二酸化塩素技術資料

cleancare co.,ltd

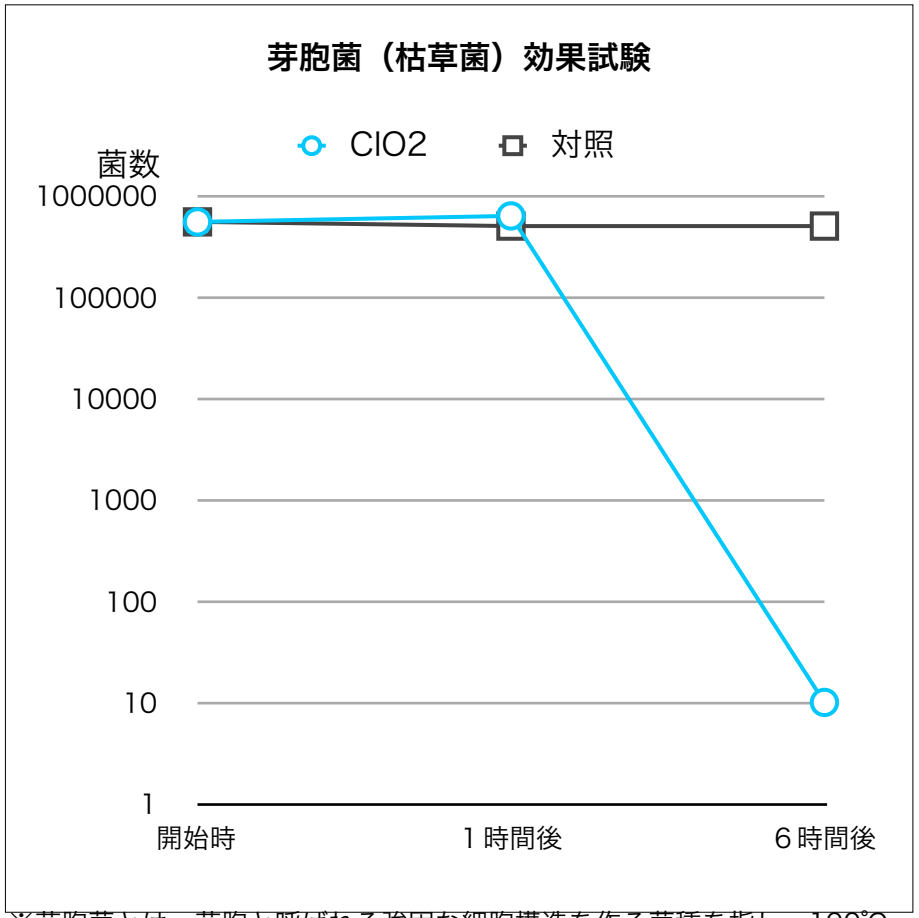
cleancare co.,ltd

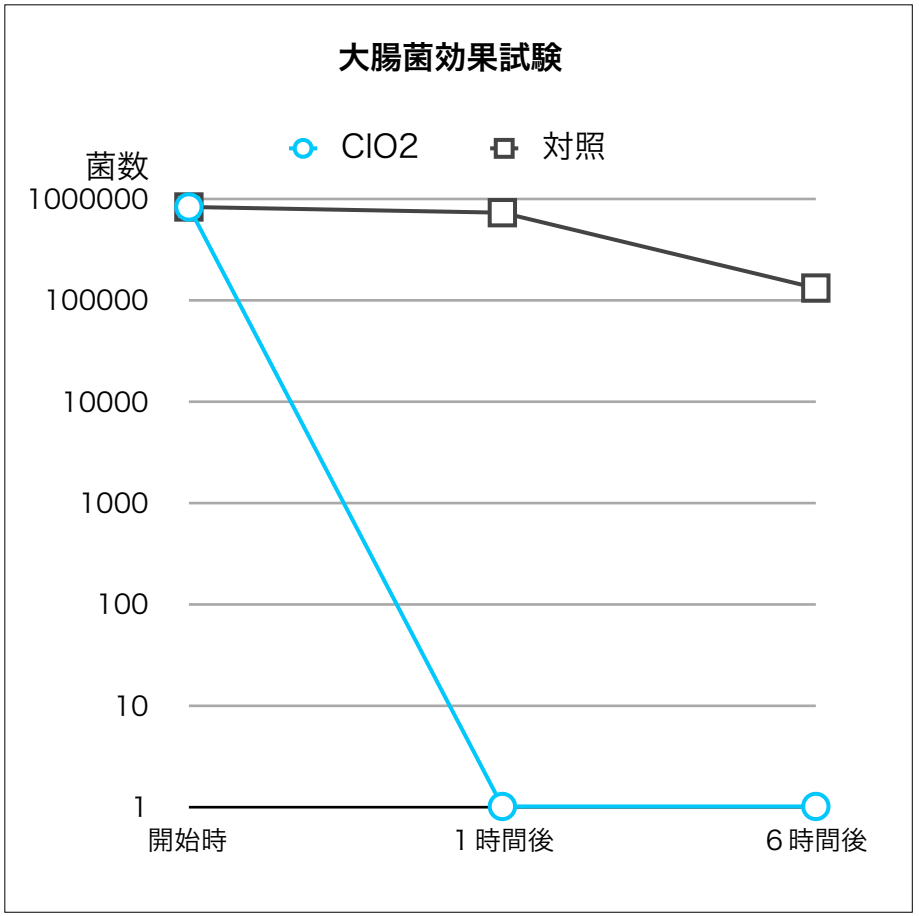
二酸化塩素ガスによる殺菌効果

使用製品 | 用時破袋型二酸化塩素徐放剤：KESTAS および 空快ルームケア

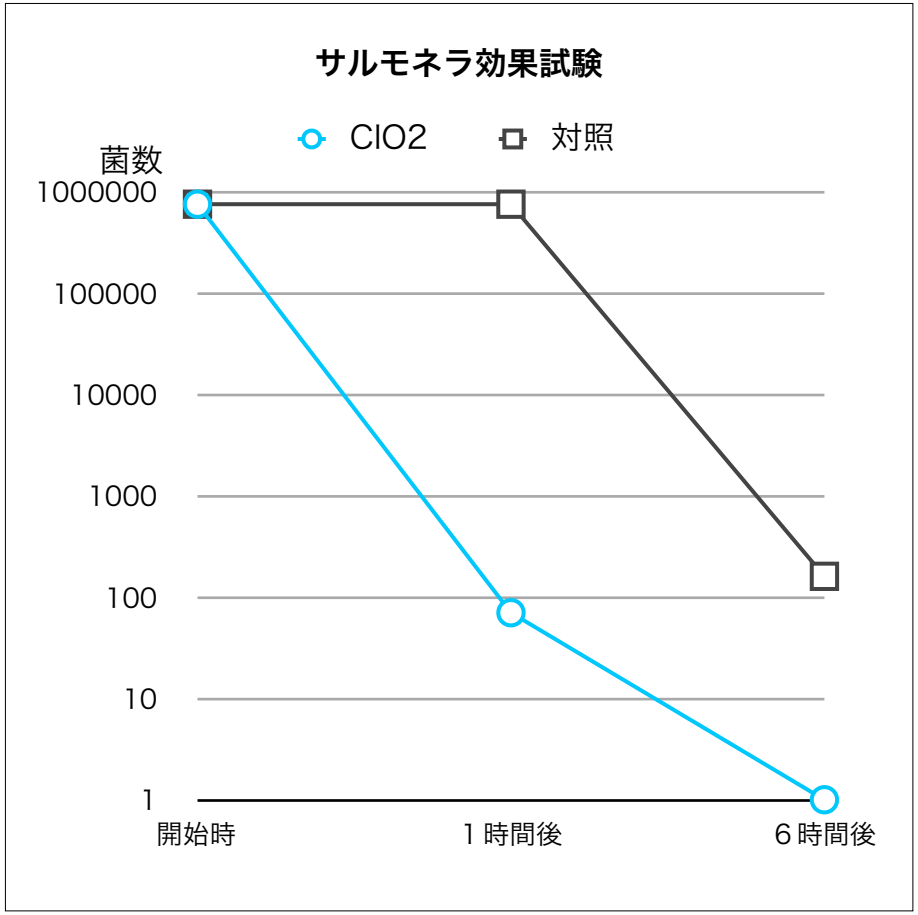
試験手順

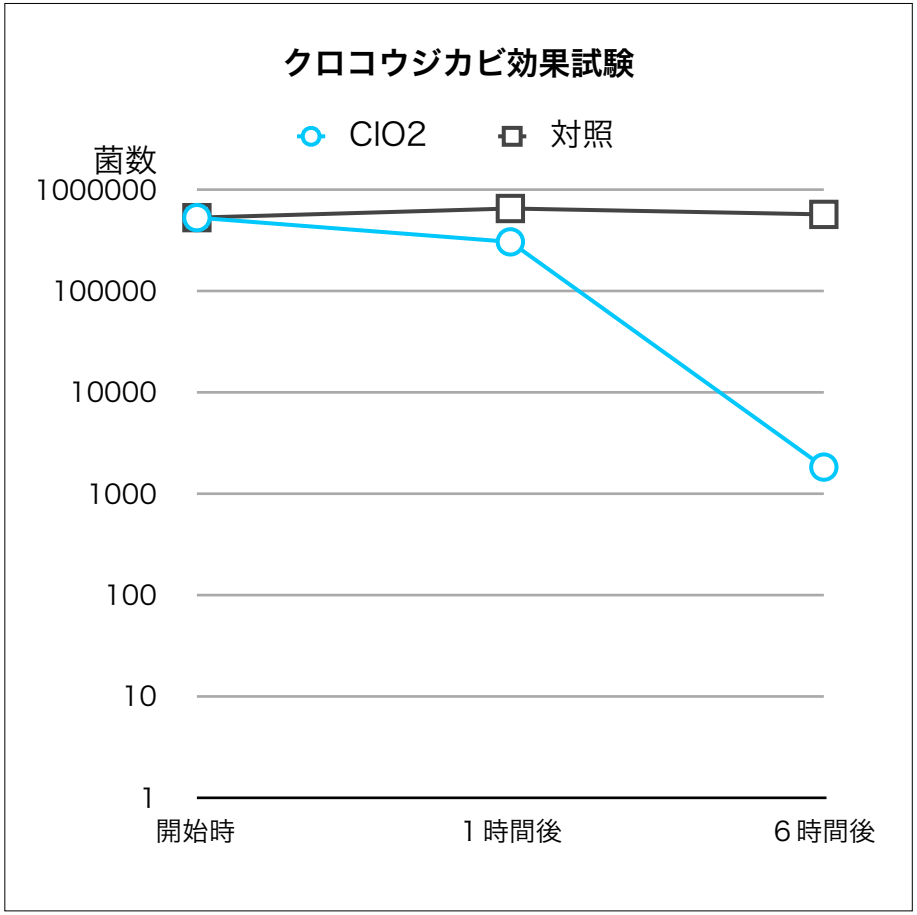
二酸化塩素を担持したビーズ（20g）と菌液を付着した不織布を９Ｌのボックスに入れて、常温で暴露させた後、経過時間後生菌数を測定

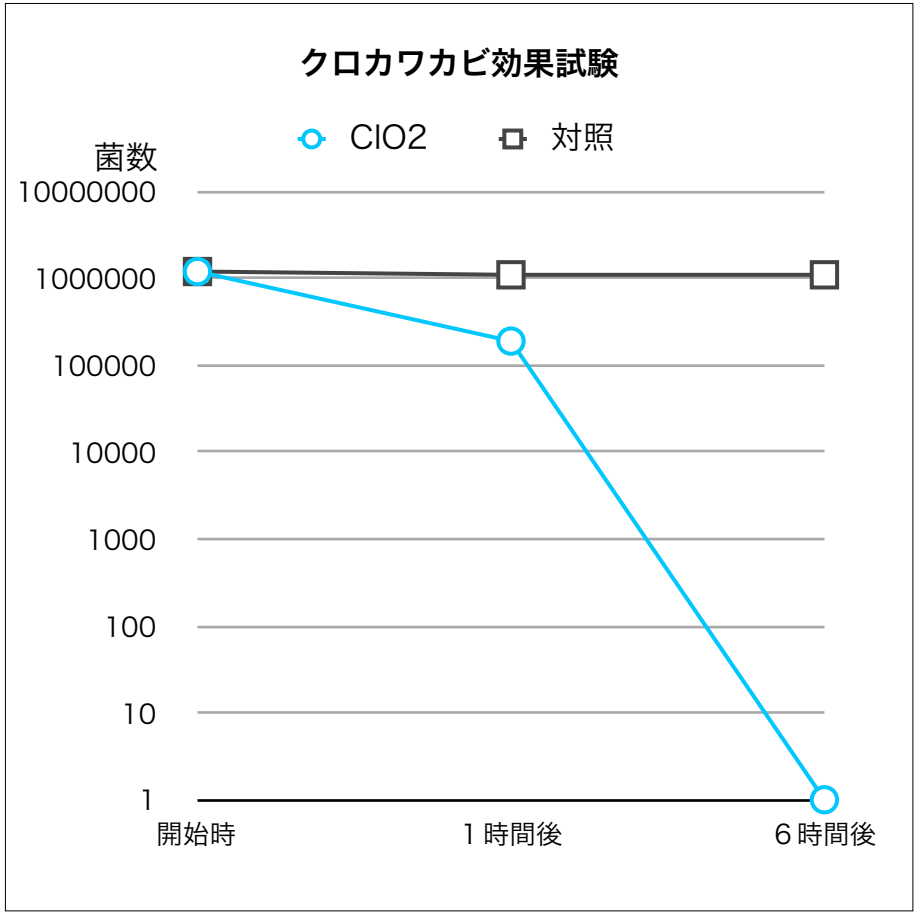


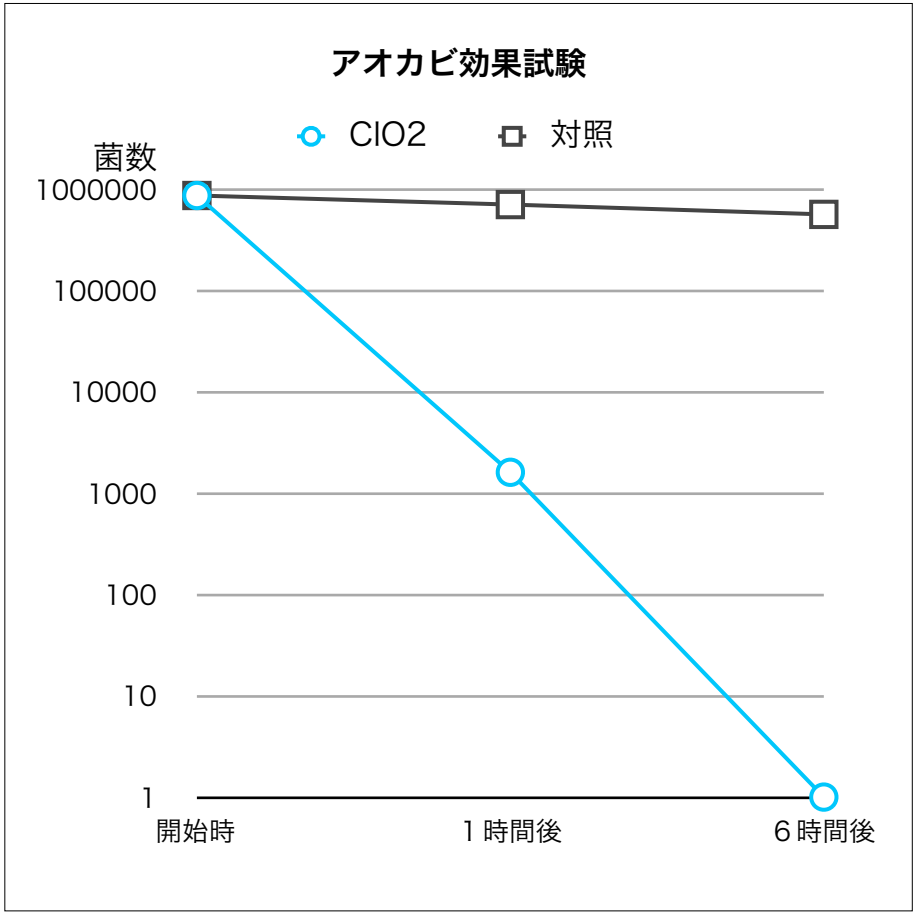


※芽胞菌とは、芽胞と呼ばれる強固な細胞構造を作る菌種を指し、100℃の煮沸でも完全に不活化できません。納豆菌や炭疽菌などが該当します。


サルモネラ効果試験
ClO2
対照
菌数
1000000
100000
10000
1000
100
10
1
開始時
1時間後
6時間後


クロコウジカビ効果試験
ClO2
対照
菌数
1000000
100000
10000
1000
100
10
1
開始時
1時間後
6時間後





※二酸化塩素ガスによる殺菌効果試験は、経済産業省ものづくり実証支援事業の一環として、日本食品分析センターで実施した結果です。
（第0903188002-01号）

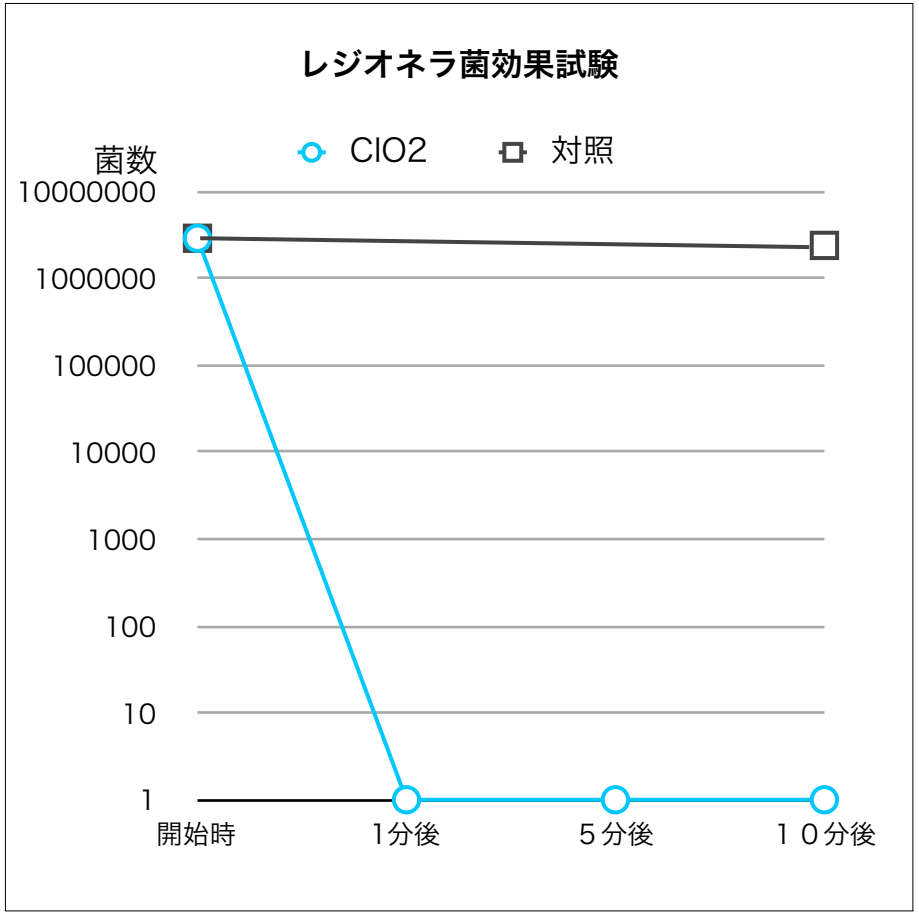
cleancare co.,ltd

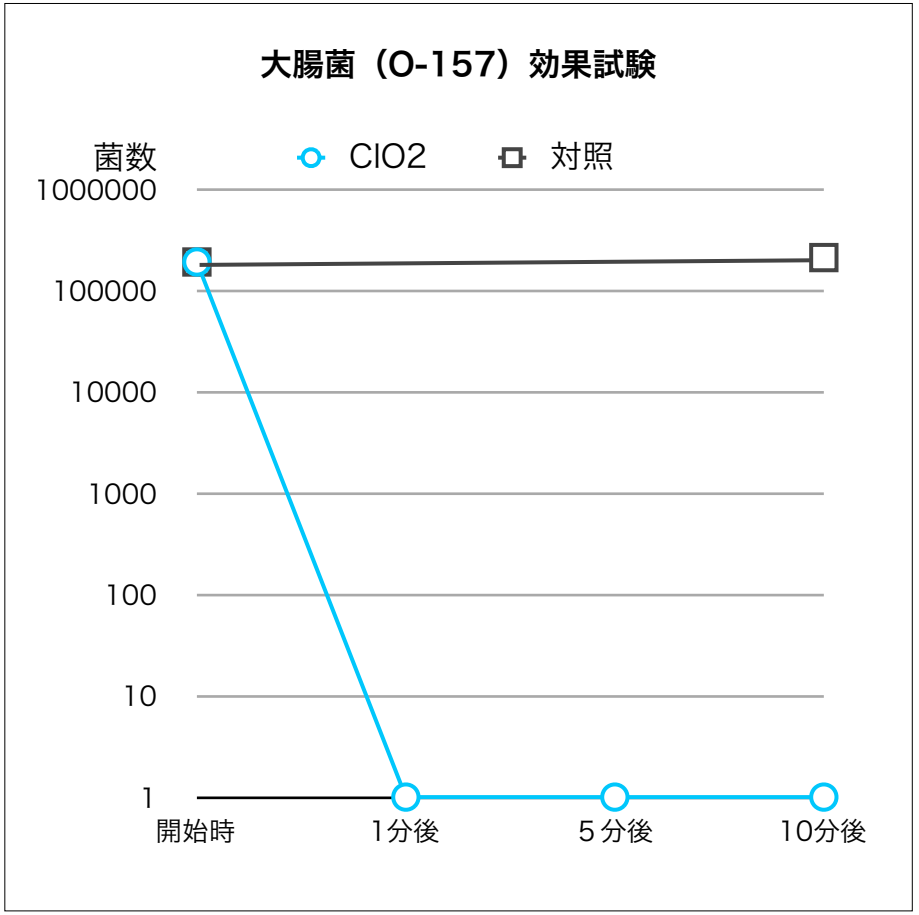
二酸化塩素水溶液による殺菌効果

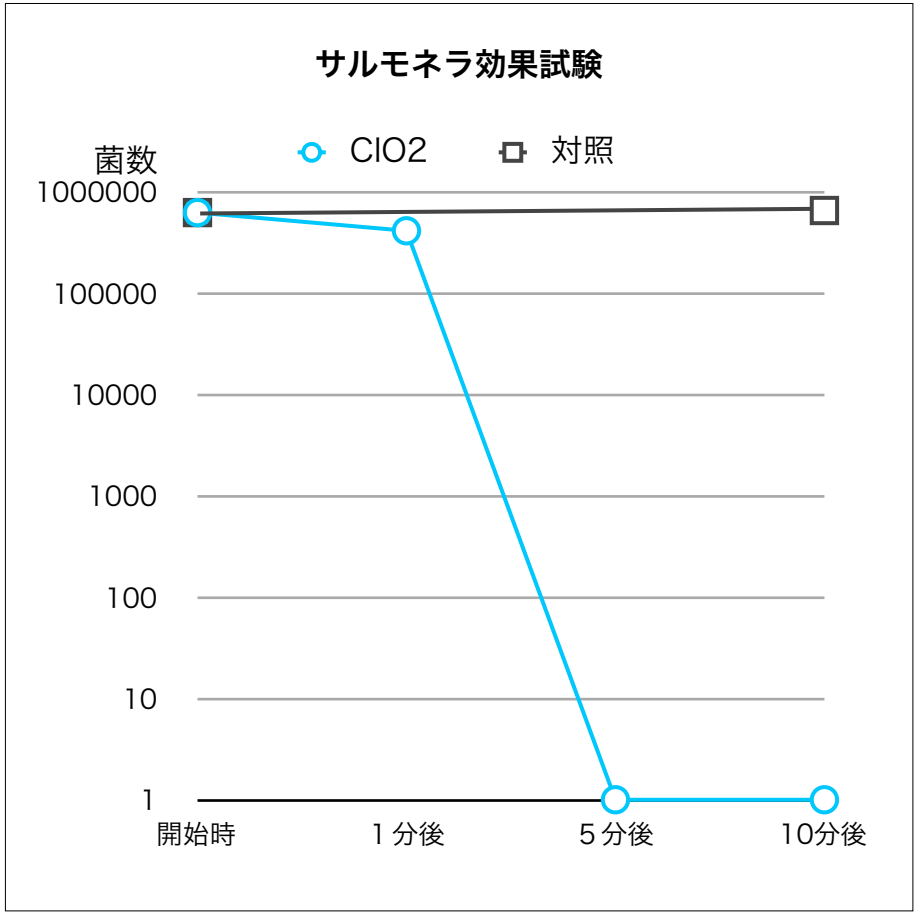
試験手順

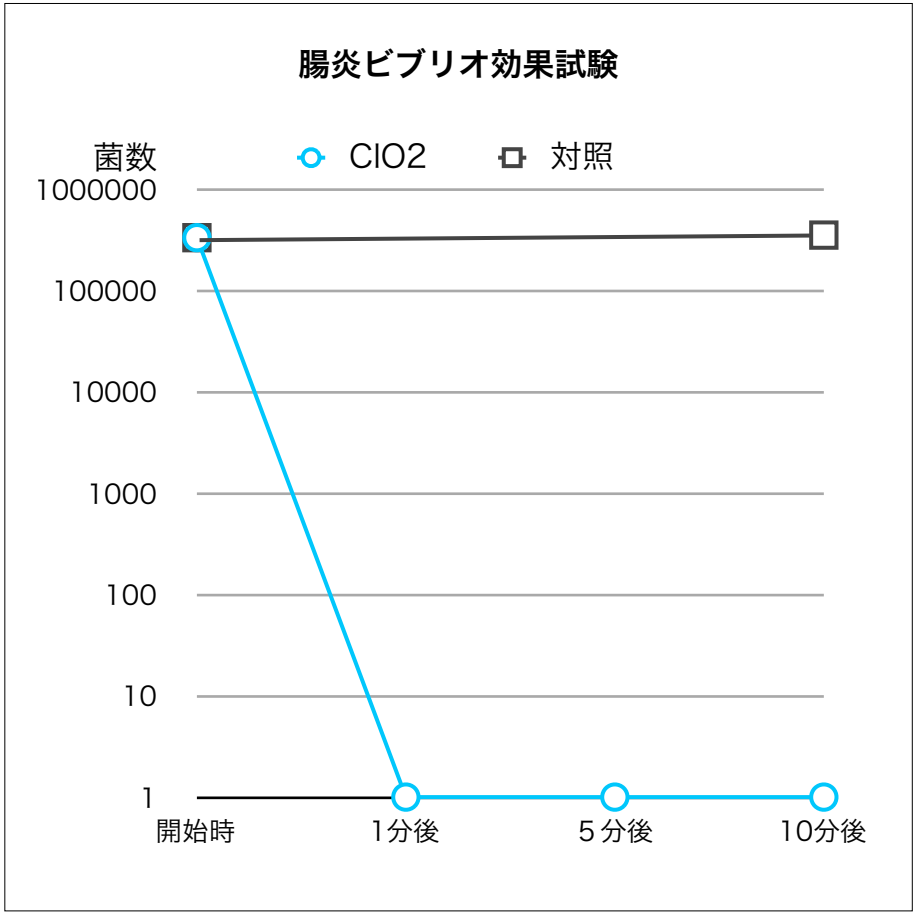
１ppmに調整した二酸化塩素溶液と菌液を常温で作用させ、経過時間後の生菌数を測定

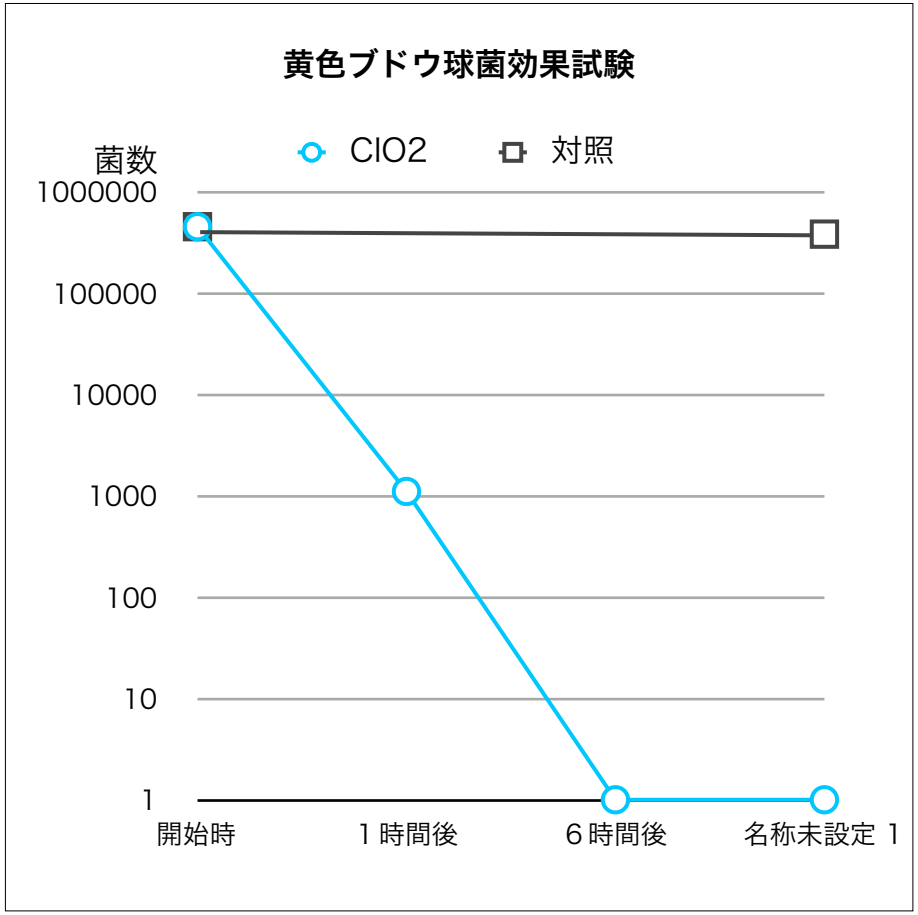
使用製品 | アクアスピード,アクアクリーナー,アクアレンジャー,カビクリア






サルモネラ効果試験
菌数
ClO2
対照
1000000
100000
10000
1000
100
10
1
開始時
１分後
５分後
10分後


腸炎ビブリオ効果試験
菌数
ClO2
対照
1000000
100000
10000
1000
100
10
1
開始時
1分後
５分後
10分後


黄色ブドウ球菌効果試験
ClO2
対照
菌数
1000000
100000
10000
1000
100
10
1
開始時
1 時間後
6 時間後
名称未設定 1

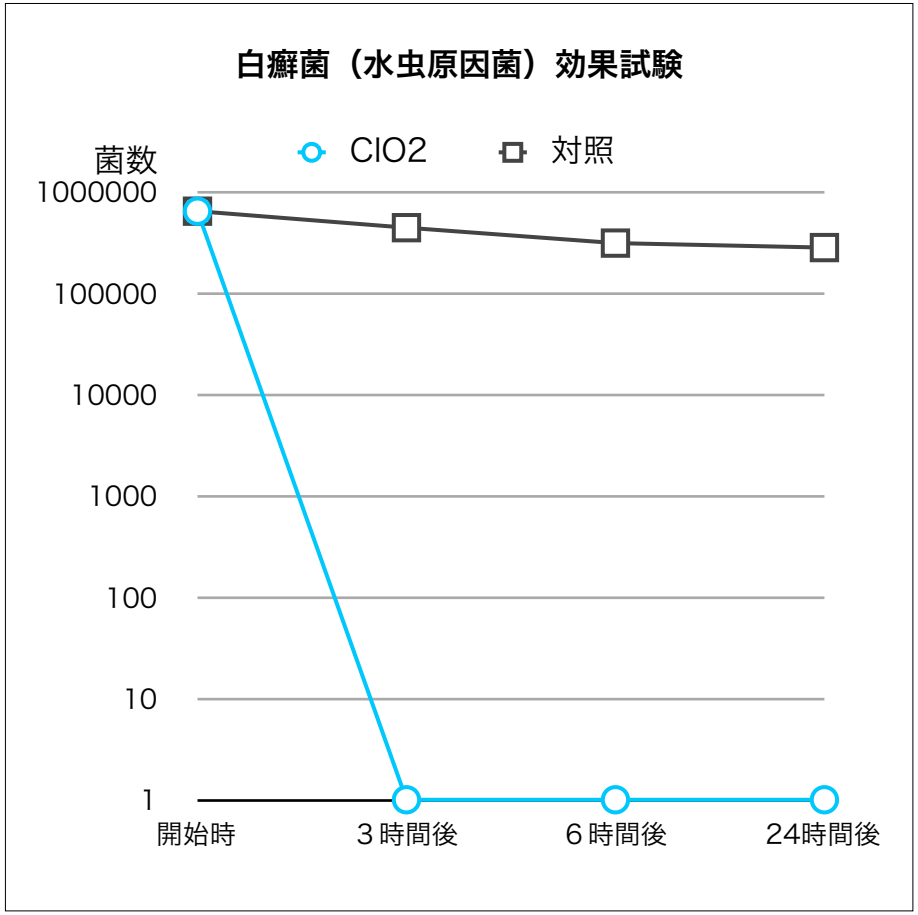
cleancare co.,ltd

吸湿反応型二酸化塩素粉末による白癬菌殺菌効果試験

試験手順

吸湿反応型二酸化塩素粉末（２g）と白癬菌の菌液を塗布した綿布を９Ｌのボックス内に設置、時間経過ごとの生菌数を測定

使用製品 | 吸湿反応型二酸化塩素徐放剤：KESTAS for shoes



cleancare co.,ltd

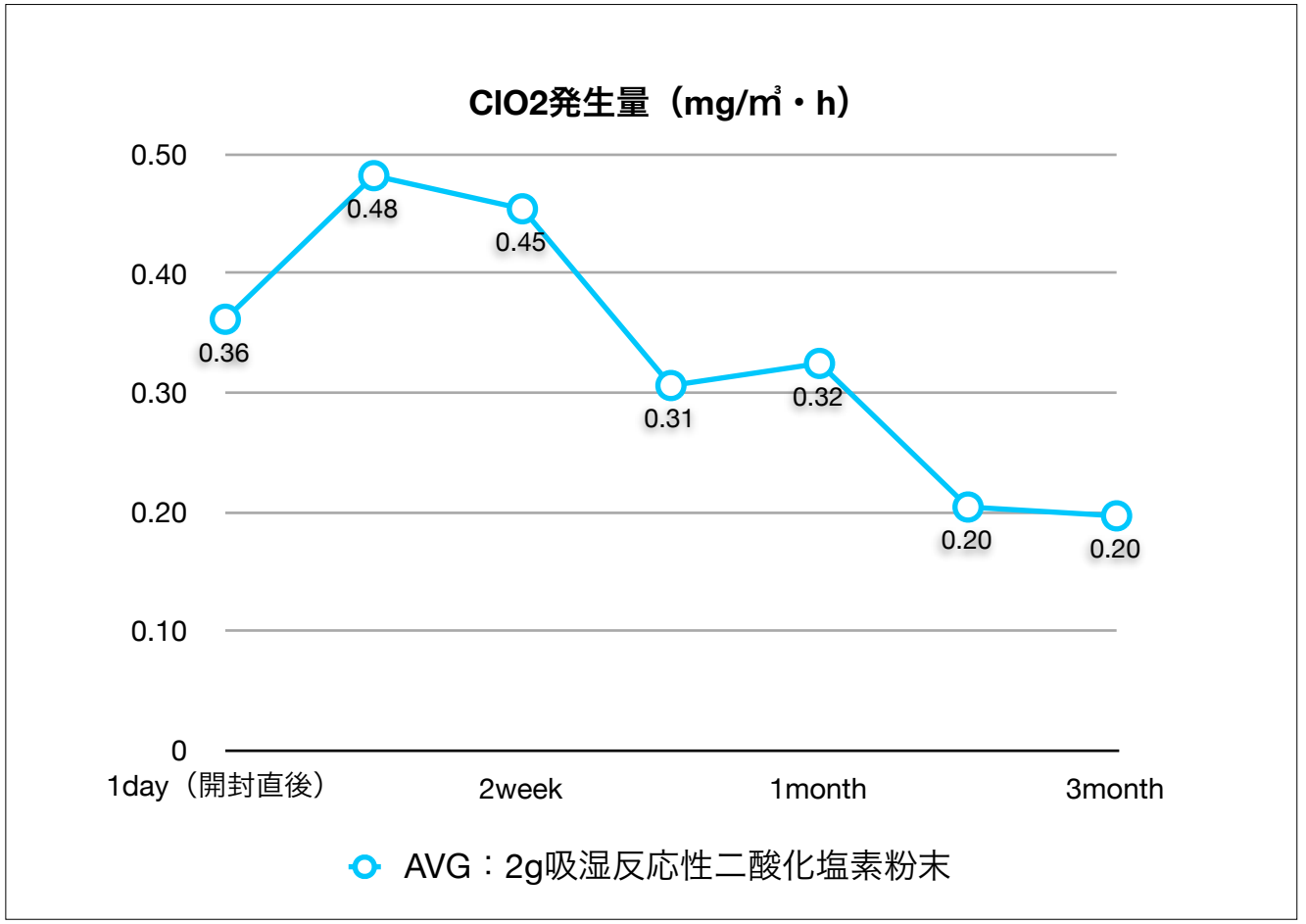
クリーンケア製徐放剤の二酸化塩素徐放量

試験手順

0.8L/minの風量で通気した補修袋内に吸湿反応型二酸化塩素粉末２gを設置。

20Lの密閉容器内に導入した二酸化塩素ガスをガス検知感により測定。

使用製品 | 用時破袋型二酸化塩素徐放剤：KESTAS および 空快ルームケア

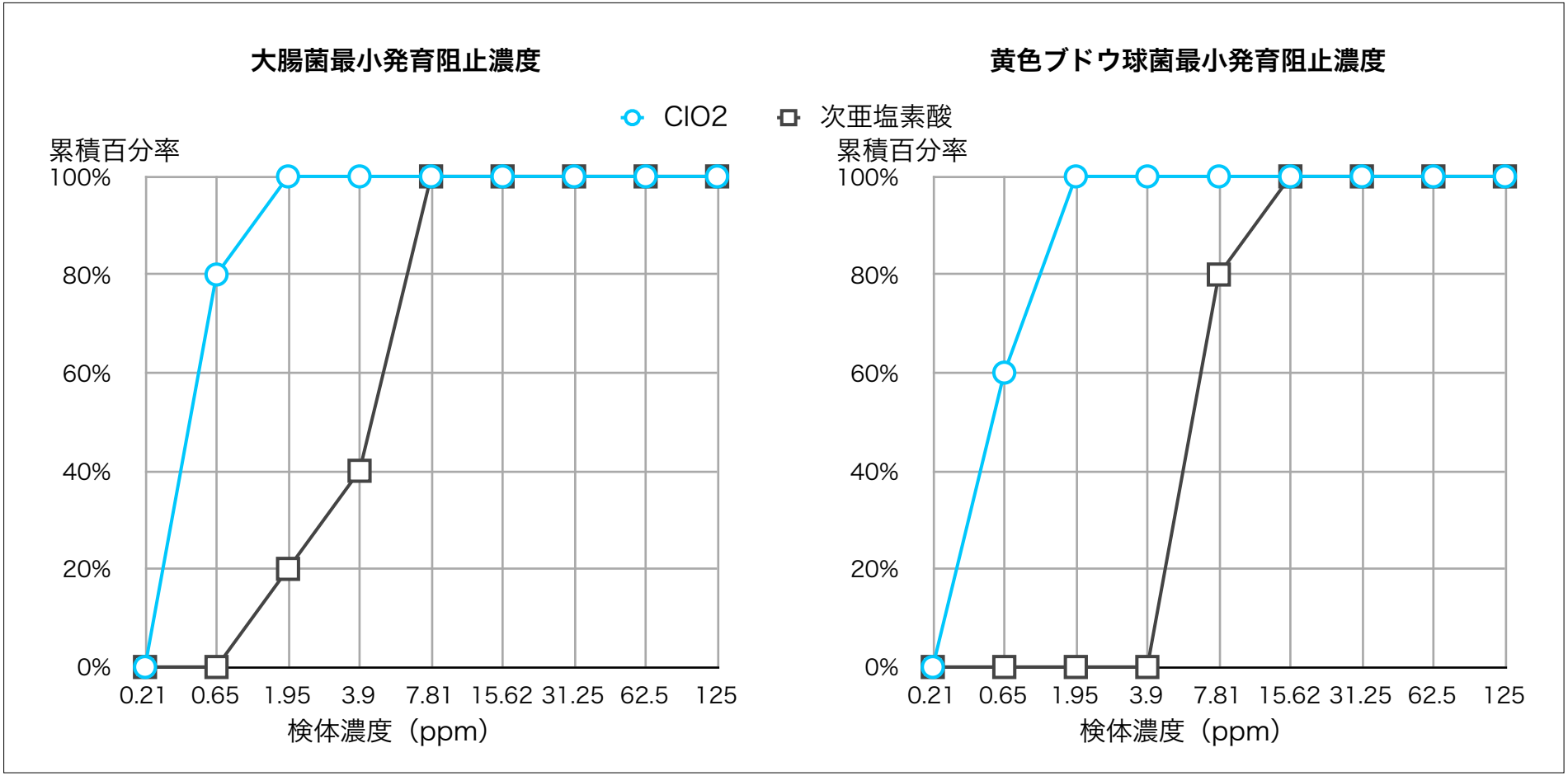


cleancare co.,ltd

クリーンケア製二酸化塩素溶液と次亜塩素酸ナトリウム溶液の殺菌効果比較

試験手順

アクアソリッドを水に溶解させ、各濃度に調整した二酸化塩素溶液と、同様に調整した次亜塩素酸ナトリウム溶液を検体とし、大腸菌および黄色ブドウ球菌について最小発育阻止濃度を測定（N=5）試験はおむつと同様の有機物を含む試験環境下で実施しています。



※本試験は、大手ベビーケア・フェミニンケア用品の製造企業の協力により実施しています。

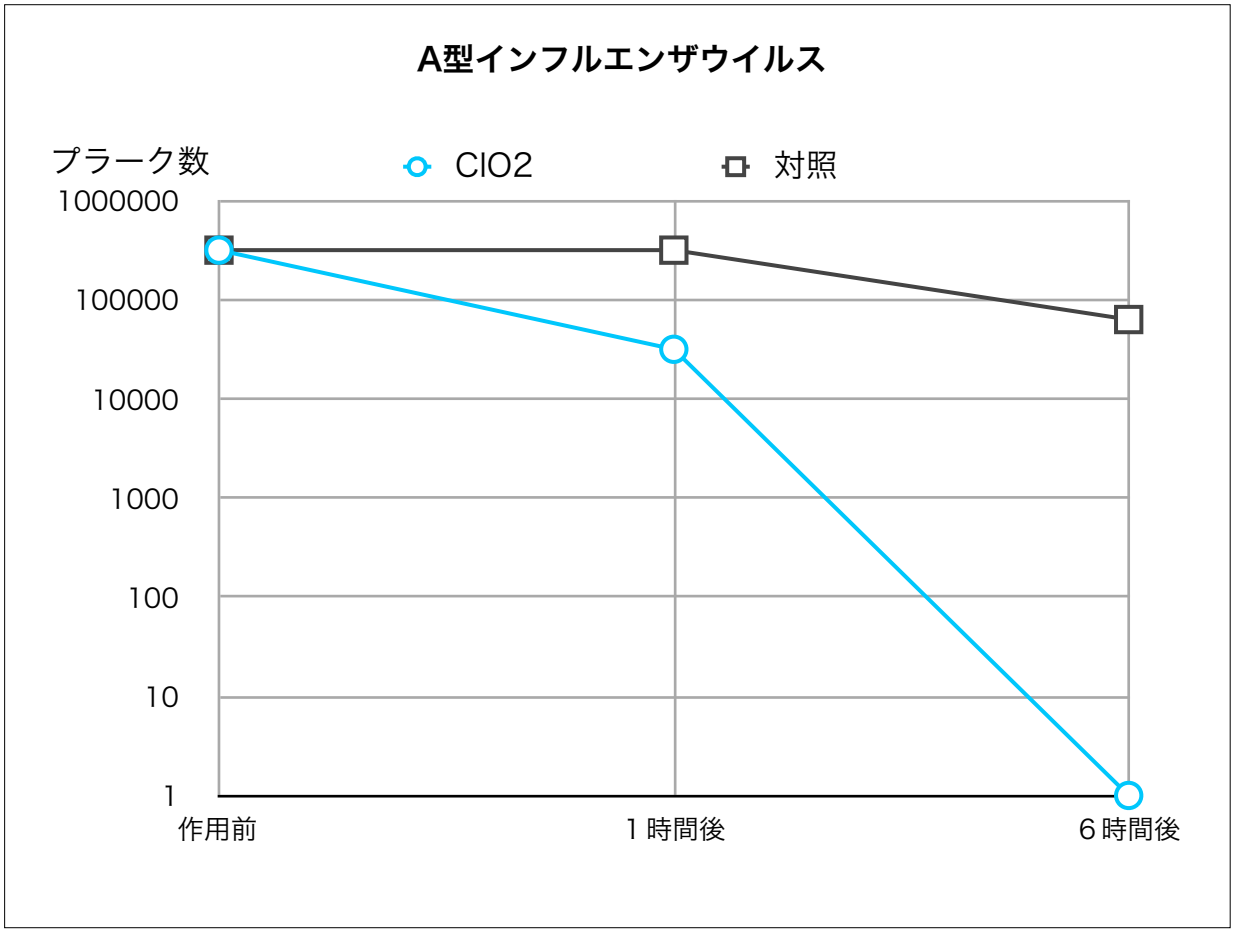
cleancare co.,ltd

インフルエンザウイルス不活化試験

試験手順

二酸化塩素を担持したビーズ（20g）とA型インフルエンザウイルス液を付着した不織布を９Ｌのボックスに入れて、常温で暴露させた後、経過時間後ウイルス感染価（logTCID50/mL）を測定

使用製品 | 用時破袋型二酸化塩素徐放剤：KESTAS および 空快ルームケア

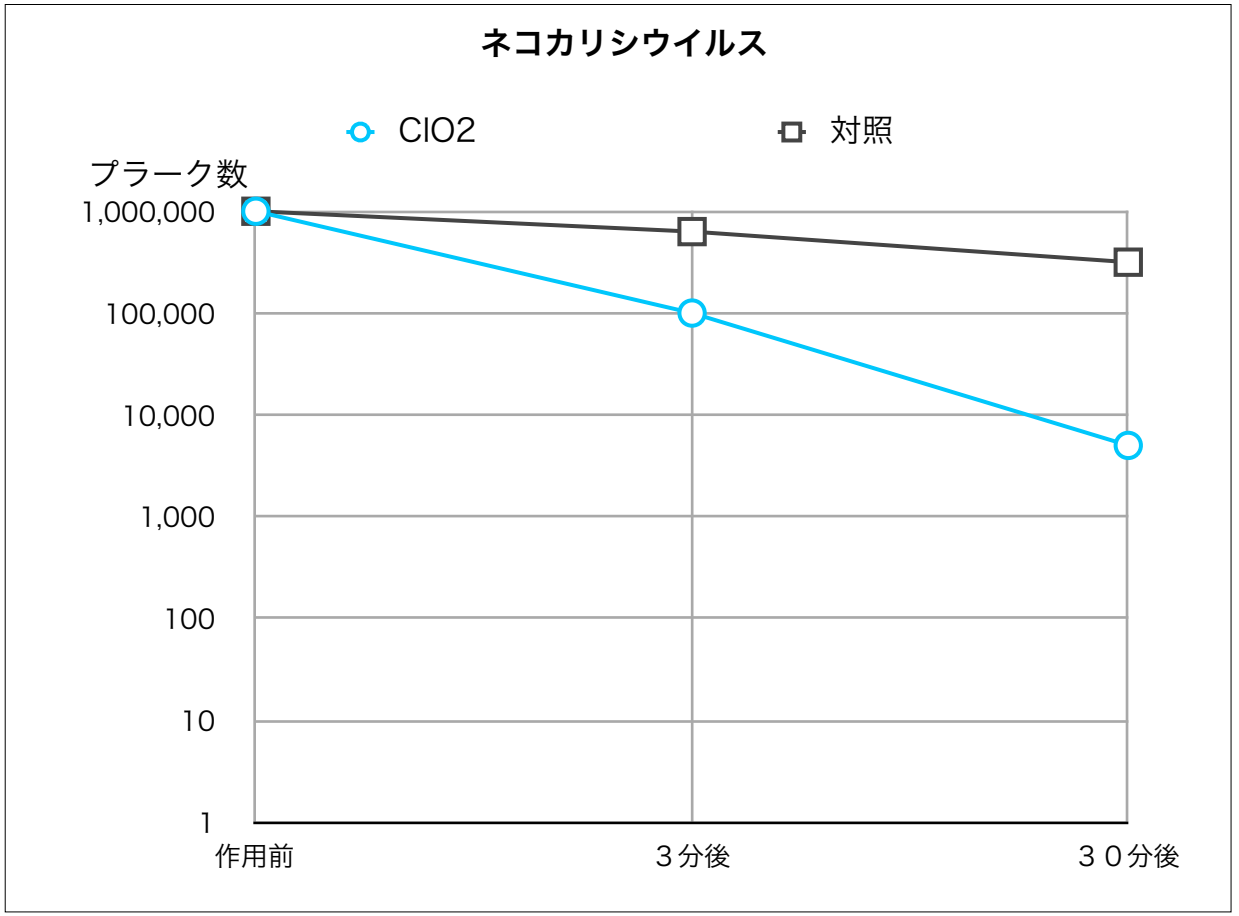


※本試験は、経済産業省ものづくり実証支援事業の一環として、日本食品分析センターで実施した結果です。（第0903188002-02号）

ネコカリシウイルス（ノロウイルス代替ウイルス）不活化試験②

試験手順

5%牛血清アルブミンを混合したネコカリシウイルス液と220ppmに調整した二酸化塩素溶液を作用させ、３分後・３０分後の感染価を測定



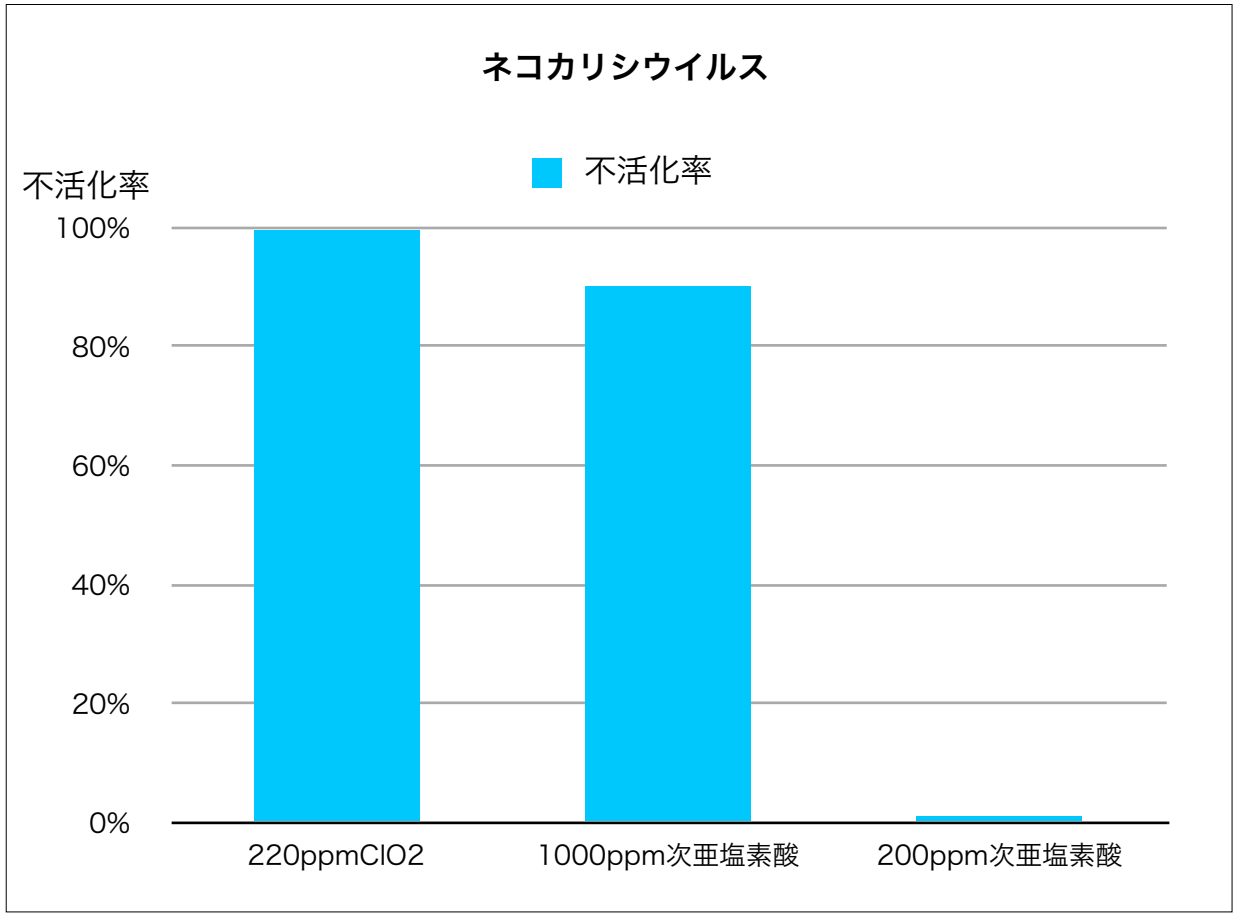
使用製品 | ゲロブロック２

※試験条件の設定は、国立医薬品食品衛生研究所のノロウイルスの不活化条件に関する調査に記載された同一条件で食品分析センターに試験を依頼

ネコカリシウイルスに対する二酸化塩素と次亜塩素酸Naの効果比較

概要

前ページで得られた結果と、国立医薬品食品衛生研究所の「ノロウイルスの不活化条件に関する調査」のデータを比較しています。



※試験機関が異なるため完全に同一の試験ではありません。

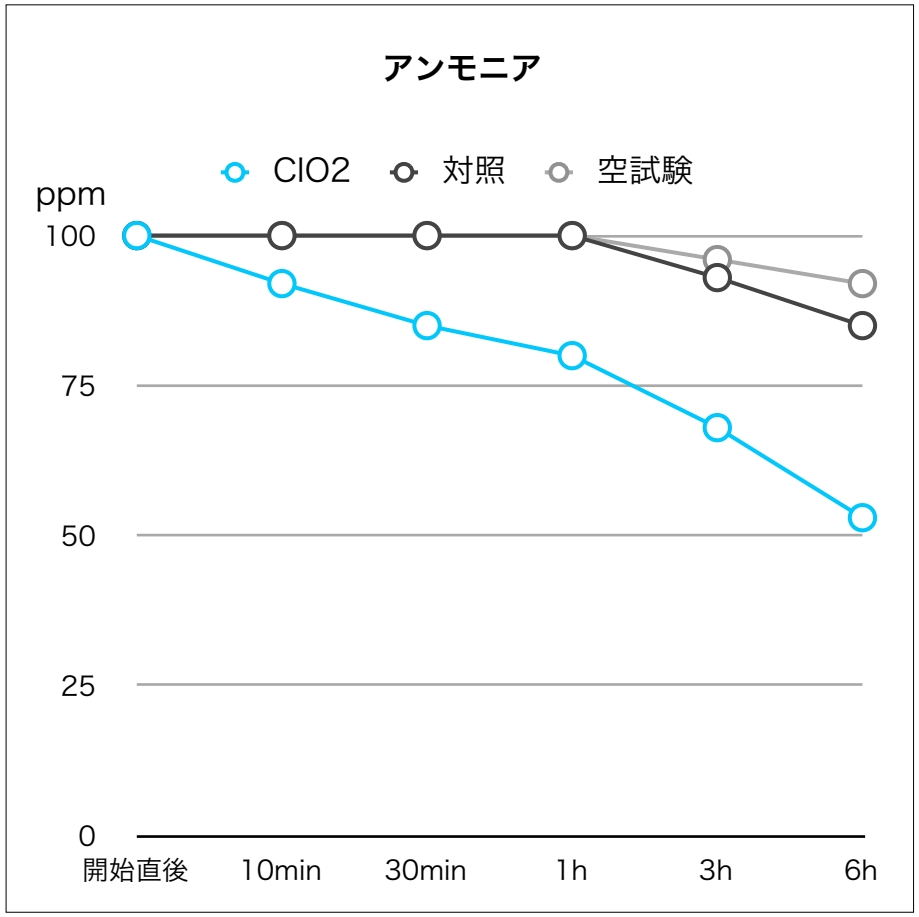
使用製品 | ゲロブロック２

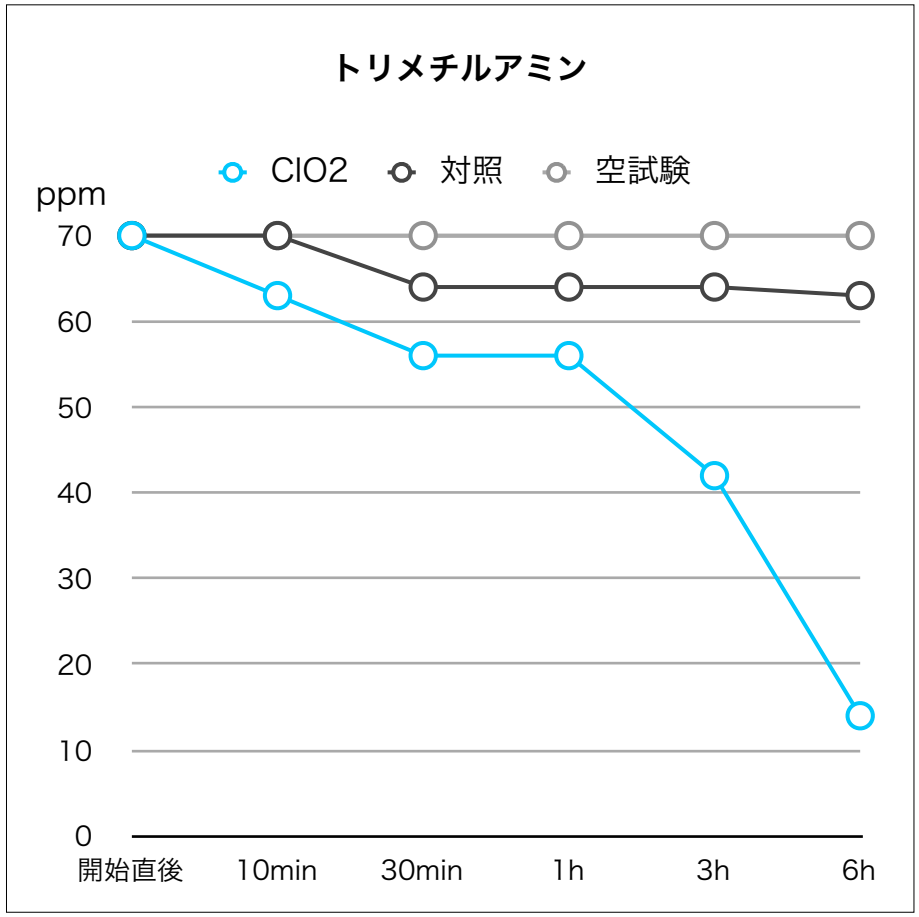
消臭効果試験

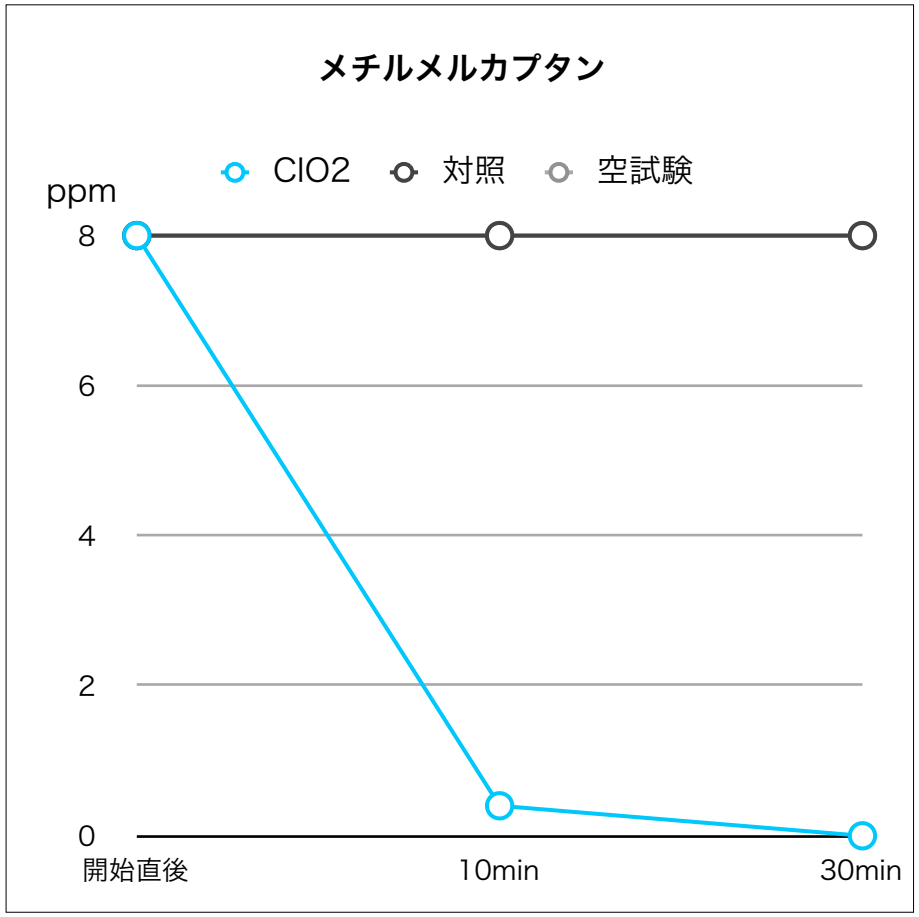
試験手順

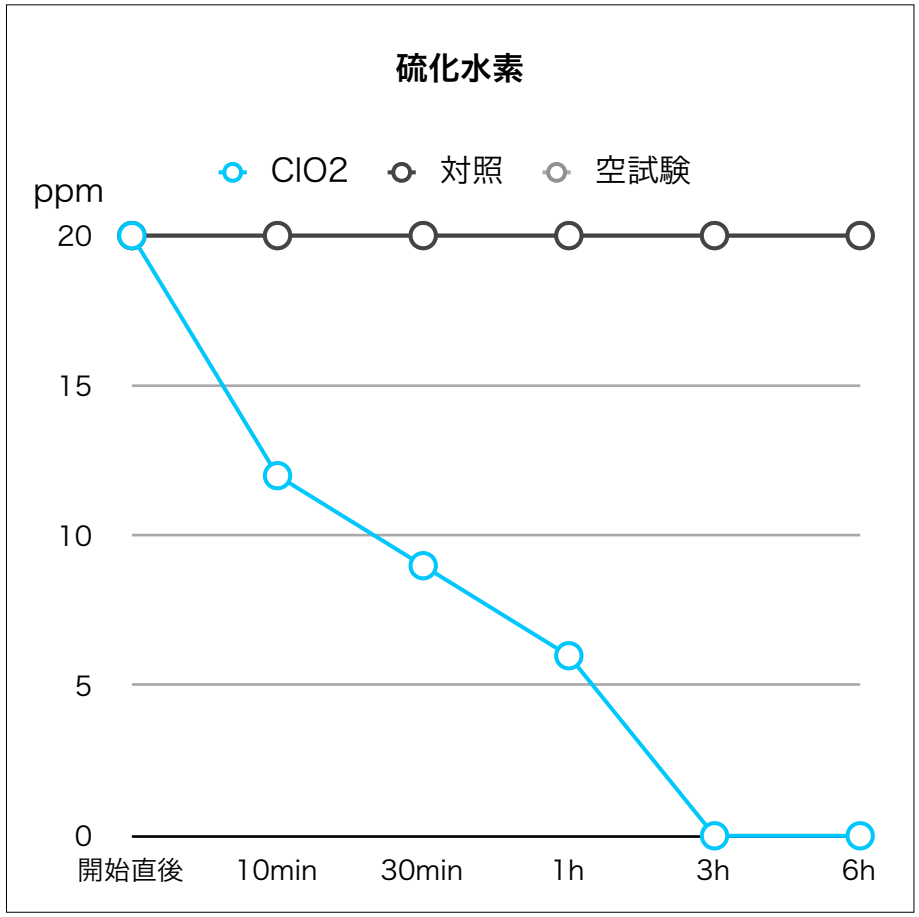
二酸化塩素を担持したビーズ（20g）と３Ｌのにおい袋に入れ試験対象ガスを添加。静置後ガス検知管またはガスクロマトグラフにより測定した。

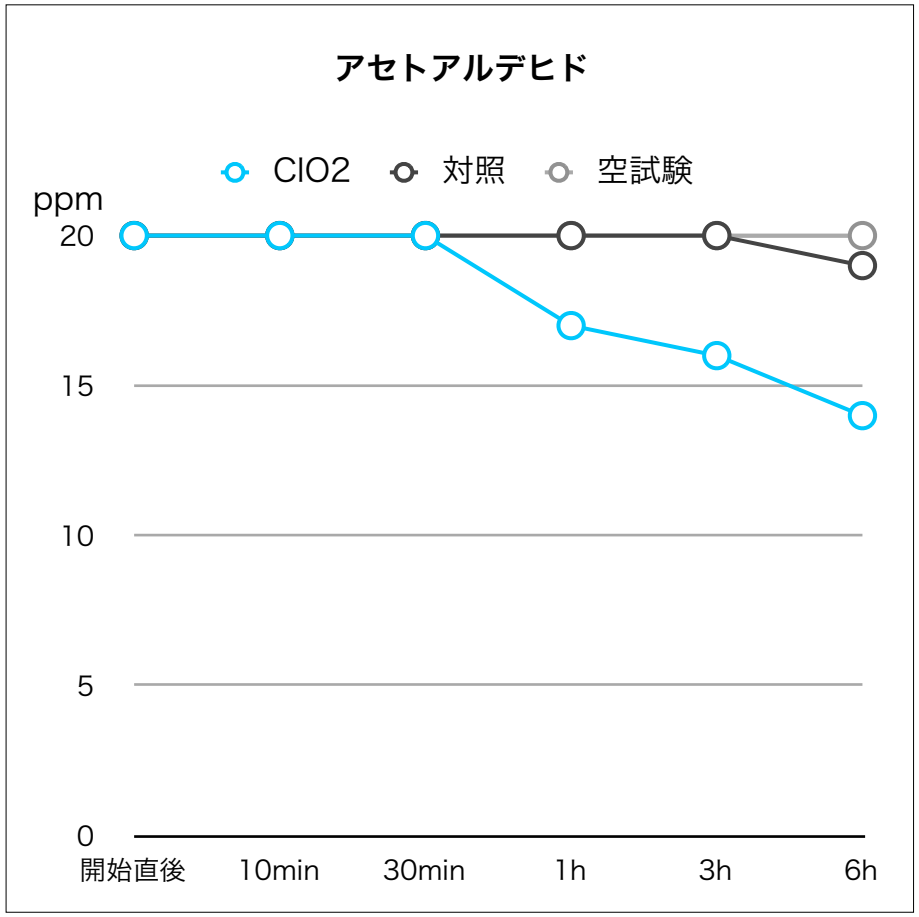
使用製品 | 用時破袋型二酸化塩素徐放剤：KESTAS および 空快ルームケア

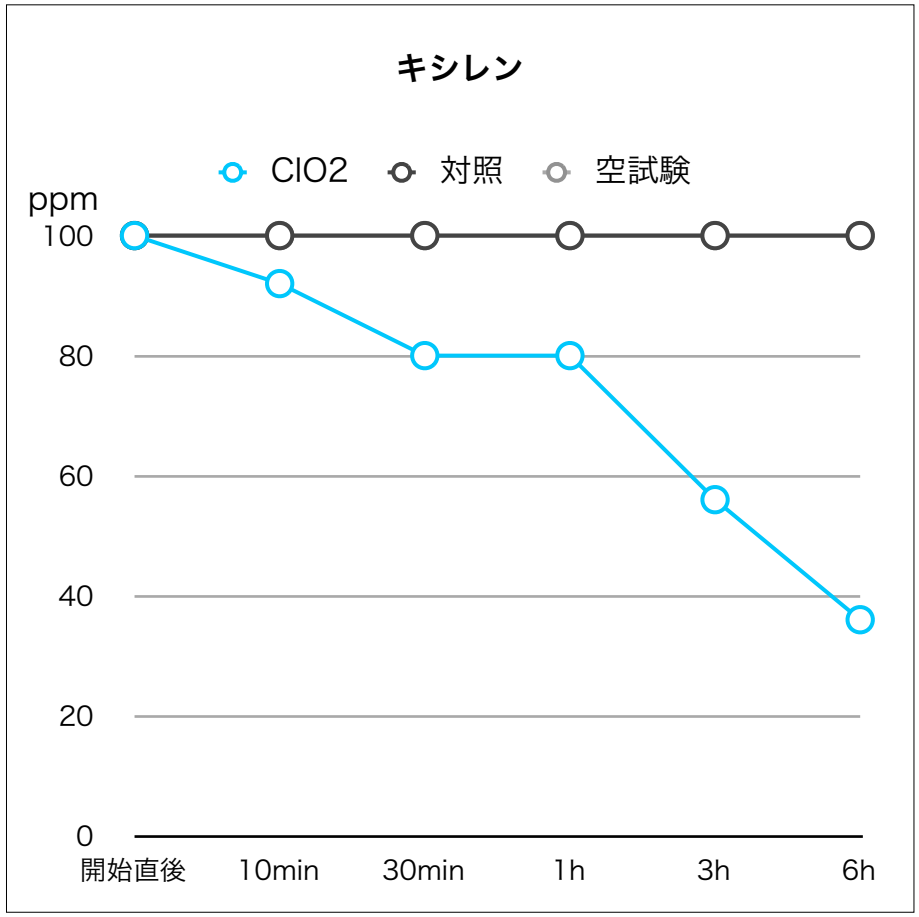


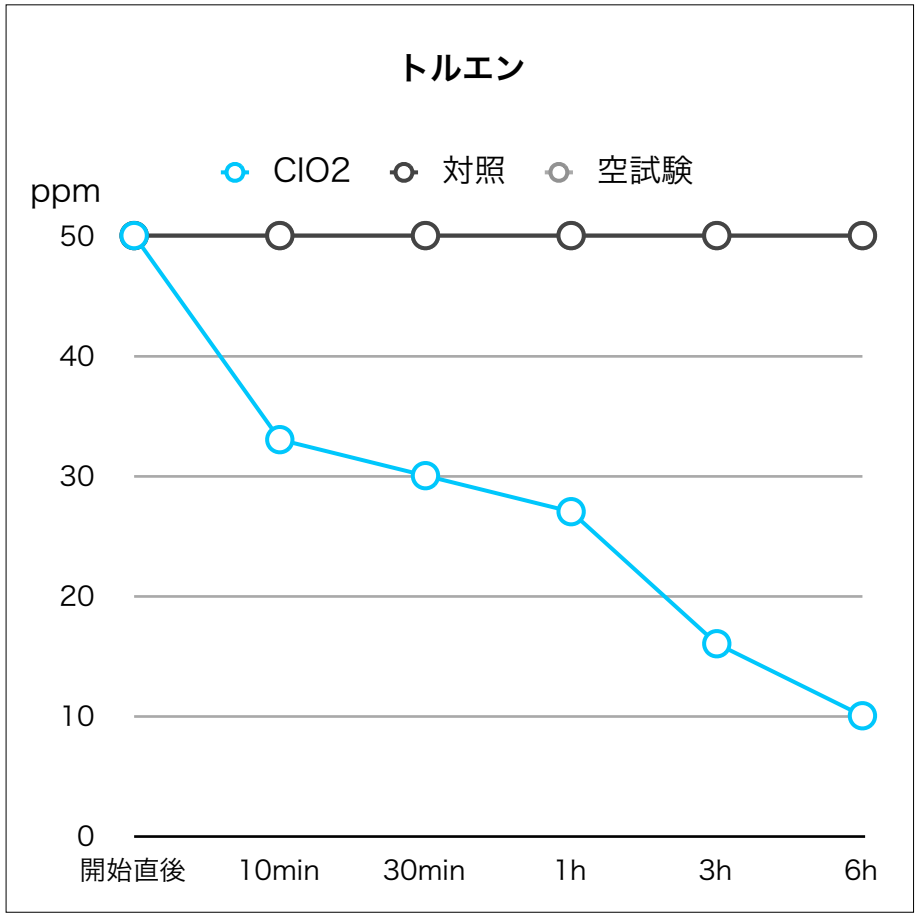


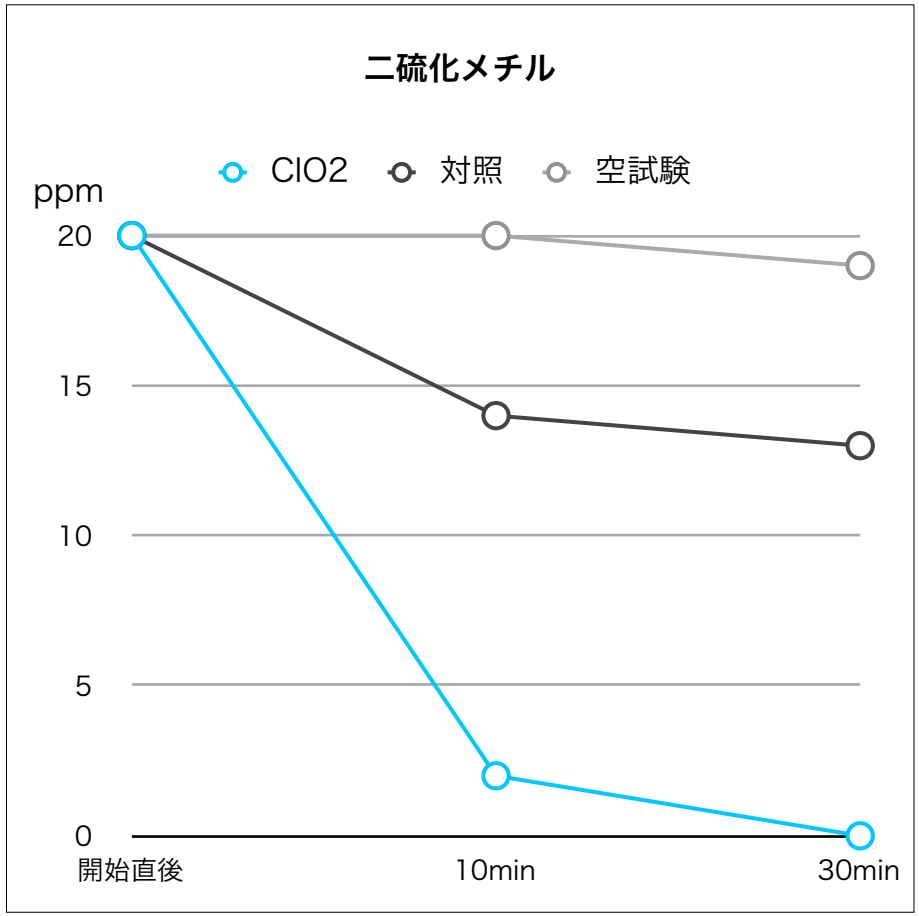

メチルメルカプタン
ClO2
対照
空試験
ppm
8
6
4
2
0
開始直後
10min
30min

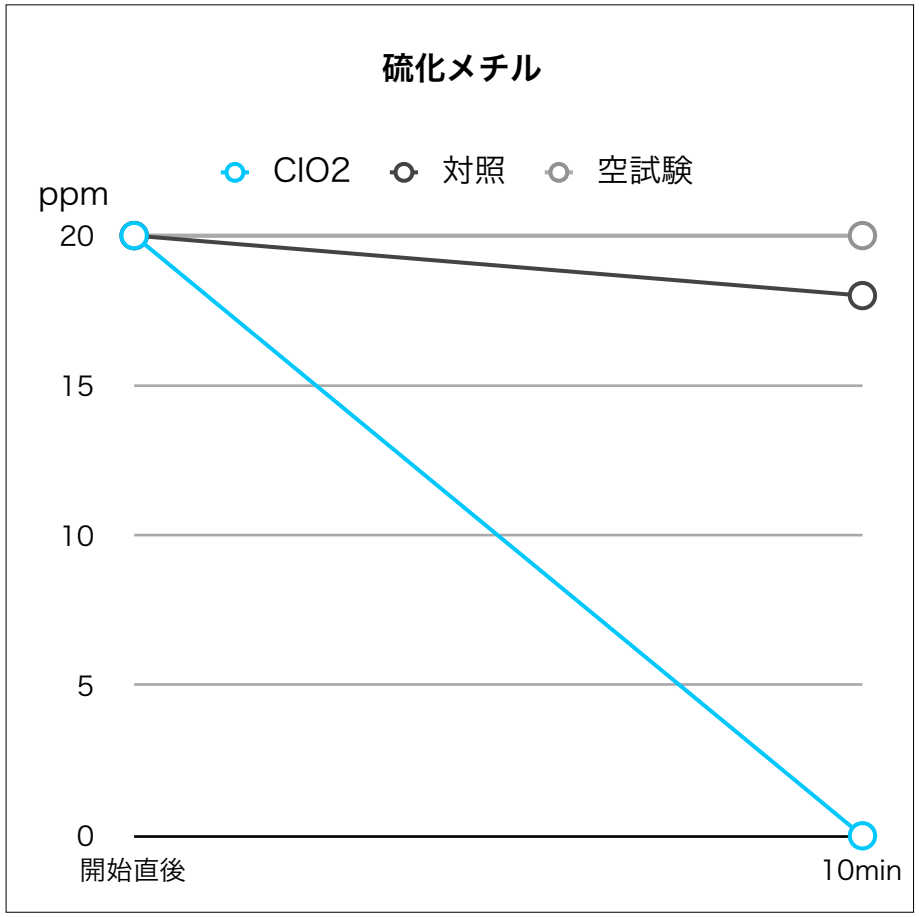

硫化水素
ClO2
対照
空試験
ppm
20
15
10
5
0
開始直後
10min
30min
1h
3h
6h

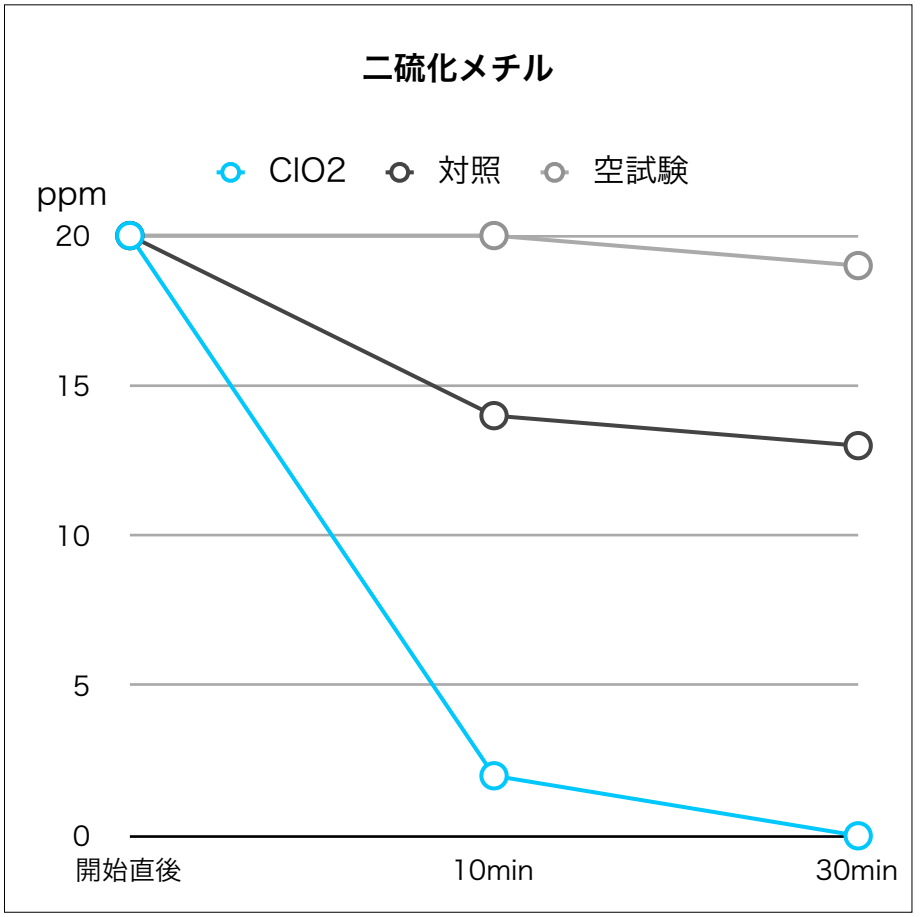

アセトアルデヒド
ClO2
対照
空試験
ppm
20
15
10
5
0
開始直後
10min
30min
1h
3h
6h

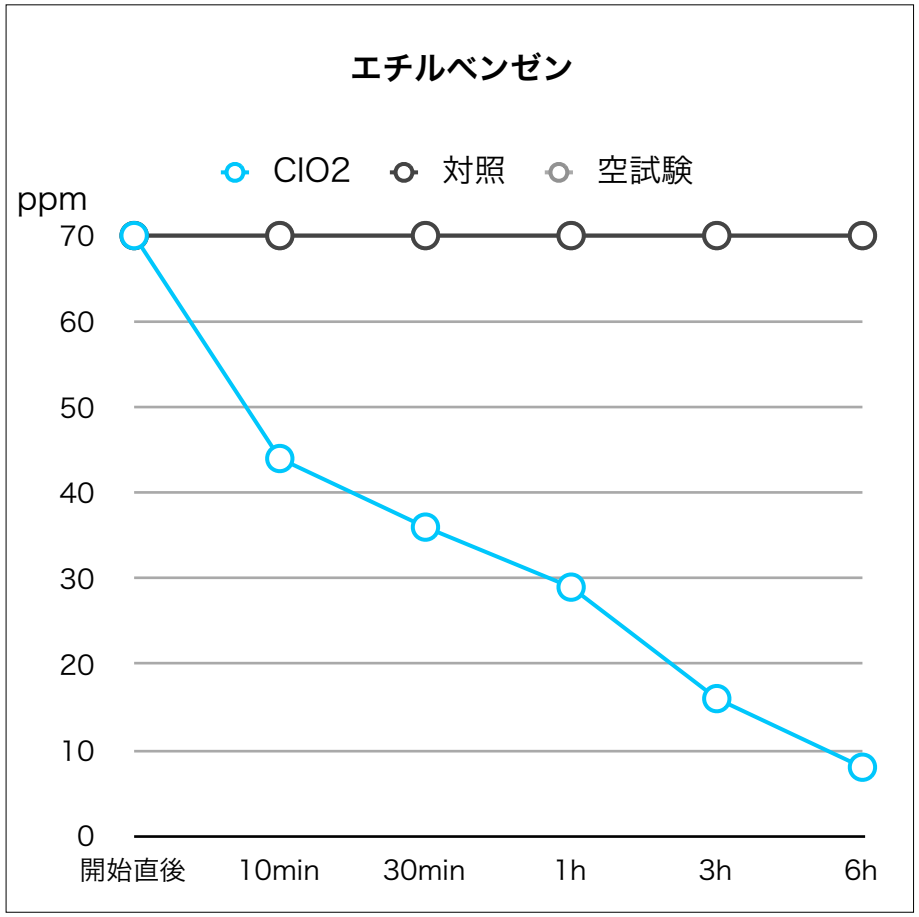

キシレン
ClO2
対照
空試験
ppm
100
80
60
40
20
0
開始直後
10min
30min
1h
3h
6h

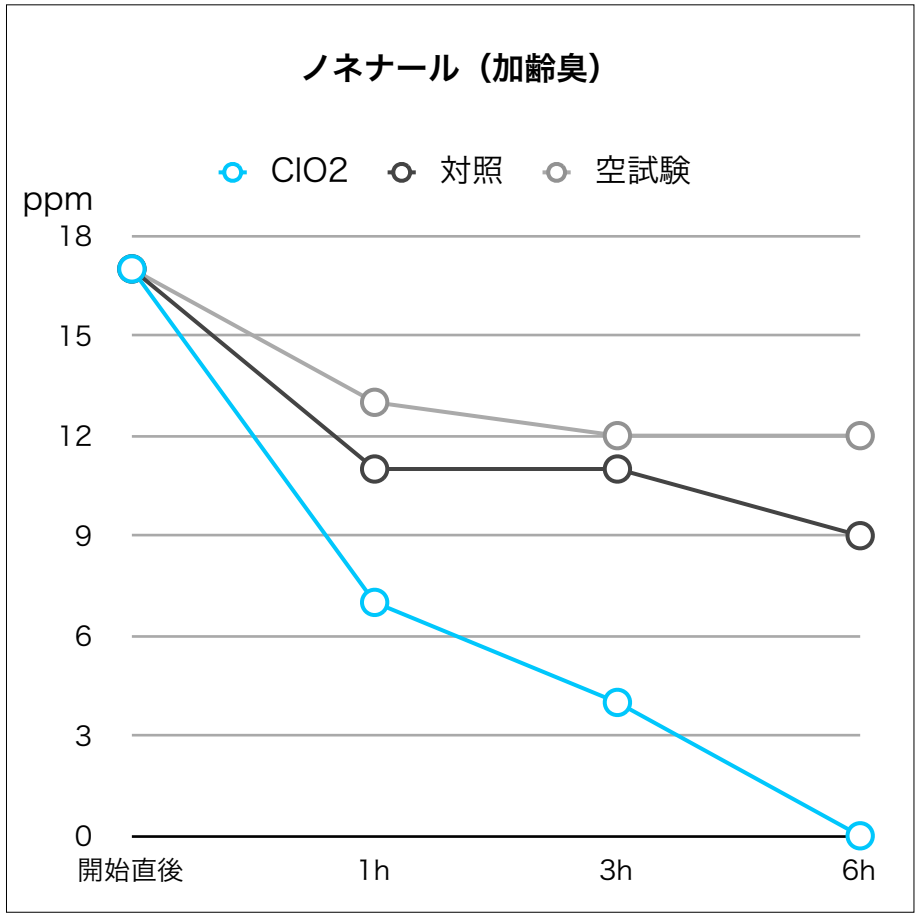

トルエン
ClO2
対照
空試験
ppm
50
40
30
20
10
0
開始直後
10min
30min
1h
3h
6h


二硫化メチル
ClO2
対照
空試験
ppm
20
15
10
5
0
開始直後
10min
30min


硫化メチル
ClO2
対照
空試験
ppm
20
15
10
5
0
開始直後
10min


二硫化メチル
ClO2
対照
空試験
ppm
20
15
10
5
0
開始直後
10min
30min


エチルベンゼン
ClO2
対照
空試験
ppm
70
60
50
40
30
20
10
0
開始直後
10min
30min
1h
3h
6h


ノネナール（加齢臭）
ClO2
対照
空試験
ppm
18
15
12
9
6
3
0
開始直後
1h
3h
6h

参考資料

二酸化塩素が有効な微生物リスト
次ページの細菌・真菌・ウイルス・原生生物などのリストはアメリカの環境保護局（ＥＰＡ）によって、二酸化塩素による有効性が認定されている微生物のリストです。

近年問題になっている、SARSやMERSなどコロナウイルスについても有効性が認められています。

Chlorine Dioxide is registered with the United States Environmental Protection Agency (EPA) as a disinfectant, sanitizer and sterilizer which is defined as the ability "to destroy or eliminate all forms of microbial life including fungi, viruses, and all forms of bacteria and their spores". Below are some of the more commonly seen organisms that Chlorine Dioxide has been proven to eliminate. To date, no organism tested against Chlorine Dioxide has proven to be resistant.

Bacteria
Bacillus anthracis Ames 30
Blakeslea trispora 28
Bordetella bronchiseptica 8
Brucella suis 30
Burkholderia mallei 36
Burkholderia pseudoomallei 36
Campylobacter jejuni 39
Clostridium botulinum (Botulism) 32
Clostridium difficile 44
Clostridium perfringens (Epsilon Toxin) 59
Corynebacterium bovis 8
Coxiella burneti (Q-fever) 35
E. coli ATCC 11229 3
E. coli ATCC 51739 1
E. coli K12 1
E. coli O157:H7 13B88 1
E. coli O157:H7 204P 1
E. coli O157:H7 ATCC 43895 1
E. coli O157:H7 EDL933 13
E. coli O157:H7 G5303 1
E. coli O157:H7 C7927 1
Erwinia carotovora (soft rot) 21
Franscicella tularensis 30
Fusarium sambucinum (dry rot) 21
Fusarium solani var. coeruleum (dry rot) 21
Helminthosporium solani (silver scruff) 21
Klebsiella pneumonia 3
Lactobacillus acidophilus NRRL B1910 1
Lactobacillus brevis 1
Lactobacillus buchneri 1
Lactobacillus plantarum 5
Legionella 38
Legionella pneumophila 42
Leuconostoc citreum TPB85 1
Leuconostoc mesenterpides 5
Listeria innocua ATCC 33090 1
Listeria monocytogenes F4248 1
Listeria monocytogenes F5069 19
Listeria monocytogenes LCDC-81-861 1
Listeria monocytogenes LCDC-81-886 19
Listeria monocytogenes Scott A 1
Methicillin-resistant Staphylococcus aureus (MRSA) 3
Multiple Drug Resistant Salmonella typhimurium (MDRS) 3
Mycobacterium bovis 8
Mycobacterium fortuitum 42
Pediococcus acidilactici PH3 1
Pediococcus pentosaceus 45
Pseudomonas aeruginosa 3
Psittacosis (Chlamydia psittaci) 58
Salmonella 1
Salmonella agona 1
Salmonella anatum Group E 1
Salmonella choleraesuis ATCC 13076 1
Salmonella choleraesuis 8
Salmonella enterica (PT30) BAA-1045 1
Salmonella enterica S. Enteritidis 13
Salmonella enterica S. Javiana 13
Salmonella enterica S. Montevideo 13
Salmonella javiana 1
Salmonella newport 4
Salmonella paratyphi (Typhoid Fever) 52
Salmonella typhimurium C133117 1
Salmonella anatum Group E 1
Shigella 38
Staphylococcal enterotoxin B 56
Staphylococcus aureus 23
Staphylococcus aureus ATCC 25923 1
Staphylococcus epidermidis 45
Staphylococcus faecalis ATCC 344 1
Staphylococcus gallinarum 45
Staphylococcus hominis 45
Staphylococcus xylosus 45
Streptococcus mutans 45
Tuberculosis 3
Tsukamurella inchonensis 45
Vancomycin-resistant Enterococcus faecalis (VRE) 3
Vibrio cholera 53
Vibrio strain Da-2 37
Vibrio strain Sr-3 37
Yersinia enterocolitica 40
Yersinia pestis 30
Yersinia ruckerii ATCC 29473 31

Viruses:
Adenovirus Type 40 6
Adenovirus Human 62
Adenovirus Canine 62
Arenaviridae (Arenavirus) including Gbagroube, Ippy, Kodoko, Lassa, Lujo, Luna, Lunk, Lymphocytic Choriomeningitis, Merino Walk, Menekre, Mobala, Mopeia, Tacaribe, Amapari, Chapare, Flexal, Guanarito, Junin, Latino, Machupo, Oliveros, Parana, Pichinde, Pirital, Sabia, Tamiami, Whitewater Arroyo 54
Calicivirus 42
Canine Distemper Virus 62
Canine Parvovirus 8, 62
Coronavirus 3
Ebola Virus 61
Enterovirus including D68, D71 60
Feline Calici Virus 3
Filoviridae (Filovirus) Marburg 54
Foot and Mouth Disease 8
Hantavirus 8
Hepatitis A Virus 3
Hepatitis B Virus 8
Hepatitis C Virus 8
Herpes Virus 62
Human coronavirus 8
Human Immunodeficiency Virus 3
Human Rotavirus Type 2 (HRV) 15
Influenza A 22
Influenza H1N1, H5N1 49
Influenza H1N1, H1N2, H2N2, H3N1, H3N2, H3N8, H5N1, H5N2, H5N3, H5N8, H5N9, H7N1, H7N2, H7N3, H7N4, H7N7, H9N2, and H10N7 50
Influenza H7N9 51
Measles Virus 62
Minute Virus of Mouse (Parvovirus, MVM-i) 8
Minute Virus of Mouse (Parvovirus, MVM-p) 8
Mouse Hepatitis Virus (MHV-A59) 8
Mouse Hepatitis Virus (MHV-JHM) 8
Mouse Parvovirus type 1 (MPV-1) 8
Murine Parainfluenza Virus Type 1 (Sendai) 8
Newcastle Disease Virus 8
Norwalk Virus 8
Poliovirus 20
Rotavirus 3
Severe Acute Respiratory Syndrome (SARS) Coronavirus 43
Sialodacryoadenitis Virus (SDAV) 8
Simian rotavirus SA-11 15
Theiler's Mouse Encephalomyelitis Virus (TMEV) 8
Vaccinia Virus 10
Variola vera (Smallpox) 57

Algae/Fungi/Mold/Yeast:
Alternaria alternate 26
Aspergillus aeneus 28
Aspergillus aurolatus 28
Aspergillus brunneo-uniseriatus 28
Aspergillus caespitosus 28
Aspergillus cervinus 28
Aspergillus clavatonanicus 28
Aspergillus egyptiacus 28
Aspergillus elongates 28
Aspergillus fischeri 28
Aspergillus fumigatus 28
Aspergillus giganteus 28
Aspergillus longivesica 28
Aspergillus niger 12
Aspergillus ochraceus 28
Aspergillus parvathecius 28
Aspergillus sydowii 28
Aspergillus uniguis 28
Aspergillus ustus 28
Aspergillus versicolor 28
Botrytis spp. 3
Botrytis cinerea 47
Candida spp. 5
Candida albicans 28
Candida dubliniensis 28
Candida edax 45
Candida maltose 28
Candida parapsilosis 28
Candida sake 28
Candida tropicalis 28
Candida viswanathil 28
Chaetomium globosum 7
Cladosporium cladosporioides 7
Cryptococcus curvatus A 45
Cryptosporiopsis perennans 47
Debaryomyces etchellsii 28
Eurotium spp. 5
Fusarium solani 3
Lodderomyces elongisporus 28
Mucor circinelloides 28
Mucor flavus 28
Mucor indicus 28
Mucor piriformis 47
Mucor rademosus 28
Mucor ramosissimus 28
Mucor saturnus 28
Penicillium chrysogenum 7
Penicillium digitatum 3
Penicillium expansum 47
Penicillium herquei 28
Penicillium spp. 5
Phormidium boneri 3
Pichia pastoris 3
Poitrasia circinans 28
Rhizopus oryzae 28
Roridin A 33
Saccharomyces cerevisiae 3
Stachybotrys bisbyi 45
Stachybotrys chartarum 7
T-mentag (athlete's foot fungus) 3
Verrucarin A 33

Bacterial Spores:
Alicyclobacillus acidoterrestris 17
Bacillus coagulans 12
Bacillus anthracis 10
Bacillus anthracis Ames 30
Bacillus atrophaeus 14
Bacillus atrophaeus ATCC 49337 31
Bacillus megaterium 12
Bacillus polymyxa 12
Bacillus pumilus ATCC 27142 12
Bacillus pumilus ATCC 27147 11
Bacillus subtillis (globigii) ATCC 9372 11
Bacillus subtillis ATCC 19659 31
Bacillus subtillis 5230 12
Bacillus thuringiensis 18
Clostridium. sporogenes ATCC 19404 12
Geobacillus stearothermophilus ATCC 12980 11
Geobacillus stearothermophilus ATCC 7953 31
Geobacillus stearothermophilus VPHP 11

Beta Lactams:
Amoxicillin 29
Amplicillin 29
Cefadroxil 29
Cefazolin 29
Cephalexin 29
Imipenem 29
Penicillin G 29
Penicillin V 29

Protozoa:
Chironomid larvae 27
Cryptosporidium 34
Cryptosporidium parvum Oocysts 9
Cyclospora cayetanensis oocysts 41
Giardia 34

Microsporidia:
Encephalitozoon intestinalis 41

Chemical Decontamination:
Cylindrospermopsin (CYN) 25
Dihydronicotinamide adenine dinucleotide 24
Microcystin-LR (MC-LR) 25
Mustard Gas 46
Ricin Toxin 10
Sarin 46
Soman (GD) 46
VX 46

References:

1. Selecting Surrogate Microorganism for Evaluation of Pathogens on Chlorine Dioxide Gas Treatment, Jeongmok Kim, Somi Koh, Arpan Bhagat, Arun K Bhunia and Richard H. Linton. Purdue University Center for Food Safety 2007 Annual Meeting October 30 - 31, 2007 at Forestry Center, West Lafayette, IN.
2. Decontamination of produce using chlorine dioxide gas treatment, Richard Linton, Philip Nelson, Bruce Applegate, David Gerrard, Yingchang Han and Travis Selby.
3. Chlorine Dioxide, Part 1 A Versatile, High-Value Sterilant for the Biopharmaceutical Industry, Barry Wintner, Anthony Contino, Gary O'Neill. BioProcess International DECEMBER 2005.
4. Chlorine Dioxide Gas Decontamination of Large Animal Hospital Intensive and Neonatal Care Units, Henry S. Luftman, Michael A. Regits, Paul Lorcheim, Mark A. Czarneski, Thomas Boyle, Helen Aceto, Barbara Dallap, Donald Munro, and Kym Faylor. Applied Biosafety, 11(3) pp. 144-154 © ABSA 2006
5. Efficacy of chlorine dioxide gas as a sanitizer for tanks used for aseptic juice storage, Y. Han, A. M. Guentert*, R. S. Smith, R. H. Linton and P. E. Nelson. Food Microbiology, 1999, 16, 53]61
6. Inactivation of Enteric Adenovirus and Feline Calicivirus by Chlorine Dioxide, Jeanette A. Thurston-Enriquez, Charles N. Haas, Joseph Jacangelo, and Charles P. Gerba. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, June 2005, p. 3100–3105.
7. Effect of Chlorine Dioxide Gas on Fungi and Mycotoxins Associated with Sick Building Syndrome, S. C. Wilson,* C. Wu, L. A. Andriychuk, J. M. Martin, T. L. Brasel, C. A. Jumper, and D. C. Straus. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Sept. 2005, p. 5399–5403.
8. BASF Aseptrol Label
9. Effects of Ozone, Chlorine Dioxide, Chlorine, and Monochloramine on Cryptosporidium parvum Oocyst Viability, D. G. KORICH, J. R. MEAD, M. S. MADORE, N. A. SINCLAIR, AND C. R. STERLING. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, May 1990, p. 1423-1428.

10. NHSRC's Systematic Decontamination Studies, Shawn P. Ryan, Joe Wood, G. Blair Martin, Vipin K. Rastogi (ECBC), Harry Stone (Battelle). 2007 Workshop on Decontamination, Cleanup, and Associated Issues for Sites Contaminated with Chemical, Biological, or Radiological Materials Sheraton Imperial Hotel, Research Triangle Park, North Carolina June 21, 2007.
11. Validation of Pharmaceutical Processes 3rd edition, edited by Aalloco James, Carleton Frederick J. Informa Healthcare USA, Inc., 2008, p267
12. Chlorine dioxide gas sterilization under square-wave conditions. Appl. Environ. Microbiol. 56: 514-519 1990. Jeng, D. K. and Woodworth, A. G.
13. Inactivation kinetics of inoculated Escherichia coli O157:H7 and Salmonella enterica on lettuce by chlorine dioxide gas. Food Microbiology Volume 25, Issue 2, February 2008, Pages 244-252, Barakat S. M. Mahmoud and R. H. Linton.
14. Determination of the Efficacy of Two Building Decontamination Strategies by Surface Sampling with Culture and Quantitative PCR Analysis. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Aug. 2004, p. 4740–4747. Mark P. Buttner, Patricia Cruz, Linda D. Stetzenbach, Amy K. Klima-Comba, Vanessa L. Stevens, and Tracy D. Cronin
15. Inactivation of Human and Simian Rotaviruses by Chlorine Dioxide. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, May 1990, p. 1363-1366. YU-SHIAW CHEN AND JAMES M. VAUGHN
16. Information obtained from CSI internal testing with Pharmaceutical customer.May 2006 Pages 364-368
17. Efficacy of chlorine dioxide gas against *Alicyclobacillus acidoterrestris* spores on apple surfaces, Sun-Young Lee, Genisis Iris Dancer, Su-sen Chang, Min-Suk Rhee and Dong-Hyun Kang**,** International Journal of Food Microbiology, Volume 108, issue 3, May 2006 Pages 364-368
18. Decontamination of Bacillus thuringiensis spores on selected surfaces by chlorine dioxide gas, Han Y, Applegate B, Linton RH, Nelson PE. J Environ Health. 2003 Nov;66(4):16-21.
19. Decontamination of Strawberries Using Batch and Continuous Chlorine Dioxide Gas Treatments, Y Han, T.L. Selby, K.K.Schultze, PE Nelson, RH Linton. Journal of Food Protection, Vol 67, NO 12, 2004.
20. Mechanisms of Inactivation of Poliovirus by Chlorine Dioxide and Iodine, MARIA E. ALVAREZ AND R. T. O'BRIEN, APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Nov. 1982, p. 1064-1071
21. The Use of Chlorine Dioxide in potato storage, NORA OLSEN, GALE KLEINKOPF, GARY SECOR, LYNN WOODELL, AND PHIL NOLTE, University of Idaho, BUL 825.
22. Protective effect of low-concentration chlorine dioxide gas against influenza A virus infection Norio Ogata and Takashi Shibata Journal of General Virology (2008), 89, 60–67
23. Preparation and evaluation of novel solid chlorine dioxide-based disinfectant powder in single-pack Zhu M, Zhang LS, Pei XF, Xu X. Biomed Environ Sci. 2008 Apr;21(2):157-62.
24. Chlorine dioxide oxidation of dihydronicotinamide adenine dinucleotide (NADH), Bakhmutova-Albert EV, Margerum DW, Auer JG, Applegate BM. Inorg Chem. 2008 Mar 17;47(6):2205-11. Epub 2008 Feb 16.
25. Oxidative elimination of cyanotoxins: comparison of ozone, chlorine, chlorine dioxide and permanganate, Rodríguez E, Onstad GD, Kull TP, Metcalf JS, Acero JL, von Gunten U., Water Res. 2007 Aug;41 (15):3381-93. Epub 2007 Jun 20.
26. Inhibition of hyphal growth of the fungus Alternaria alternata by chlorine dioxide gas at very low concentrations, Morino H, Matsubara A, Fukuda T, Shibata T. Yakugaku Zasshi. 2007 Apr;127(4):773-7. Japanese.
27. Inactivation of Chironomid larvae with chlorine dioxide, Sun XB, Cui FY, Zhang JS, Xu F, Liu LJ., J Hazard Mater. 2007 Apr 2;142(1-2):348-53. Epub 2006 Aug 18.
28. Information obtained from CSI decontamination at Pharmaceutical facility.
29. Information obtained from CSI beta-lactam inactivation at Pharmaceutical facility.
30. Decontamination of Surfaces Contaminated with Biological Agents using Fumigant Technologies, S Ryan, J Wood, 2008 Workshop on Decontamination, Cleanup, and Associated Issues for Sites Contaminated with Chemical, Biological, or Radiological Materials Sheraton Imperial Hotel, Research Triangle Park, North Carolina September 24, 2008.
31. Sporicidal Action of CD and VPHP Against Avirulent Bacillus anthracis – Effect of Organic Bio-Burden and Titer Challenge Level, Vipin K. Rastogi, Lanie Wallace & Lisa Smith, 2008 Workshop on Decontamination, Cleanup, and Associated Issues for Sites Contaminated with Chemical, Biological, or Radiological Materials Sheraton Imperial Hotel, Research Triangle Park, North Carolina September 25, 2008.
32. Clostridium Botulinum, ESR Ltd, May 2001.
33. Efficacy of Chlorine Dioxide as a Gas and in Solution in the Inactivation of Two Trichothecene Mycotoxins, S. C. Wilson, T. L. Brasel, J. M. Martin, C. Wu, L. Andriychuk, D. R. Douglas, L. Cobos, D. C. Straus, International Journal of Toxicology, Volume 24, Issue 3 May 2005 , pages 181 – 186.
34. Guidelines for Drinking-water Quality, World Health Organization, pg 140.
35. Division of Animal Resources Agent Summary Sheet, M. Huerkamp, June 30, 2003.
36. NRT Quick Reference Guide: Glanders and Melioidosis
37. Seasonal Occurrence of the Pathogenic Vibrio sp. of the Disease of Sea Urchin Strongylocentrotus intermedius Occurring at Low Water Temperatures and the Prevention Methods of the Disease, K. TAJIMA, K. TAKEUCHI, M. TAKAHATA, M. HASEGAWA, S. WATANABE, M. IQBAL, Y.EZURA, Nippon Suisan Gakkaishi VOL.66;NO.5;PAGE.799-804(2000).
38. Biocidal Efficacy of Chlorine Dioxide, TF-249, Nalco Company, 2008.
39. Sensitivity Of *Listeria Monocytogenes, Campylobacter Jejuni* And *Escherichia Coli* Stec To Sublethal Bactericidal Treatments And Development Of Increased Resistance After Repetitive Cycles Of Inactivation, N. Smigic, A. Rajkovic, H. Medic, M. Uyttendaele, F. Devlieghere, Oral presentation. FoodMicro 2008, September 1st – September 4th, 2008, Aberdeen, Scotland.
40. Susceptibility of chemostat-grown Yersinia enterocolitica and Klebsiella pneumoniae to chlorine dioxide, M S Harakeh, J D Berg, J C Hoff, and A Matin, Appl Environ Microbiol. 1985 January; 49(1): 69–72.
41. Efficacy of Gaseous Chlorine Dioxide as a Sanitizer against *Cryptosporidium parvum, Cyclospora cayetanensis*, and *Encephalitozoon intestinalis* on Produce, Y. Ortega, A. Mann, M. Torres, V. Cama, Journal of Food Protection, Volume 71, Number 12, December 2008 , pp. 2410-2414.
42. Inactivation of Waterborne Emerging Pathogens by Selected Disinfectants, J. Jacangelo, pg 23.
43. SARS Fact Sheet, National Agricultural Biosecurity Center, Kansas State University.
44. High sporocidal activity using dissolved chlorine dioxide (SanDes) on different surface materials contaminated by Clostridium difficile spores, Andersson J., Sjöberg M., Sjöberg L., Unemo M., Noren T. Oral presentation. 19th European Congress of Clinical Microbiology and Infectious Diseases, Helsinki, Finland, 16 - 19 May 2009.
45. Information obtained from CSI decontamination at Pharmaceutical facility
46. Systematic Decontamination of CWAs and TICs, S Ryan, E Snyder, H Stone, I MacGregor, D Kenny, T Hayes, J Rogers, J Cappello, R Fitzpatrick, M Stapleton, L Oudejans, B Preston, M Clayton, 2008 Workshop on Decontamination, Cleanup, and Associated Issues for Site Contaminated with Chemical, Biological, or Radiological Materials Sheraton Imperial Hotel, Research Triangle Park, North Carolina September 25, 2008
47. Chlorine Dioxide as an Effective Antimicrobial Pesticide for Sanitation and Disinfection, Griffith D., Mainz E., Etherington R., Vulcan Chemicals, Birmingham, AL (1999)
48. Study performed by the University of Tennessee at Knoxville.
49. Assessment of the Removal and Inactivation of Influenza Viruses H5N1 and H1N1 by Drinking Water Treatment. Lenes, D., Deboosere, N., Menard-Szczebara, F., Jossent, J., Alexandre, V., Machinal C., Vialette M. April 2010
50. Methods of Treating or Preventing Influenza Associated Illness with Oxidative Reductive Potential Water Solutions. Hojabr Alimi, Eileen Thatcher. May 2010.
51. Application of Chlorine Dioxide on the Disinfection of the Indoor Environment in the Elevator. Ching-Shan Hsu, Wei-Che Huang, Nai-Lin An, Ming-Chun Lu, Ming-Jer. Liou, Sheau-Long Lee.
52. EPA Guidance Manual Alternative Disinfectants and Oxidants Report April 1999 pg 4-18
53. Malaysia Journal of Analytical Sciences, Vol 10. No. 1 (2006): pg 83
54. CDC Website
55. Division of Animal Resources Agent Summary Sheet, M. Huerkamp, June 30, 2003
56. FDA Website
57. Biological Agents by S.K. Prasad
58. US National Library of Medicine
59. Biological Safety Manual University of Florida
60. CDC Website
61. CDC Website
62. Bioscience Control, 2010, Vol. 15, No. 2, 45-49