# Efficacy of some sanitizers or alternatives on food contact surfaces?

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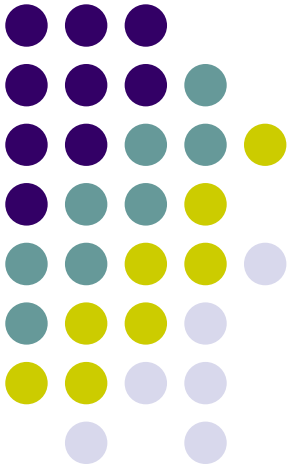
NCCEH

Winnipeg

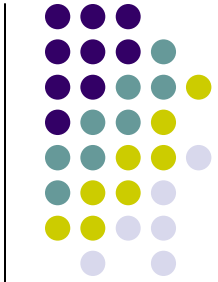
October 1st, 2009



# What is NCCEH?

- National Collaborating Center in Environmental Health
- Knowledge translation products
- Great resource for public health professionals
- Directories of legislations, practica, and professional training programs in Canada
- Recent environmental health news

# Difference between sanitizers, disinfectants and sterilants



- Sanitizer
  - Reduces, but not necessarily eliminates the number of pathogenic bacteria
- Disinfectant
  - Kills infectious fungi and vegetative bacteria, but not necessarily spores
- Sterilant
  - Kills bacteria, endospores, fungi and viruses

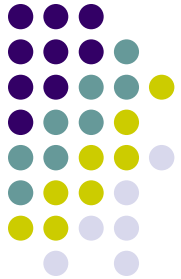
# When using sanitizers

we should look at..

| | | |
|---|---|---|
| Ease of application | Low toxicity | Non corrosive |
| Good penetrative power | Fast acting | No harmful or offensive odor |
| Stability | Reduce vegetative count by 5 log | Active in hard water |
| Compatibility with other chemicals | Broad spectrum | Not persistent in the environment |
| Demonstrate residual activity | Cost-effective | Not affected by organic matter |

## Sanitizers:

# Different efficacy levels

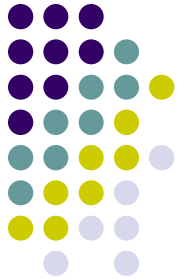


- Non-food contact surfaces
  - Requires 99.9% kill of microorganisms or 3 log reduction
- Food contact surfaces
  - 99.999% kill of microorganisms in 30 seconds or 5 log reduction.

# Method of Application

- Pre-Rinse
- Wash
- Post-Rinse
- Sanitize

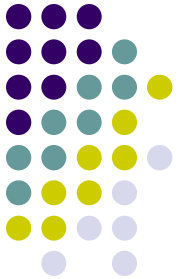
# Regulations in Canada



- Regulated by the Food and Drug Act
- Proof of efficacy, safety and quality to Health Canada
- DIN (Drug Identification Number) on product label
- Notice of Decision available to public through Summary Basis of Decision

## Health Canada:

# Approved sanitizers



- Available through http://active.inspection.gc.ca/scripts/fssa/reference/reference.asp?lang=e

Canadian Food Inspection Agency - Guidelines for Submissions - Reference Listing of Accepted Co - Windows Internet Explorer

http://active.inspection.gc.ca/scripts/fssa/reference/reference.asp?lang=e&cmd=1&cat=23&subcat=101

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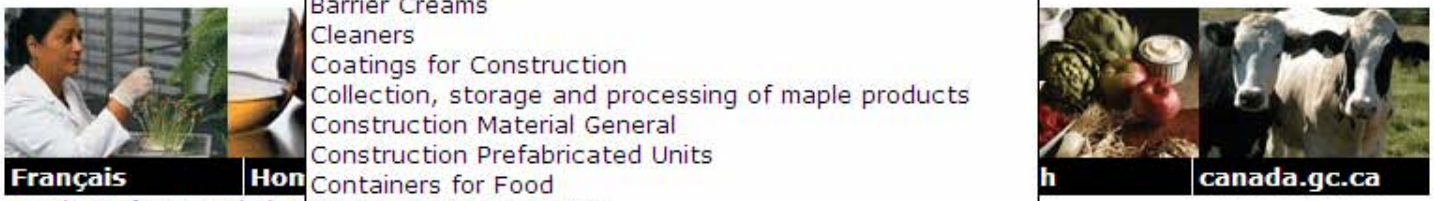
Canadian Food Inspection Agency - Guidelines for Su...

Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments | Canada




Food > Reference Listing

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Lubricants
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Sanitizers

General

*No entry in any field will return the entire list.*

SUBMIT

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**Last Update: 2009/09/08**

New Search

Results of the search for...Category **Sanitizers**, Sub-Category **General** (v1) (Display All)

| Company Name | Product Name | Acceptance Date |
|---|---|---|
| Category: **Sanitizers** | | |
| Sub-Category: **General (v1)** (Conditions of use: *to be used with instructions outlined on the label*) | | |
| 3M Canada Company | 3M Sanitizer/Assainisseur | 2008/11/02 |
| A Ferland Enrg. | Spatial | 1984/05/14 |
| ABC Compounding Company Incorporated | Allstar Allstar Uni-Dyne ( DIN # 02184400 ) | 1997/03/04 |
| ABC Compounding Company Incorporated | Allstar No Rinse Sanitizer ( DIN # 02153181 ) | 1995/05/16 |
| ABC Compounding Company Incorporated | Allstar DC No Rinse Sanitizer ( DIN # 02172461) (PCP # 24721 ) | 1997/03/04 |
| Active Chemicals Ltd. | Action DS | 2002/09/20 |
| Active Chemicals Ltd. | Action SC-200 | 2005/02/16 |
| Adept Chemical Technology Inc. | Sanquat | 2003/06/18 |
| Adept Chemical Technology Inc. | Adept 12 (Sodium Hypochlorite) | 2003/11/27 |
| ADM Labo Canada Inc. | MAG | 2007/12/17 |



Number of items found: **788**

First Page << Previous Next >> Last Page

Date modified: 2009-05-21

Top of Page

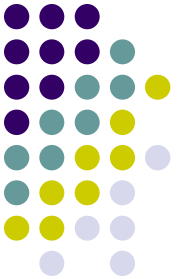
Important Notices

# Label information

- Active ingredients and their concentrations
- Intended use of the product
  - E.g. food processing plant
- Its type
  - Sanitizers, disinfectants and so forth
- Detailed guideline for using including
  - Type of surface
  - Mode of application
  - Contact time
  - Potential warnings
- Health and first aid information

# Categories of Sanitizers

# Commonly used on food contact surfaces



| Chemical sanitizing | Active products | Application |
|---|---|---|
| *Chlorine compounds* | Hypochlorites are the most active of the chlorine compounds and also the most widely used. | All food contact surfaces |
| *Acid Sanitizers* | *Peroxide and Peroxyacid mixtures (PAA)* | All food contact surfaces, especially cold temperature |
| | *Acid anionic sanitizers* | |
| | *Carboxylic acid (fatty acid sanitizer)* | |
| *Hydrogen Peroxide ($H_2O_2$)* | Developed in 1800s but used more recently as a sanitizer. | All type of surfaces, equipment, floors and drains, walls, steel mesh gloves, belts and others areas where contamination exists. |
| *Quaternary ammonium compounds (QUATS)* | Developed in 1930s | All food contact surfaces; mostly used for environmental control, walls, drains and tiles. |
| *Iodophors* | Used for more than 200 years | All food contact surfaces, approach as a hand dip. |

# Chlorine


http://pzrservices.typepad.com/.shared/image.html?/photos/uncategorized/clorox.gif


http://www.acemart.com/renderImage.image?imageName=graphics/00000001/products/COLFVBLEACH.jpg

- Advantages
  - Broad spectrum of activity
  - Fast-acting
  - Inexpensive
  - Not affected by hard water
- Disadvantages
  - Affected by pH, organic material, UV, and heat.
  - Corrosive to stainless and other metals
  - Not effective against biofilms
  - Can cause skin or respiratory irritation

# Acid sanitizers

- Advantages
  - Broad spectrum
  - Excellent stability
  - Not affected by hard water
  - Not affected by organic matter
  - Effective against biofilm
  - Environmentally friendly
  - Frequently used to combine the rinsing and sanitizing steps

- Disadvantages
  - Strong, pungent smell at full strength.
  - Concentrate can cause blistering, itching, scaling or skin burns.
  - May be corrosive to galvanized steel.
  - No residual activity

- Examples
  - Peroxide and Peroxyacid mixtures
  - Acid anionic sanitizers
  - Carboxylic acid

LYSOL® - Food Surface Sanitizer - Windows Internet Explorer

http://www.lysol.com/chef/index.shtml

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LYSOL® - Food Surface Sanitizer

# Reduce Bacterial Cross Contamination That Could Lead to Food Poisoning

New!

Lysol Food Surface SANITIZER

Did you know that 80% of Salmonella poisoning happens at home?

NEW LYSOL® Food Surface Sanitizer has been specially designed to kill 99.999% of bacteria* such as Salmonella and E. coli to help protect your family from getting sick.

LYSOL® Food Surface Sanitizer is not a cleaner. It is a Bleach-Free, Color-Free and Fragrance-Free sanitizer designed to use in areas where you prepare food.

- Kills 99.999% of bacteria*
- Eliminates bacteria that cause food-borne illnesses like E. coli and Salmonella
- Gentle enough to use on food contact surfaces around your home


✓Bleach Free
✓Color Free
✓Fragrance Free

Use to Sanitize:

- Nonwood Cutting Boards
- High Chairs
- Counter tops
- Refrigerators
- Tabletops
- Microwaves
- Appliances

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# Hydrogen peroxide


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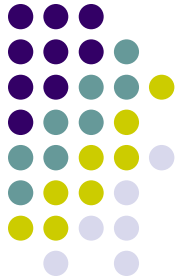
- Advantages
  - Broad spectrum of activity
  - Accelerated $H_2O_2$ more stable
  - No odor
  - Environmentally friendly
- Disadvantages
  - Affected by hard water
  - Can be corrosive to metal
  - Not effective against biofilms.
  - Can cause skin irritation
  - No residual activity
  - May be unstable in high temperatures

# Quaternary ammonium compounds (QUATS)

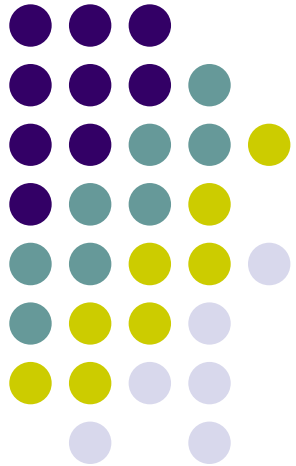


- **Advantages**
  - Excellent stability
  - Odorless
  - Residual activity (non-volatile bacteriostatic residue)
  - Not corrosive
  - Effective against biofilms
- **Disadvantages**
  - Not sporocidal
  - Affected by hard water
  - Residue may contaminate foods
  - Limited effectiveness against most gram-negative bacteria except Salmonella and E. coli. Effective against Listeria.

# Iodophors

- Advantages
  - Broad spectrum of activity
  - Not affected by hard water
- Disadvantages
  - May bleach skin or cause irritation
  - Can stain
  - Corrosive to silver
  - Not effective against biofilms
  - Inactivated by organic material
  - None or slight residual activity
  - Not effective against spores
  - Stability varies with temperature
  - Effective at pH 1-4

# Alternatives



# Other types of sanitizers

- Tea tree oil
- Vinegar baking soda
- Electrolyzed water
- Silver disinfectant
- Natural microfibre cloths (ENJO)

# Tea tree oil

- What is tea tree oil?
  - Obtained by steam distillation of the leaves of Melaleuca alternifolia, a tree native to Australia
  - Reported to have antibacterial, antifungal, antiviral and antinflammatory properties.
- Carson et al. 2006
  - Review of literature about antimicrobial and other medicinal properties
- May et al. 2000
  - Compare the activity of standard and clone 88 oil against MRSA, *K. pneumoniae* and *P. aeruginosa*
- Has not been tested as a sanitizer on food contact surfaces

*Tea Tree Oil is a natural antiseptic, germicide, antibacterial, fungicide. Many people use tea tree oil for: athletes foot, cold and flu, oral thrush, cold sores & canker sores, tooth ache & gum infections, ringworm, candida, head lice or louse, cleanser additive, gum problems, mosquito bites, bug repellent, cockroaches, deter flees, mouth ulcers, herpes, cuts, abrasions, after shave, sunburn, anorectal or vaginal yeast infections, unwanted body odors, acne, toe nail infections, and many other uses. Products: Please click here.

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# Vinegar and baking soda

- Rutala et al. 2000
  - Assess the efficacy of both natural products and common commercial disinfectants
  - Tested against bacteria: *S. aureus, enterococcus, Salmonella cholerasuis, E. coli and P. aeruginosa*.
  - Household settings
  - Exposure times: 30 seconds and 5 minutes
  - Vinegar or baking soda eliminate less than 3 log of *S. aureus* and *E. coli*
  - Can’t be used as a sanitizer.

# Electrolyzed water (EO)

- Produced by applying a low-voltage electrical charge to saltwater.
  - Sodium ions form sodium hydroxide (NaOH), a strong base that cleans much like a detergent.
  - Chloride ions form hypochlorous acid (HClO), which is a powerful disinfectant.
- Approved in Japan for disinfecting vegetables or fruits, and in the US for applications in the food industry by EPA
- Huang et al. 2008
  - Product needs to be immersed in EO water for more than 1 minute
  - 5 log reducion of the number of bacteria
  - Not useful for disinfecting counters
  - A generator is needed

# Silver disinfectant

- Brady et al. 2003
  - Tested against *P. aeruginosa and S. aureus*
  - Exposure times of 30 min, and 2, 4, 6, 8, hours with log reductions ranged from 2.2 to 4.8 respectively
  - Residual activity showed 3 log reduction
  - Has potential as a sanitizer
- Criticism due to methodological problems


http://image.ec21.com/image/nanogist/oimg_GC00477235_CA00657004/_SilverCare_Nano_Silver_Disinfectant_Spray.jpg

# ENJO Natural microfiber cloths

- Lalla et al. 2005 – two studies
  - Assess the sanitizing performance of kitchen fiber cloths compared to antibacterial cloths.
  - Bioburden on cloths overtime
  - Conducted in kitchen settings
  - Standardized methods to prepare the surface and chemicals
  - Testing after 2 minutes, one hour and 6 hours.
  - 5 log reduction of *S. aureus* and *E. coli*
  - Long fibres to trap and remove organic and grease materials
  - Unclear on mechanism
  - No mention is made of potential of cloths to be reused.

ENJO
CLEAN THE WORLD

ENJO exclusively

ENJO Canada Inc. 1200 Aerowood Drive Unit 41 Mississauga Ontario Canada L4W 2S7 905 629 4888 office @enjo-canada.com

# In conclusion

- Always new products on the market
- Be sure the product you choose has the characteristics you need
- Read the label
- Be able to read the label
- Look at the website to be sure the product has been authorized by health Canada:
  - http://www.inspection.gc.ca/english/fssa/reference/refere.shtml

# Thank You!

# Questions?