VitalOxide

VitalOxide

7 Solutions in 1 Product

1.E.P.A Registered Hospital Disinfection

2. N.S.F Registered (D-2) “No rinse required on food contact surfaces”

3. Kills Mold and Mildew

4. Eliminates Allergens

5. Odor Eliminator

6. Disinfects HVAC and Air Ducts

7. Soft Surface Sanitizer

VitalOxide

E.P.A Registered Hospital Disinfectant

- **As a Hospital Disinfectant Vital Oxide stands out with a unique blend of efficacy and safety.**

1. Vital Oxide is effective against a wide range of virus and bacteria (see appendix for full list) yet no personal protection equipment is needed during use.
2. In clinical trials Vital Oxide provided a decrease of 95% Acientobacter HAI rate. (see appendix for Nashville General Study)
3. Equally important - Vital Oxide will not promote the growth of drug resistant super bugs.
4. Safe for use on treated articles, carpeting, fabrics, flooring, and frequently touched surfaces - no need to rinse or wipe off.
5. Effective at removing blood stains and other body fluids.

VitalOxide

Vital Oxide is Used to Disinfect HVAC and Air Ducts

- Vital Oxide effectively disinfects HVAC and Air Ducts by inhibiting growth of odor causing bacteria, fungi, and other odor, stain or damage causing organisms in residential, commercial, institutional, and industrial buildings.

Applications:

- Furnaces
- Air Handlers
- Rooftops and Packer Terminal Air Conditioner (PTAC) units.
- Fan coil units
- Air distribution components such as mixing boxes, transfer boxes, transitions and turning vanes as well as associated components.

Vital Oxide in Action:

- Elimination of significant accumulations of contaminants of debris in HVAC and Air Ducts.
- Prevention of regrowth of microbes and fungi
- Non-Corrosive on a wide range of materials
- No rinse or wipe required.

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Vital Oxide is Used as a Soft Surface Sanitizer

Vital Oxide can be used as a sanitizer on a wide range of soft surfaces. Vital Oxide kills odor causing bacteria on soft surfaces by eliminating the source. Great for upholstery, curtains and auto interiors.

Applications:

- Furniture and Pet Bedding
- Curtains and blinds
- Upholstery, couches and sofas
- Carpets and rugs
- Clothing
- Unpleasant odors (tents, outdoor equipment and automobile interiors)

Vital Oxide in Action:

- Elimination of significant accumulations on soft surfaces that cause bad odors and allergic reactions
- Prevention of regrowth of microbes and fungi
- Does not damage fabrics
- No rinse or wipe required.

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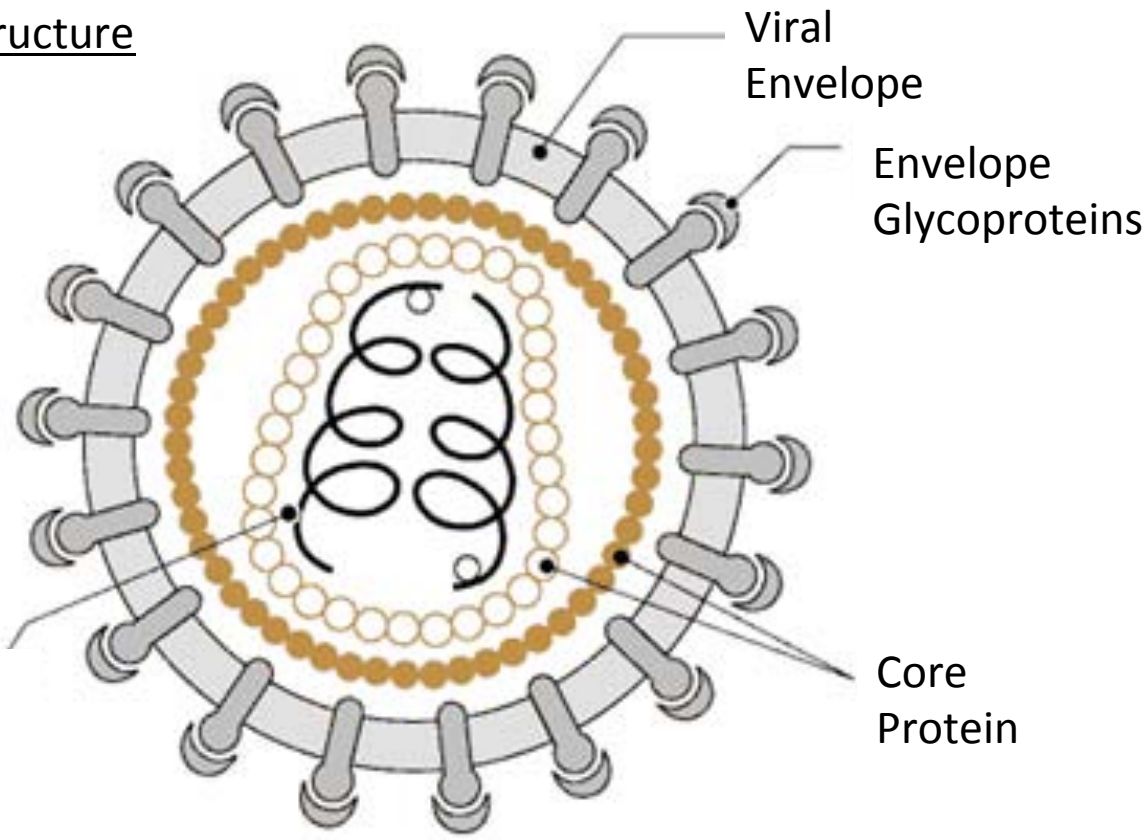
How does Vital Oxide work against Viruses?

Virus Structure



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Viruses are eliminated through selective oxidation . First attacking the viral envelope then the core protein preventing the production of protein and destroying the virus.

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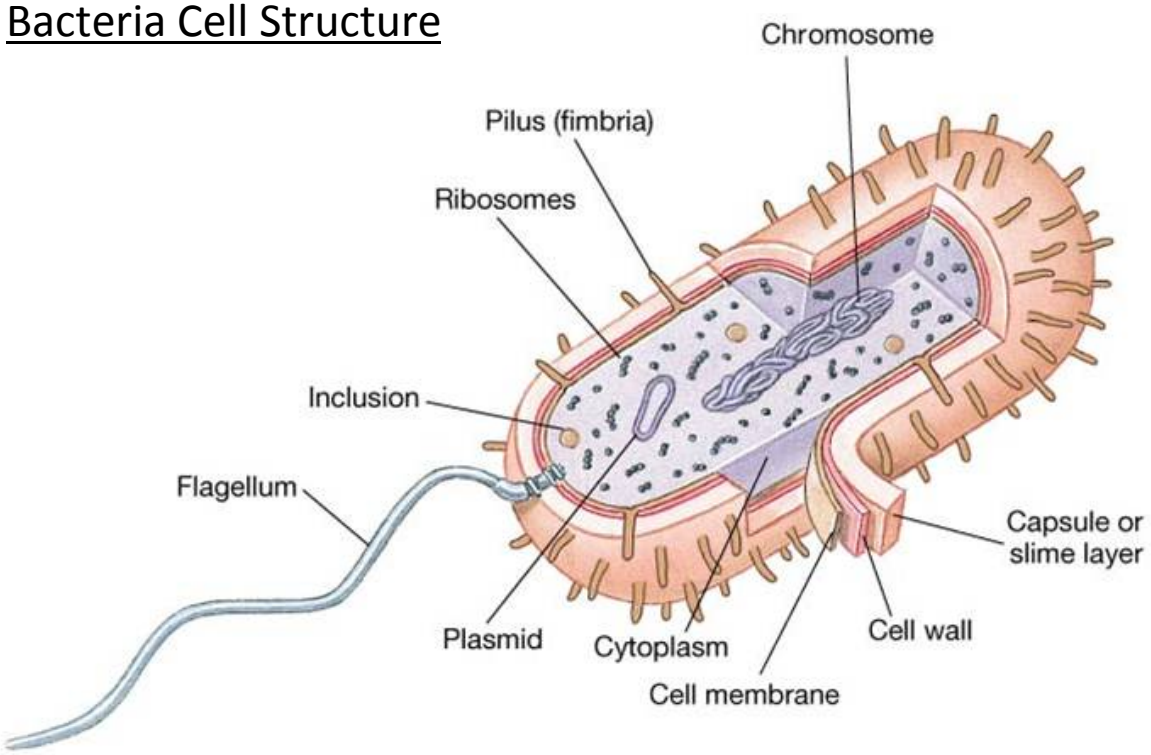
How does Vital Oxide work against Bacteria?

Bacteria Cell Structure



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Bacteria are also eliminated through selective oxidation. Vital Oxide attacks the proteins in the cell wall then disrupting protein synthesis effectually killing the bacteria. Vital Oxide is effective on both gram positive and gram negative bacteria.

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N.S.F Registered No Rinse Require on Food contact surfaces

- **Vital Oxide has received a class D-2 rate from N.S.F. No rinse required on Food Contact Surfaces. This rating category is rarely seen in a hospital strength disinfectant, making Vital Oxide the ideal choice for both restaurant and health care facilities that provide food services.**

1. Can be diluted 9 parts water to 1 part Vital Oxide for economic sanitization.
2. Will not alter the taste of the food prepared on sanitized surfaces.
3. Apply to table top without leaving a lingering offensive odor.
4. Control odors from stale cooking, seafood or spoiled goods.
5. Can be used in bathrooms for disinfection/sanitization and odor control.
6. Fast contact kill time under 30 seconds for sanitization, killing 99.999% of Bacteria

VitalOxide

Odor Eliminator

- Unpleasant odors have been recognized as a warning sign of potential risks to human health and can also maybe the direct cause of some symptoms.

- Vital Oxide contains no masking agents or fragrances to cover offensive odor.

A Few of the Odors Vital Oxide eliminates:

1. Stale cooking odors
2. Musty mold and mildew odor
3. Urine odors and fecal matter odors
4. Septic, waste water treatment and lift station odor
5. Garbage and dumpster odors

VitalOxide

Kill Mold and Mildew

Mold and mildew are fungi that can be found both indoors and outdoors. Molds grow best in warm, damp, and humid conditions, spreading and reproducing by making spores. Mildew requires moisture. The optimal growth range for mildew is 70 to 93 percent relative humidity. Many mold spores can survive in harsh conditions, such as dry conditions, that do not support mold growth.

1. Proven Mold and Mildew killer with up to seven months of residual effects.
2. Safe to use on surfaces traditional molds and mildew killer would damage like marble and carpeting.
3. Can penetrate deep into semi-porous surfaces like concrete to kill the root of the problem.
4. Will not harm plants or damage the exterior of your home.
5. Doesn't contain any VOC's (volatile organic compounds).

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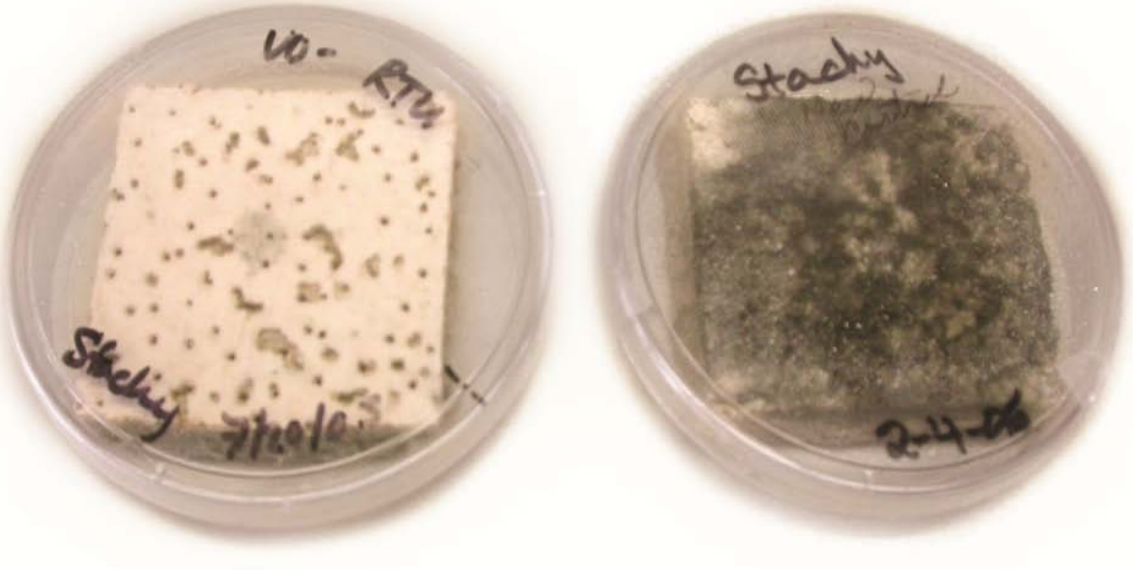
Vital Oxide residual effects

- Vital Oxide has been shown to prevent mold spore germination up to seven months on ceiling tiles.



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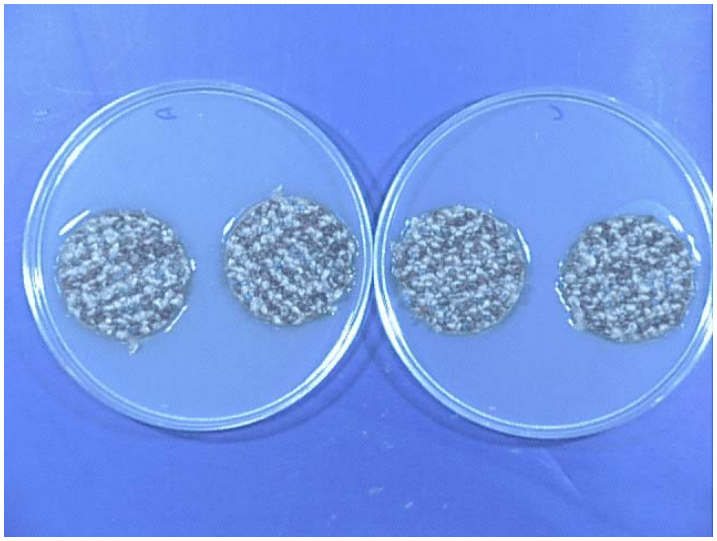
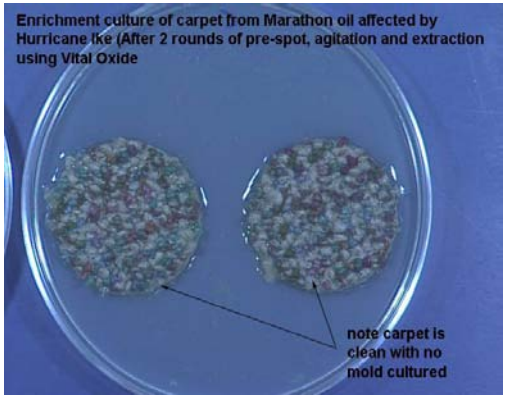
Vital Oxide Effective Against Mold

- Carpet Coupons Enrichment culture of carpet from Marathon Oil building affected by Hurricane Ike (Not Treated with Vital Oxide)



- Carpet Coupons Enrichment culture of carpet from Marathon Oil building affected by Hurricane Ike (after 2 rounds of prespot agitation and extraction using Vital Oxide)



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Eliminates Allergens

Allergens effect over 50 Million Americas of those 50 million approximately 10 Million people are allergic to cat dander, the most common pet allergy. The most common indoor/outdoor allergy triggers are: tree, grass and weed pollen; mold spores; dust mite and cockroach allergen; and, cat, dog and rodent dander.

1. Vital Oxide is Hypoallergenic and is not a allergen trigger.
2. Proven effective against cat, dog, rodent dander, dust mite and cockroach allergen.
3. Has been in use for over ten years by customers with no side effects.
4. Not a skin sensitizer and will not further aggravate allergy symptoms.
5. Can be applied directly to pets and their bedding/sleeping areas.

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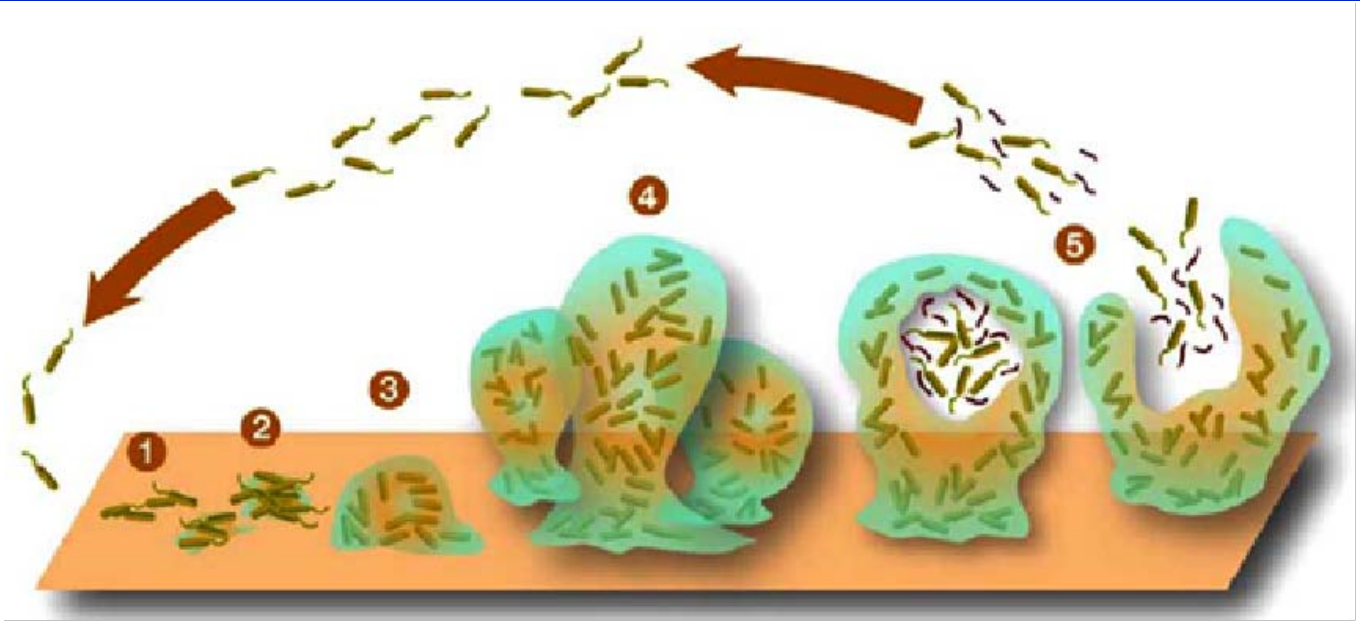
Kills and Prevents Bioflim



Biofilm bacteria excrete extracellular polymeric substances, or sticky polymers, which hold the biofilm together and cement it to the pipe wall. In addition, these polymer strands trap scarce nutrients and protect bacteria from most biocides. According to Mittleman (1985), the development of a mature biofilm may take several hours or several weeks, depending on the water delivery system. *Pseudomonas aeruginosa is a common pioneer bacterium and is used in a* biofilm research. In one experiment (Vanhaecke 1990) researchers found that Pseudomonas cells adhere to stainless steel, even to electropolished surfaces, within ***30 seconds of exposure.***

VitalOxide

Kills and Prevents Bioflim

Under certain conditions biofilms may develop from bacteria, molds and yeast. These biofilms can be invisible on surfaces. Biofilms present challenges to the food service industry due to their inherent characteristic of protecting inner organisms from contact with disinfectants. The Health Care industry estimates biofilm to cause 1 million HAI infection each year, Pseudomonas Aeruginosa and Legionella Pneumophila are common bacteria found in biofilms. In the dairy and agricultural industries biofilm effects the quality of goods by accumulating in water systems.

1. Can penetrate the protective outer film and breakdown hard/soft slim.

2. No need to mechanically remove.

3. Effectively prevent biofilm at very low concentrations.

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Chlorine dioxide compared to chlorine bleach

- When hearing the word chlorine dioxide you probably think of chlorine, a harsh chemical used in the backyard pool. The two are oxidizing agents but have little else in common. Chlorine dioxide is a friendly compound in common use today for treatment of municipal water supplies, the disinfection of meat, seafood, fruit and surfaces, whitening teeth, eliminating odors, and experimentally to treat wounds and infections. Numerous studies have shown that chlorine dioxide, at appropriate concentrations, has no adverse health effects, either by skin contact or ingestion. It does not irritate, leave toxic residues or inhibit wound healing as chlorine bleach does.

VitalOxide

Application Methods

Time saving tools :

- **The Vital Oxide Power Sprayer** and is available to treat small to medium size jobs. It comes equipped with a rotary dial to allow for an adjustment of output volume and particle size. This flexibility makes the Vital Oxide Sprayer is a good choice given its versatility to apply a heavy coat of product or to use a much smaller particle which may be sprayed to eliminate airborne contaminants. Particle size is adjustable between fifteen and thirty microns.

- **Bag-in-a-Box & Proportioner** is convenient eco-sustainable packaging designed to reduce packaging waste, transportation cost, and storage space. This dual-purpose packaging design consists of heavy a duty cardboard box and strong leak resistant bladder equipped with an on/off valve. The unique closed-loop valve allows for either a free pour directly into application equipment, or connection to the Vital Solutions Proportioner.

VitalOxide

Vital Sprayer

Vital Sprayer:
Small
Lightweight
Electric hand-held
The Vital Oxide Sprayer is great for household use but also used successfully in commercial applications.

Technical Specifications
Electricity Required 110v
Cord Length 8ft (2.5m)
Tank capacity 1 quart (950ml)
Particle Size 15-40 Micron
Flow Rate 0-4oz (120ml) per 1 min, adjustable
Dimensions 10”H (25cm) x 4.5”W (11cm) 11”L (28cm)

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Proportioner

- **The Vital Oxide Proportioner** consists of three individual units, two units designed to easily fill spray bottles at a 5:1 deodorizer and carpet/fabric sanitizer and 9:1 Daily Sanitizer with no rinse required dilutions, the third is fitted with an attachment to fill a mop bucket or storage container at the 9:1 Daily Sanitizer dilution.
- Reduced chemical waste and accurate dilutions are realized.
- One step installation, the proportioner unit comes pre-assembled, all you need to do is insert two screws into the wall.
- Closed loop system will prevent any possible contamination.
- Comes with Instructional Placard in both English and Spanish

APPENDIX

VitalOxide

Vital Oxide Environmental Health and Safety Overview

Environmental Protection Agency Toxicity Categories

Vital Oxide

Toxicity Study	Category I High Toxicity	Category II Moderate Toxicity	Category III Low Toxicity	Category IV Very Low Toxicity	EPA Toxicity Rating
Acute Oral	Up to and including 50 mg/kg	>50 thru 500 mg/kg	>500 thru 5000 mg/kg	>5000 mg/kg	Category IV Very Low Toxicity
Acute Dermal	Up to and including 200 mg/kg	>200 thru 2000 mg/kg	>2000 thru 5000 kmg/ kg	>5000 mg/kg	Category IV Very Low Toxicity
Acute Inhalation	Up to and including 0.05 mg/liter	>0.05 thru 0.5 mg/liter	>0.5 thru 2.0 mg/liter	>2mg/liter	Category IV Very Low Toxicity
Eye Irritation	Corrosive (Irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or irritation clearing in 8-21 days.	Corneal involvement or irritation clearing in 7 days or less	Minimal effects clearing in less than 24 hours	Category IV Very Low Toxicity
Skin irritation	Corrosive (Tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (Severe erythema or edema)	Moderate irritation at 72 hours (Moderate erythema)	Mild or slight irritation (No irritation or slight erythema)	Category IV Very Low Toxicity

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Complete Independent Lab Testing Summary 2-24-2015

Bacteria	Use Method	Contact Time	Study Conclusion
Pseudomonas Aeruginosa ATCC 15442	AOAC Use-Dilution	10 min.	Hospital Grade Disinfection
Acinetobacterbaumannii ATCC 19606	AOAC Use-Dilution	10 min.	Hospital Grade Disinfection
Escherichia Coli ATCC 11229	AOAC Food Contact Sanitization	30 sec	99.999 kill (no rinse required)
Staphylococcus aureus ATCC 33592	AOAC Food Contact Sanitization	30 sec	99.999 kill (no rinse required)
Pseudomonas Aeruginosa ATCC 15442	DIS/TSS-8 Carpet Sanitizer	10 min.	99.9 Carpet Sanitizer
Enterbacter aerogenes ATCC 13048	DIS/TSS-8 Carpet Sanitizer	10 min.	99.9 Carpet Sanitizer
Staphylococcus aures MRSA ATCC 33592	AOAC Use-Dilution	10 min.	Disinfection
Listeria monocytogenes ATCC 15313	AOAC Use-Dilution	10 min.	Disinfection
Escherichia Coli ATCC 11229	AOAC Use-Dilution	10 min.	Disinfection
Legionella Pneumophila ATCC 33153	AOAC Use-Dilution	10 min.	Disinfection
Salmonella choleraesuis ATCC 10708	AOAC Use-Dilution	10 min.	Disinfection
Klebsiella pneumoniae NDM-1*	AOAC Use-Dilution	10 min.	Disinfection
Staphylococcus aureus ATCC 6538	Soft Surface Sanitization	5 min.	Sanitization
Enterbacter aerogenes ATCC 13048	Soft Surface Sanitization	5 min.	Sanitization

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Virus	Use Method	Contact Time	Study Conclusion
Rotavirus	Virucidal Efficacy	5 min.	complete inactivation
Hepatitis C Virus	Virucidal Efficacy	5 min.	complete inactivation
Hepatitis B Virus	Virucidal Efficacy	5 min.	complete inactivation
Norovirus Feline Calicivirus	Virucidal Efficacy	5 min.	complete inactivation
Murine Norovirus (MNV-1)	Virucidal Efficacy	5 min.	complete inactivation
Swine Influenza (H1N1) Virus	Virucidal Efficacy	5 min.	complete inactivation
Respiratory Syncytial Virus	Virucidal Efficacy	5 min.	complete inactivation
Human Immunodeficiency Virus (HIV Type 1)	Virucidal Efficacy	5 min.	complete inactivation
Influenza B Virus	Virucidal Efficacy	5 min.	Complete Inactivation
Hepatitis A Virus*	Virucidal Efficacy	5 min.	complete inactivation

Fungi	Use Method	Contact Time	Study Conclusion
Aspergillus Niger ATCC 6275	Hard Surface Mildew Fungistatic	10 min.	>1 week protection
Stachybotrus chartarum	Sporicidal viability	10 min.	no germination of spores
Aspergillus fumigatus	Sporicidal viability	10 min.	no germination of spores
Alternaria alternata	Sporicidal viability	10 min.	no germination of spores
Penicillum sp	Sporicidal viability	10 min.	no germination of spores
Aspergillus Niger ATCC 6275	Fabric Mildew Fungistatic	10 min.	>4 weeks protection

An Intervention to Reduce the Rate of Hospital-Acquired Acinetobacter Infections in an Urban Community Teaching Hospital

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Adjunct Assistant Professor, Family and Community Medicine, Meharry Medical College

BACKGROUND

Incidence of Acinetobacter infection in hospitals has dramatically increased in recent years becoming a significant global problem. (1,2)

These infections are often very difficult and costly to treat and have a mortality rate that approaches 75% in some settings (1, 2, 3). Moreover, Acinetobacter presents significant infection Control challenges since it may colonize both environmental surfaces as well as skin surviving for many months, may readily cause Hospital-Acquired Infections (HAI), is often resistant to multiple antibiotics, and often infects critically ill patients. (2,4,5,6). Accordingly, hospitals are often forced to take extensive and costly steps to prevent its spread that may be impractical in resource-limited settings. We present an easy to implement program for the reduction of Acinetobacter HAI rates in hospitals.

METHODS

For this project we initiated a program in a 100-bed urban community teaching hospital in the U.S. whereby the Hospital Environmental Services Staff was notified immediately and automatically if any culture of any specimen taken from a hospital inpatient was found to be positive for Acinetobacter. Upon receiving this notification, the EVS staff would augment their standard terminal cleaning procedures by fogging the patient room with a chlorine dioxide solution (Figure 1) at the time of patient discharge in addition to their standard cleaning practices (Figure 2). We then reviewed the rates of infections meeting CDC NHSN definitions for HAI resulting from these pathogens for the 12 month period before and after the initiation of the intervention through active and passive surveillance of laboratory and other clinical records, coding data, and syndromic surveillance as well as the rate of community acquired laboratory-confirmed community acquired infections over this same time frame

INTERVENTION PROCESS

Figure 1. Intervention Process

Figure 2. Chlorine Dioxide Solution and fogger

RESULTS

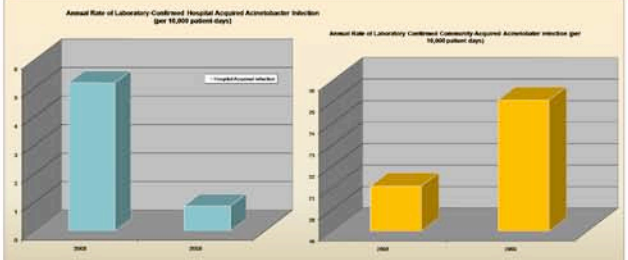

Figure 3. Charts of Results

RESULTS CONT'D

In the 12 month period prior to the intervention, 13 Acinetobacter HAI were identified out of 25089 patient days for an aggregate rate of 5.2/10000 patient days (95% CI 3.0-8.9). For the period of the intervention only 2 Acinetobacter HAI were identified out of 22704 patient days for an aggregate rate of 0.88/10,000 patient days (95% CI 0.2-3.2) a decrease in Acinetobacter HAI Rate of 4.3/10000 (95% CI 1.1-8.0) Over the study period, the incidence of laboratory-confirmed community acquired Acinetobacter infection increased slightly from 4.42/month to 4.75/month.

CONCLUSIONS

The fogging of patient rooms of Acinetobacter infected patients with chlorine dioxide at discharge implemented at our hospital led to significant reductions in Acinetobacter HAI rates without the need for intrusive and costly additional interventions.

ACKNOWLEDGEMENTS

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The Meharry Acinetobacter Study Team (MAST)
Mr. James Burnett

Acinetobacter image courtesy of Case Western Reserve University
http://www.case.edu/think/breakingnews/Bacteria.html

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The author reports no conflicts of interest.

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Effectiveness of Vital Oxide for Controlling Fungal Contamination on Building Materials

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Abstract

Rationale: Mold growth on building materials can be an exposure risk for atopic individuals. The gas chlorine dioxide is an effective fungicide but is unstable. Vital oxide (VO) is an aqueous solution containing either 0.2% or 0.5% chlorine dioxide in a stabilized form. The goal of this investigation was to determine the effects of VO on fungi commonly found growing on building materials.

Methods: Ceiling tile and sheetrock squares (36 cm^2) were sterilized and then saturated with either sterile distilled water or various concentrations of VO. Saturated squares were inoculated with a spore suspension of one of the following fungi: *Alternaria alternata, Aspergillus fumigatus, Aspergillus versicolor, Chaetomium globosum, Penicillium* sp., and *Stachybotrys chartarum*. Cultures were incubated at room temperature for up to eight weeks. Spray applications of VO were also tested on ceiling tile squares inoculated with *Asp. fumigatus* or *S. chartarum*. Spore germination of all six species was evaluated in Sabouraud's broth with and without VO for 96 hrs.

Results:VO solutions containing either 0.1% or 0.2% chlorine dioxide inhibited growth of all six fungi on both ceiling tile and sheetrock squares. Spray applications were also effective for the species tested. In the germination experiments, some spore germination occurred in the medium with 0.1% chlorine dioxide ranging from <1% germination for *Alternaria* spores to 18% for *Chaetomium* spores; however, media with higher chlorine dioxide levels prevented spore germination for all species.

Conclusions:VO inhibited growth of fungi on sheetrock and ceiling tiles and shows possible applications for control of indoor fungal contamination.

Introduction

- Water-damaged building materials, such as ceiling tiles and sheetrock, are prone to fungal contamination due to their high cellulose content. Fungal growth on these materials can be an exposure risk for mold sensitive individuals.
- The gas chlorine dioxide is an antimicrobial pesticide known for its disinfectant properties for the past century. This gas is an effective fungicide but requires special handling. It has been unstable in liquid and is often prepared on-site when liquid applications are needed.
- Vital oxide (VO) is an aqueous solution containing either 0.2% or 0.5% chlorine dioxide in a stabilized form. The current project was undertaken to determine the effectiveness of VO for controlling fungal growth on building materials.

Methods and Materials

- **Vital Oxide**: Two preparations of Vital Oxide (VO) were used in these experiments: Ready To Use (VO-RTU) with 0.2% ClO_2 and Professional Strength (VO-PS) at 0.5% ClO_2
- **Spore germination**: Spore suspensions of *Alternaria alternata, Aspergillus fumigatus, Aspergillus versicolor, Chaetomium globosum, Penicillium* sp., and *Stachybotrys chartarum* were prepared by harvesting spores from cultures grown on malt extract agar. Spore germination of all six species was evaluated in Sabouraud's broth with and without VO.
- **Building material cultures**: Ceiling tile (CTS) and sheetrock (SRS) squares (36 cm^2) were sterilized by autoclaving and then saturated with either sterile distilled water or various concentrations of VO. Saturated squares were inoculated with a spore suspension of test fungi and incubated at room temperature for up to 8 weeks.
- **Spray application of VO**: Sterile CTS and SRS were saturated with sterile distilled water and inoculated with test fungi. When growth was visible, half the materials were sprayed with 5 sprays (3.5 ml) VO. Incubation continued for up to 10 wks.
- **Viability Tests**: Sterile SRS were saturated with sterile distilled water and inoculated with *Stachybotrys chartarum* or *Aspergillus fumigatus* and incubated 2 to 4 wks. One half of the cultures were sprayed with 7 sprays (5 ml) of VO-RTU. SRS were incubated for an additional 48 hrs. Spores were harvested with a cell lifter and placed in 10 ml of sterile water. Spores were counted with a hemacytometer and percent viability was determined by dilution plating.

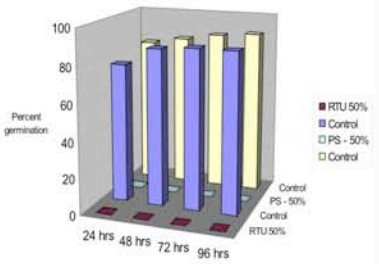
Results

- Culture medium with 50% VO-RTU was effective in inhibiting spore germination for *Alternaria, Stachybotrys*, and *Penicillium* spores. *Chaetomium* spores had an 18% germination rate. The medium with 50% of VO-PS was effective in inhibiting germination for all spores.
- Pretreatment of CTS and SRS with VO-RTU was effective in preventing fungal growth. In fact, CTS were still able to inhibit fungal growth 7 months after saturation.
- Spray applications using VO-RTU on CTS and SRS with active fungal growth resulted in a resumption of fungal growth within approximately 2 wks when CTS or SRS were water saturated and not allowed to dry.
- Spray applications using VO-PS were more effective inhibiting fungal growth up to 2 months for some fungi even in water saturated conditions.
- Spray applications of VO-RTU were effective in reducing viability of *Aspergillus fumigatus* spores.

Fungus	Mean percent spore germination after 96 hours	
	Control	50% RTU
Alternaria alternata	>90	0
Chaetomium globosum	>90	18.3
Stachybotrys chartarum	88.3	0
Penicillium sp.	>90	0

Fungus	Mean percent spore germination after 96 hours	
	Control	50% PS
Alternaria alternata	88.3	0
Aspergillus versicolor	76.7	0
Aspergillus fumigatus	60.0	0
Chaetomium globosum	86.7	0
Penicillium sp.	>90	0
Stachybotrys chartarum	>90	0

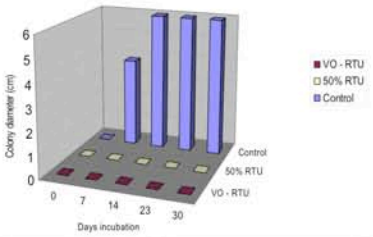
Percent germination of *Stachybotrys* spores



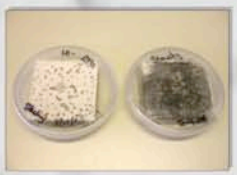
Fungi	Mean colony diameter (cm) of fungi after 30 days incubation on CTS saturated with VO or water		
	Control	VO - RTU	50% RTU
Alternaria alternata	>6.0	0	0
Aspergillus fumigatus	>6.0	0	0
Aspergillus versicolor	4.0	0	0
Chaetomium globosum	0.23*	0	0
Penicillum sp	5.6	0	0
Stachybotrys chartarum	>6.0	0	0

*Growth of *Chaetomium* on ceiling tiles could only be detected after perithecia formed. After 8 weeks perithecia were visible over an area approximately 4 cm in diameter.

Average colony diameter of *Aspergillus fumigatus* growing on ceiling tiles saturated with VO or sterile water



Fungi	Mean colony diameter (cm) of fungi after 30 days incubation on SRS saturated with VO or sterile water		
	Control	VO - RTU	50% RTU
Alternaria alternata	>6.0	0	0
Aspergillus fumigatus	>6.0	0	0
Aspergillus versicolor	3.6	0	0
Chaetomium globosum	>6.0	0	0
Penicillum sp.	>6.0	0	0
Stachybotrys chartarum	>6.0	0	0



Pretreatment of ceiling tiles with VO-RTU inhibited growth of *Stachybotrys* after 7 months following treatment. Ceiling tile saturated with VO-RTU in July 2005 was inoculated with *Stachybotrys* spore suspension on 4 Feb 2006. Control tile was inoculated at the same time.

Colony diameter of various fungi growing on saturated SRS. Treated squares were sprayed with VO-PS 2 to 3 weeks after inoculation. Final measurements and observations were made 5 to 7 weeks after spraying

	Control SRS	SRS sprayed with VO-PS
Alternaria alternata	6.0 cm	6.0 cm – Actively growing but less dense than controls
Aspergillus fumigatus	4.6 cm	No measurable colonies but one culture had small areas of growth
Aspergillus versicolor	5.32 cm	4.50 cm – Sprayed areas appear dead.
Chaetomium globosum	6.0 cm	1.85 cm – Sprayed areas appear dead.
Cladosporium cladosporoides	4.5 cm	3.67 cm – Sprayed areas appear dead.
Penicillium sp.	4.7 cm	No visible growth

Viability of *Aspergillus fumigatus* following spray application of VO-RTU

	Harvested conidia x 10^6	CFU x 10^6	Viability
Control 1	28.0	14.4	51.4%
Control 2	14.0	11.8	84.3%
Control 3	12.5	11.4	91.2%
VO-RTU Spray 1	27.5	0.34	1.24%
VO-RTU Spray 2	24.8	0.05	0.20%
VO-RTU Spray 3	36.3	0.21	0.58%

Conclusions

- VO inhibited spore germination of test fungi
- Pretreatment with VO inhibited the growth of fungi on sheetrock and ceiling tiles
- Spray applications of VO-PS were effective in stopping fungal growth for several weeks even in saturated conditions
- More work needs to be done to determine the most effective spray application methods for VO-RTU

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