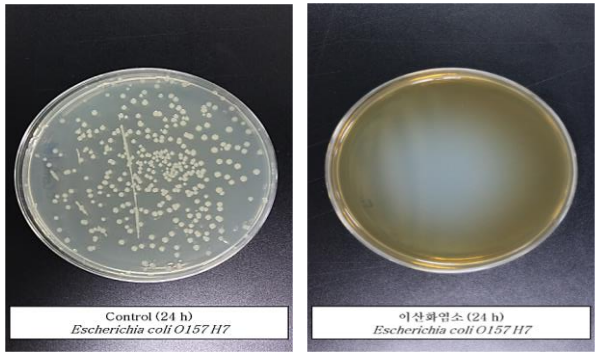
■ *Streptococcus agalatiae*

- Neonatal Meningitis, Cystitis



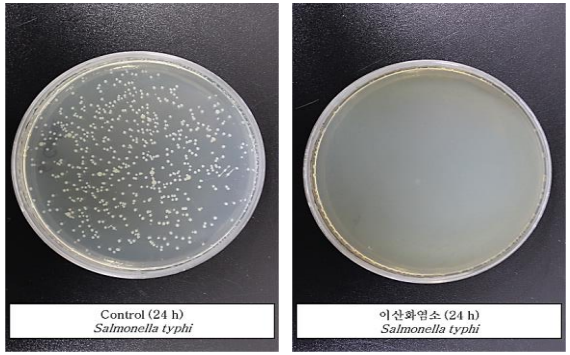
■ *Escherichia coli 0157 H7*

- Enterohemorrhagic Diarrhea



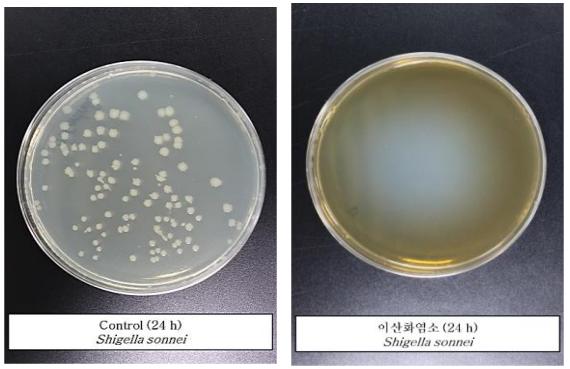
■ *Salmonella typhi*

- typhoid fever



■ *Shigella sonnei*

- Shigellosis



Puristic De-odorizing Effects confirmation

KCL (Korea Conformity Lab) Test Results

Puristic

Effectively Eliminates

Bad smells:

Methyl mercaptan

(Rotten Onion Smell)

hydrogen sulfide

(Rotten Egg Smell)

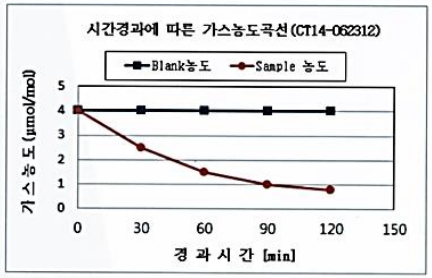
the way to trust KCL

시험성적서

성적서번호 : CT14-062312 Methyl mercaptan

6. 시험결과

시험항목		시험결과 Blank농도 (μmol/mol)	Sample농도 (μmol/mol)	탈취율 (%)	시험방법
탈취 시험 메틸머캡탄 CH_3SH	0 분	4	4	0.0	의뢰자제시방법
	30 분	4	2.5	37.5	
	60 분	4	1.5	62.5	
	90 분	4	1.0	75.0	
	120 분	4	0.8	80.0	



※ 시험방법

1. 의뢰자가 제시한 막대 시료를 96 L 크기 반응기에 넣고 밀봉함.
2. 시험가스의 초기농도를 황화수소 50 μmol/mol, 메틸머캡탄 4 μmol/mol으로 주입하고 시험가스의 농도를 초기(0분), 30분, 60분, 90분, 120분에서 측정하고 이를 sample 농도라 함.
3. 시험가스의 농도는 KS I 2218:2009에 의해 측정함.
4. 시험 중 온도는 23 ℃ ± 5 ℃, 습도는 50 % ± 10 %를 유지함.
5. 이와 별도로 시료가 없는 상태에서 위의 2 ~ 4에 의해 시험을 진행하고 이를 blank 농도라 함.
6. 각 시간대별 시험가스의 제거율은 다음 식에 의해 계산함.
   시험가스의 제거율(%) = [{(blank 농도)-(sample 농도)}/(blank 농도)] × 100.끝.

----- 이 하 여 백 -----

총 3 페이지 중 3 페이지

양식QP-20-01-06(0)

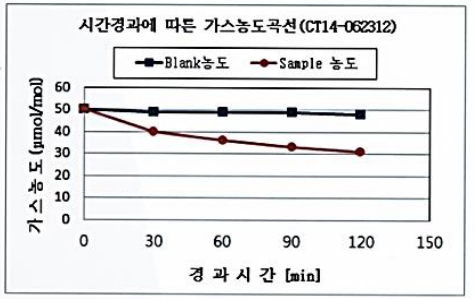
the way to trust KCL

시험성적서

성적서번호 : CT14-062312 hydrogen sulfide

6. 시험결과

시험항목		시험결과 Blank농도 (μmol/mol)	Sample농도 (μmol/mol)	탈취율 (%)	시험방법
탈취 시험 황화수소 H_2S	0 분	50	50	0.0	의뢰자제시방법
	30 분	49	40	18.4	
	60 분	49	36	26.5	
	90 분	49	33	32.7	
	120 분	48	31	35.4	



총 3 페이지 중 2 페이지

양식QP-20-01-06(0)

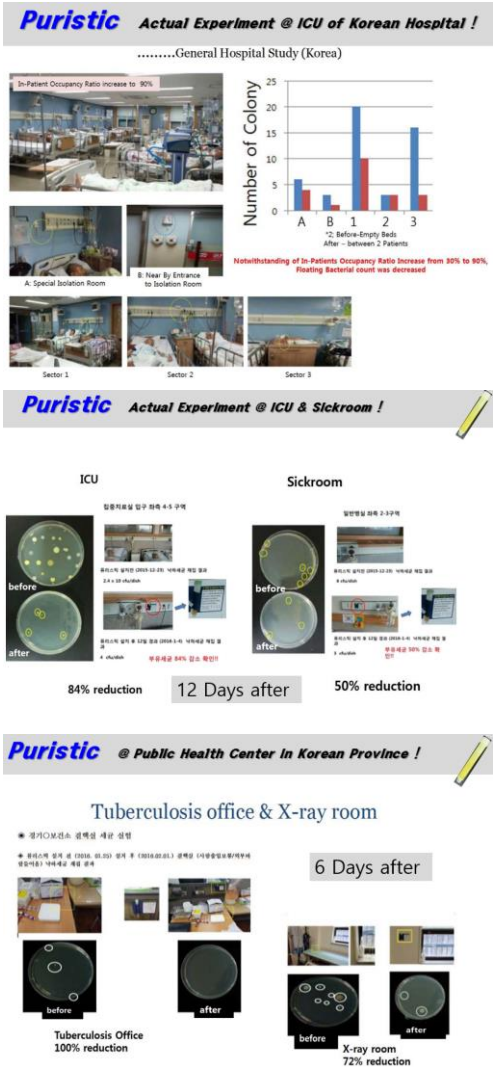
Puristic *Indoor air quality affects patient care quality!*

By Jeannie Akridge

As the Centers for Medicare and Medicaid Services continues to turn up the heat on hospitals to reduce healthcare acquired infections (HAIs) – forcing scrutiny of policies and procedures at every turn in order to minimize risk – indoor air quality is more critical than ever.

EX-Flow ultra-clean ventilation system distributed by Modern Medical Systems

"In recent years, the U.S. healthcare community has been hyper-focused on contact precautions such as handwashing," said David Lutz, director of marketing, Mintie Corp, Los Angeles, CA. "This has served an important role in combating a number of contact transmissible diseases. But, increasing awareness of airborne dangers and solutions both here and abroad is bringing the subject of airborne precautions and air cleaning technologies back into the forefront of hospital safety conversations." In particular, he noted that recent research in Europe has identified airborne transmission as a potential risk for diseases such as C. difficile. "Not only are airborne HAIs harder to conclusively prove, but the risks are also not always as apparent since airborne particulates can travel from a 'low risk' area to a higher one," Lutz continued. "Yet, the growing intolerance for preventable infections, understanding of transmission and expanding list of CMS no-pay events means that healthcare facilities can no longer afford to put off taking action."



http://www.hpnonline.com/inside/2008-09/0809-or-air.html

Puristic : CD ever reach!

Letters in Applied Microbiology

Letters in Applied Microbiology ISSN 0266-8254

ORIGINAL ARTICLE

Effect of low-concentration chlorine dioxide gas against bacteria and viruses on a glass surface in wet environments

H. Morino, T. Fukuda, T. Miura and T. Shibata

Research and Development Department, Taiko Pharmaceutical Co., Ltd, Suita, Osaka, Japan

Abstract

Aims: To evaluate the efficacy of low-concentration chlorine dioxide (ClO_2) gas against model microbes in the wet state on a glass surface.

Methods and Results: We set up a test room (39 m^3) and the ClO_2 gas was produced by a ClO_2 gas generator that continuously releases a constant low-concentration ClO_2 gas. Influenza A virus (Flu-A), feline calicivirus (FCV), *Staphylococcus aureus* and *Escherichia coli* were chosen as the model microbes. The low-concentration ClO_2 gas (mean 0·05 ppmv, 0·14 mg m^{-3}) inactivated Flu-A and *E. coli* (>5 $\log_{10}$ reductions) and FCV and *S. aureus* (>2 $\log_{10}$ reductions) in the wet state on glass dishes within 5 h.

Conclusions: The treatment of wet environments in the presence of human activity such as kitchens and bathrooms with the low-concentration ClO_2 gas would be useful for reducing the risk of infection by bacteria and viruses residing on the environmental hard surfaces without adverse effects.

Significance and Impact of the Study: This study demonstrates that the low-concentration ClO_2 gas (mean 0·05 ppmv) inactivates various kinds of microbes such as Gram-positive and Gram-negative bacteria, enveloped and nonenveloped viruses in the wet state.

Significance and Impact of the Study:
This study demonstrates that the low concentration
ClO2 gas (mean 0.05 ppmv) inactivates various kinds of microbes such as Gram-positive and Gram-negative bacteria, enveloped and non-enveloped viruses in the wet state.

Puristic ： Taiwan Armed Forces General Hospital !

Nature and Science, 5(4), 2007, Kuen Song Lin, Ming June Hsieh, Ming Jer Liou, Sheau Long Lee, Cheng-Kuo Lai. Disinfection effect of chlorine dioxide on air quality control in Armed Forces General Hospital of Taiwan

Disinfection effect of chlorine dioxide on air quality control in Armed Forces General Hospital of Taiwan

Kuen Song Lin[1], Ming June Hsieh[1], Ming Jer Liou[2], Sheau Long Lee[2], Cheng-Kuo Lai[3]

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Abstract: Under the increasing threat of various global infectious diseases, the importance of epidemic prevention and air quality control in hospital is accented. Four disinfectants were prepared and tested to verify the disinfection effect of air environment in Taoyuan Armed Forces General Hospital (TAFGH). STB bleach powder (1417 ppm), Type 82 disinfectant (4877 ppm), NaOCl bleacher (1386 ppm) and chlorine dioxide disinfectant (193 ppm) were all capable to sterilize medical disposal of 3.2×10^5 CFU/mL with disinfection efficiency higher than 99.9% were observed from the environmental specimen and disinfection tests in the physician out-patient department. Before sterilization, the average residual colony was 180 per handset, which were higher than the value of 15 on door knob. After spraying 1 mL of 200 ppm chloride dioxide solution twice onto the surfaces of different objects using the hand-held sprayer, the comparison for average disinfection efficiencies of the samples was door knob (100%) = handset of telephone (100%) > chair cushion (90.3%) > floor (20.5%) in series. In addition, the background data of biological aerosols also revealed that the comparison of average space colony numbers was semi-closed out-patient area in the physician department (318 CFU/m^3) > semi-closed out-patient area in the surgical department (183 CFU/m^3) > open-space emergency ward (58 CFU/m^3) in series. After using ultrasonic aerosol and handheld sprayer ways to sprinkle the chlorine dioxide solution into hospital spaces for 30 minutes, the average colony number in the physician out-patient area decreased from 421 to 21 CFU/m^3, approaching to a disinfection efficiency of 95.0 %. The disinfection efficiency of chlorine dioxide in gas or solution phase is notably affirmative and available for the infection control of hospital. [Nature and Science. 2007;5(4):94-99].

☐ **Spatial Disinfection Case with ClO2**

- Armed Forces General Hospital in Taiwan

- Physician Out-Patient Area
  - Before Test: 421 CFU/m^3
- After Clo2 Gas Treatment
  - Decrease to 21 CFU/m^3

※ 95% disinfection efficiency

Application of chlorine dioxide for disinfection of student health centers

The study has done according to the Occupational Safety and Health Administration (OSHA) of the USA and the American Conference of Governmental Industrial Health, the 8-h time-weighted average (TWA) of ClO2 in the workplace should not exceed 0.3 mg/m3 (equivalent to 0.1 mg/L).

Abstract

In Taiwan, the immediate health care requirements of students and faculty members are satisfied by on-campus medical service centers. The air quality within these centers should comply with the guidelines laid down by the Taiwan Environmental Protection Agency (EPA). Accordingly, this study performed an experimental investigation into the efficiency of various chlorine dioxide applications in disinfecting a local student health center (SHC). The air quality before and after disinfection were evaluated in terms of the bioaerosol levels of bacteria and fungi. The average background levels of bacteria and fungi before disinfection were found to be 1,142 ± 455.4 CFU/m(3) and 520 ± 442.4 CFU/m(3), respectively. Chlorine dioxide (0.3 mg/m(3)) was applied using three different methods, namely a single, one-off application, multiple applications within a single day, and regular (daily) applications. Among the three disinfection methods, the regular application method was found to yield a high disinfection efficiency for both bacteria and fungi, i.e., 6.5 ± 0.7% and 4.2 ± 0.3%, respectively. The average residual bacteria and fungi levels after regular daily interval disinfection were 318.8 ± 51.5 CFU/m(3) and 254.0 ± 43.8 CFU/m(3), respectively. Therefore, the results suggest that the air quality guidelines prescribed by the Taiwan EPA for SHCs and other healthcare facilities can best be achieved by applying chlorine dioxide at regular (daily) intervals.

Puristic : ambulance Decontamination !

EVALUATION OF AMBULANCE DECONTAMINATION USING GASEOUS CHLORINE DIOXIDE

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ABSTRACT

Objective. We evaluated gaseous chlorine dioxide (ClO_2) decontamination of an ambulance using a variety of bacterial biological agents. **Methods.** Spores of attenuated *Bacillus anthracis* and *Bacillus atrophaeus* as well as vegetative cells of *Acinetobacter baumannii, Mycobacterium smegmatis,* and *Staphylococcus aureus* were exposed to ClO_2 gas inside an ambulance. Log reduction in viability was assessed following decontamination using organism plate counts. **Results.** Ambulance decontamination with ClO_2 gas concentrations of 362 to 695 ppm maintained to exposures of 756 ppm-hours with 65% relative humidity (RH) achieved inactivation of all the bacterial agents tested. Decreasing exposure (ppm-hours) and RH (<65%) or restricting air flow reduced inactivation but still achieved greater than 6-log reductions in organism viability. **Conclusion.** Up to 10-log reductions were achieved in an ambulance interior following exposure to ClO_2, indicating that gas concentrations needed to mitigate biological agent contamination can be achieved and maintained safely in an ambulance. Future studies are ongoing to evaluate gaseous ClO_2 in other environments contaminated with biological agents of health care concern. **Key words:** chlorine dioxide; ambulance; decontamination; fumigation; *Bacillus anthracis*

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Conclusion. Up to 10-log reductions were achieved in an ambulance interior following exposure to ClO2, indicating that gas concentrations needed to mitigate biological agent contamination can be achieved and maintained safely in an ambulance

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