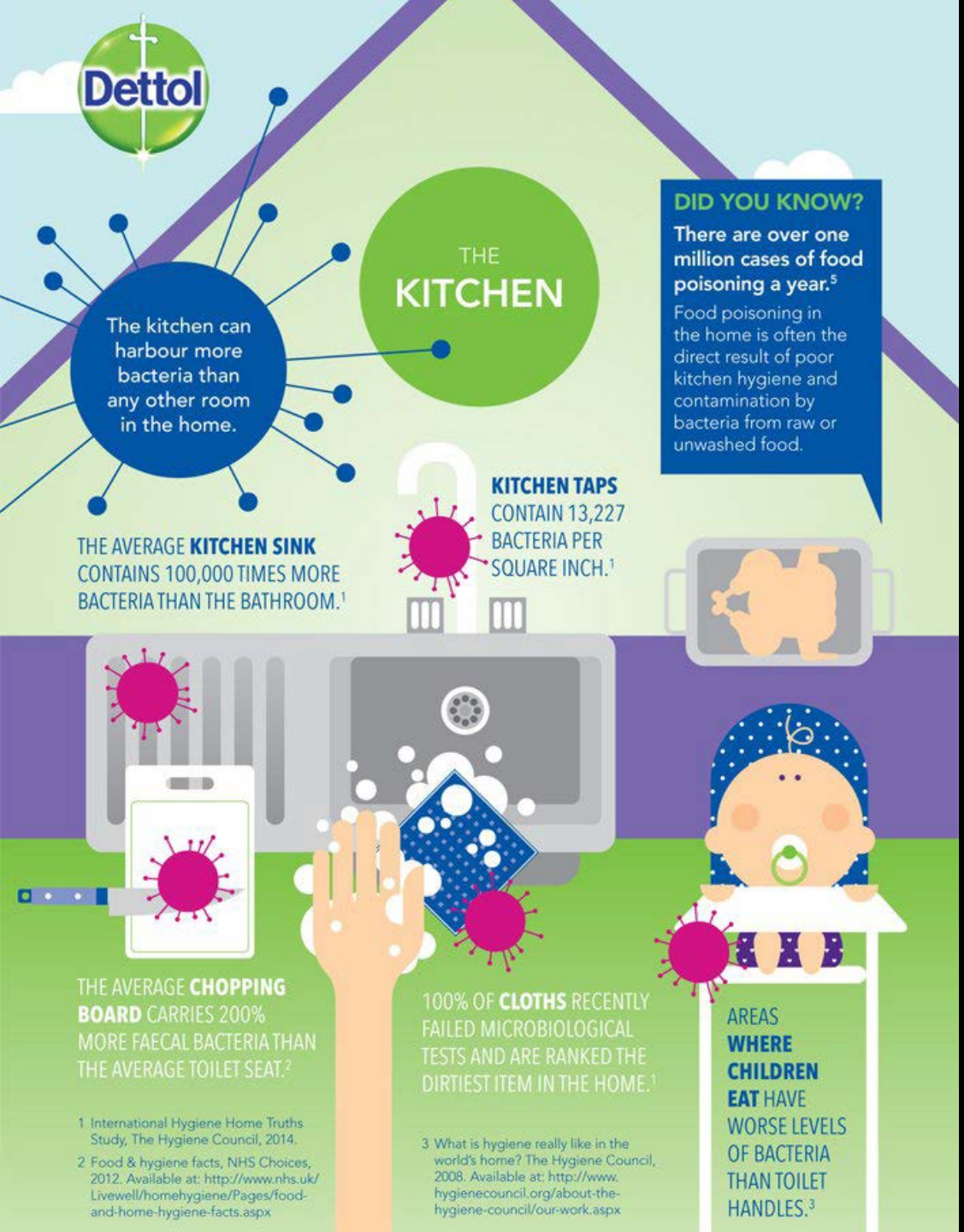
Control of Microbial Growth

- Introduction
- Terminology
- Rate of death
- Physical control
- Chemical control
- Relative resistance



Dettol is the trade name for a line of hygiene products manufactured by Reckitt Benckiser. It has been in use since before 1936, when it was used after surgery as an antiseptic.

Maid In Amarillo is dedicated to providing the most up to date cleaning information available to everyone! Please let us know if you have any questions or comments. Also, let us know if you want us to clean your home!

GERMS! They're hiding...

A recent study conducted by NSF International highlights the corners of the house where germs and other unwanted bacteria love to nestle. Although they have a bad reputation, don't panic, exposing yourself to these pathogens at a safe level can help boost your immune system.

DID YOU KNOW?

Disinfecting does not completely get rid of all micro-organisms. Over time, the microbial community will increase and even build a resistance to the disinfectant.

SALMONELLA

*** Bacteria is responsible for the widespread of zoonosis, salmonella and food poisoning.**

THE KITCHEN SINK

Because it is in contact with food, it's 100,000 times more contaminated than the sink in the bathroom.

Clean once or twice a week with hot water and soap without leaving a trace of food. Disinfect the drain once a month with a water and bleach based solution.

THE KITCHEN SPONGE

After 3 weeks of use, 70% of sponges start to exhibit bacteria, including e coli and salmonella.

Placing a sponge in the microwave for two minutes can kill most of the bacteria, viruses parasites and spores on it. Change the sponge every two weeks or less.

THE KITCHEN COUNTER

Being a high traffic area for cross-contamination, they collect and harbour all types of germs.

After cooking or preparing food, wash the surface with hot soapy water after each use. Also rinse with water containing a little bit of bleach to disinfect.

COFFEE MAKER

Being dark and damp, this is a prime location for bacteria and mold to hide.

Fill the machine with up to 4 cups of vinegar in the tank and let it stand for 30 minutes. Run a cycle with the vinegar, followed by two or three cycles with water until the vinegar smell diminishes.

KITCHEN STOVE

Often overlooked, they are more often than not in contact with contaminated hands and food.

Once a week, remove all the buttons and soak them in hot soapy water. Rinse them well and let dry.

BATHTUB AND SHOWER

26% of baths and showers harbour a bacteria called staphylococci. compared to the 6% found in garbage cans.

Clean with hot water to remove anything from the drain, and make sure to disinfect regularly.

TOOTHBRUSH HOLDER

It's the one place that has the most germs with an average of 2,465,876 cells per 10 cm².

Put in the dishwasher or wash by hand with hot soapy water, rinse and disinfect once or twice a week.

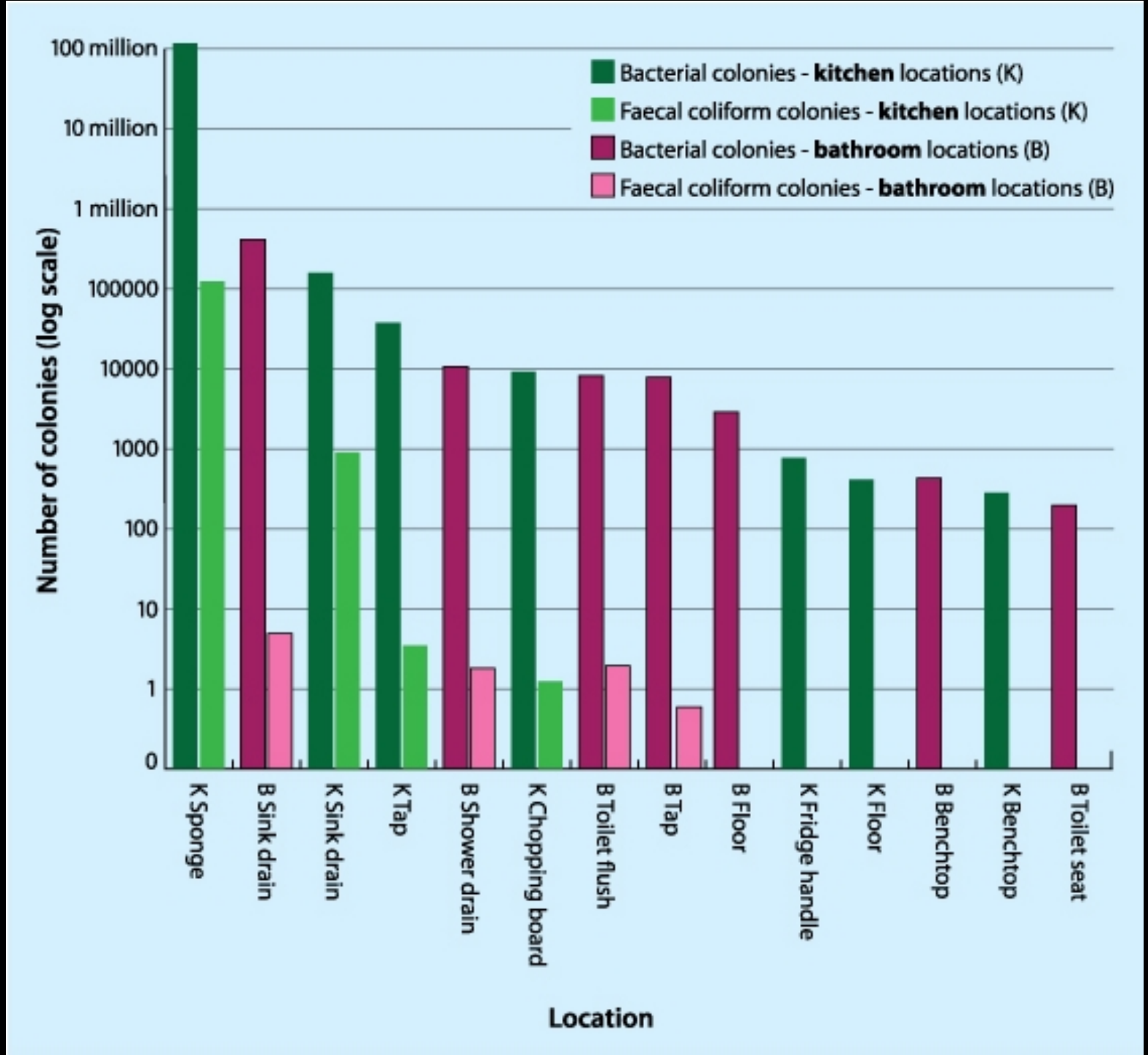
ANIMAL FOOD DISH

Animals often carry germs without our knowledge, especially through their saliva.

Food dishes should be washed daily either in the dishwasher or by hand with hot soapy water.

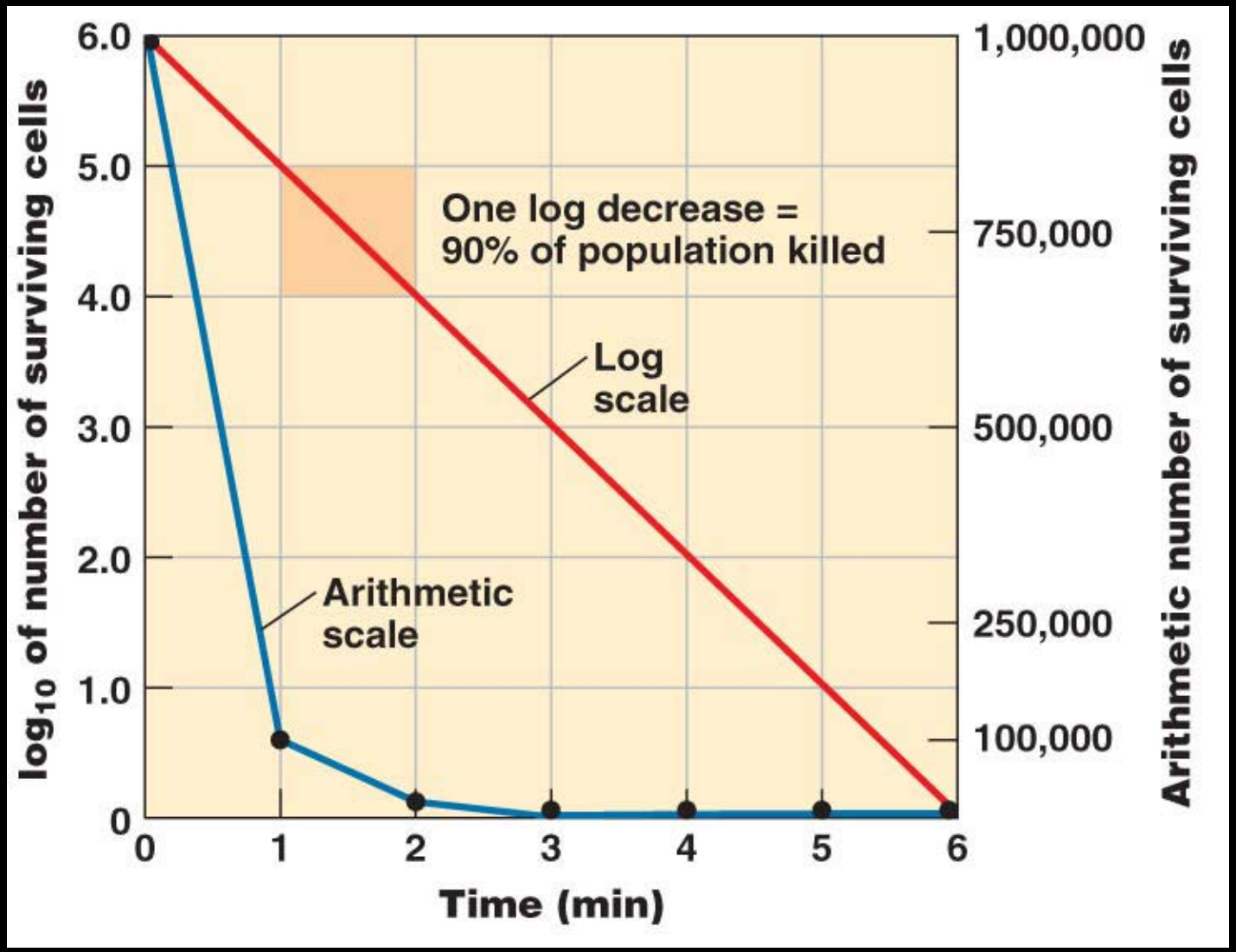
Sources: NSF International, Health Canada

QMI AGENCY



Rate of death

Fig. 7.1



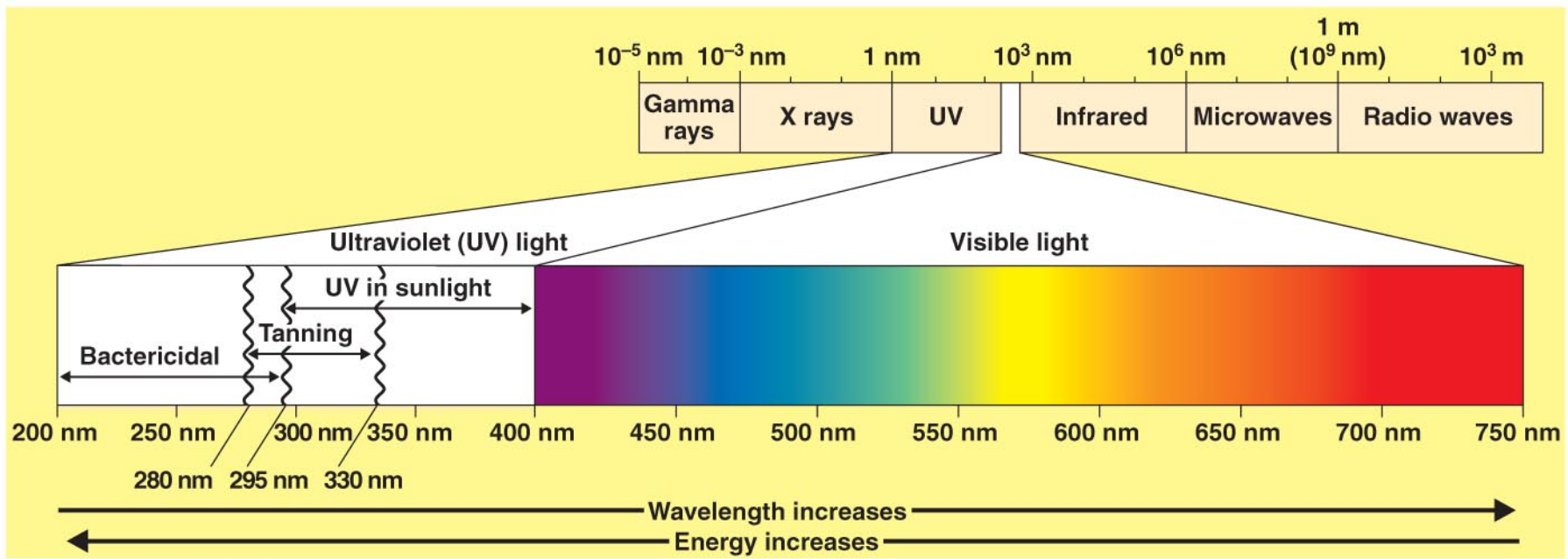
Autoclaves

Other uses of heat

Filtration

Radiation

Fig. 7.5



Physical controls

Table 7.5

Table 7.5 Physical Methods Used to Control Microbial Growth

Methods	Mechanism of Action	Comment	Preferred Use
Heat			
1. Moist heat			
a. Boiling or flowing steam	Protein denaturation	Kills vegetative bacterial and fungal pathogens and almost all viruses within 10 min; less effective on endospores	Dishes, basins, pitchers, various equipment
b. Autoclaving	Protein denaturation	Very effective method of sterilization; at about 15 psi of pressure (121°C), all vegetative cells and their endospores are killed in about 15 min	Microbiological media, solutions, linens, utensils, dressings, equipment, and other items that can withstand temperature and pressure
2. Pasteurization	Protein denaturation	Heat treatment for milk (72°C for about 15 sec) that kills all pathogens and most nonpathogens	Milk, cream, and certain alcoholic beverages (beer and wine)
3. Dry heat			
a. Direct flaming	Burning contaminants to ashes	Very effective method of sterilization	Inoculating loops
b. Incineration	Burning to ashes	Very effective method of sterilization	Paper cups, contaminated dressings, animal carcasses, bags, and wipes
c. Hot-air sterilization	Oxidation	Very effective method of sterilization but requires temperature of 170°C for about 2 hr	Empty glassware, instruments, needles, and glass syringes
Filtration	Separation of bacteria from suspending liquid	Removes microbes by passage of a liquid or gas through a screenlike material; most filters in use consist of cellulose acetate or nitrocellulose	Useful for sterilizing liquids (enzymes, vaccines) that are destroyed by heat

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Methods	Mechanism of Action	Comment	Preferred Use
Cold			
1. Refrigeration	Decreased chemical reactions and possible changes in proteins	Has a bacteriostatic effect	Food, drug, and culture preservation
2. Deep-freezing (see Chapter 6, page 170)	Decreased chemical reactions and possible changes in proteins	An effective method for preserving microbial cultures, in which cultures are quick-frozen between −50° and −95°C	Food, drug, and culture preservation
3. Lyophilization (see Chapter 6, page 170)	Decreased chemical reactions and possible changes in proteins	Most effective method for long-term preservation of microbial cultures; water removed by high vacuum at low temperature	Food, drug, and culture preservation
High Pressure	Alteration of molecular structure of proteins and carbohydrates	Preservation of colors, flavors, nutrient values	Fruit juices
Desiccation	Disruption of metabolism	Involves removing water from microbes; primarily bacteriostatic	Food preservation
Osmotic Pressure	Plasmolysis	Results in loss of water from microbial cells	Food preservation
Radiation			
1. Ionizing	Destruction of DNA	Not widespread in routine sterilization	Sterilizing pharmaceuticals and medical and dental supplies
2. Nonionizing	Damage to DNA	Radiation not very penetrating	Control of closed environment with UV (germicidal) lamp

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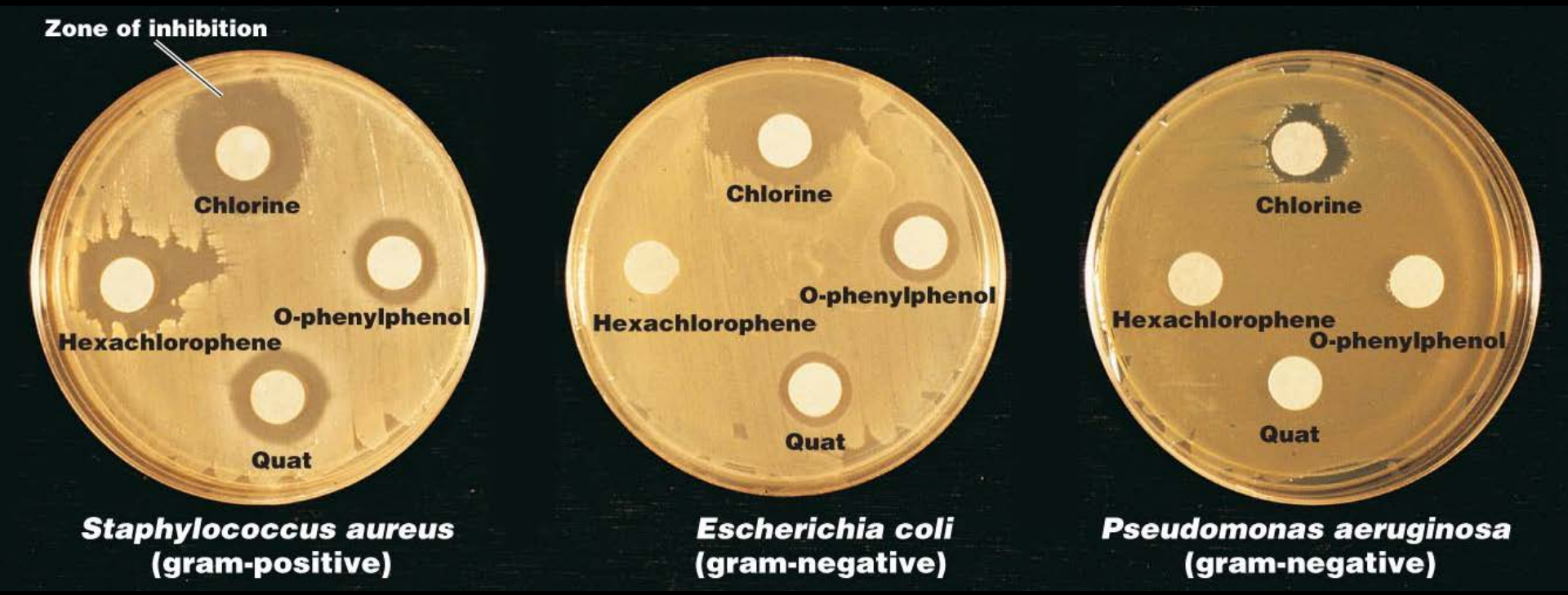
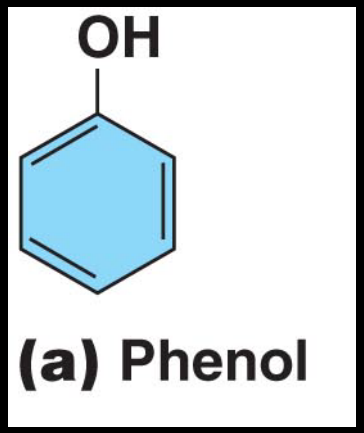
Chemical controls

Fig. 7.6

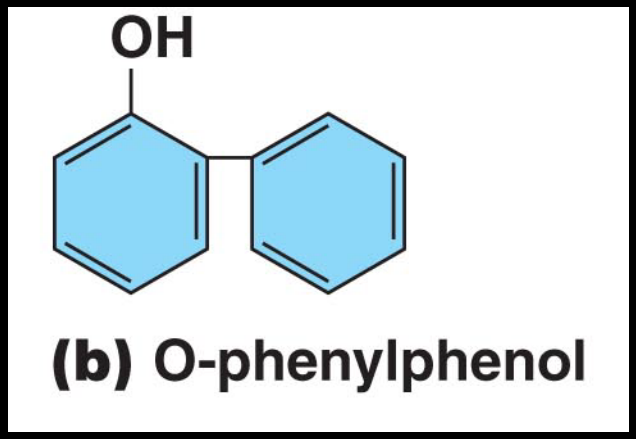


Chemical controls

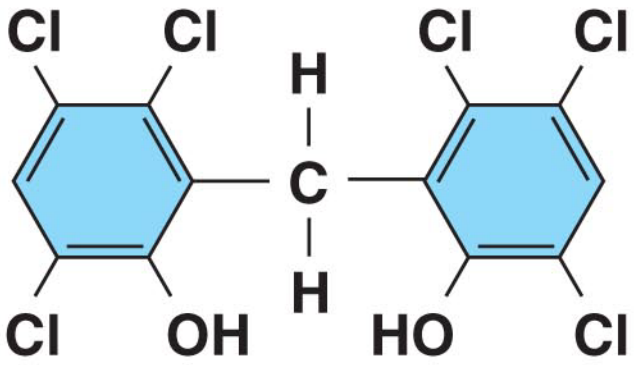
Fig. 7.7



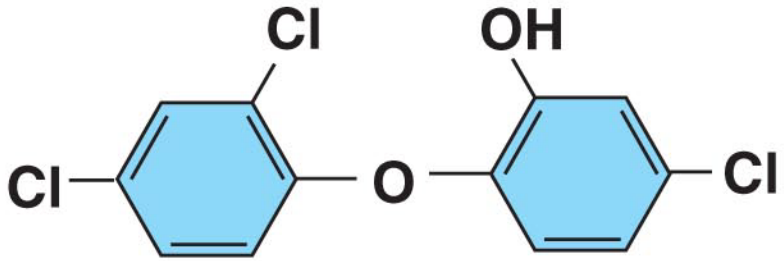
(a) Phenol



(b) O-phenylphenol



(c) Hexachlorophene (a bisphenol)



(d) Triclosan (a bisphenol)

Only products with EPA registration numbers should be used. This number indicates the product has been reviewed by the EPA and poses minimal risk to animals, people and the environment when used in accordance with their label.

This section will describe the hazards related to humans and animals when using this product. It recommends personal protective gear that should be worn, what effects it will have on the environment and treatment information should it be splashed into the eyes or ingested.

EPA Reg. No. 1658 – XX

COMPANY Y

EPA Est. No. 16XX – MO – 1

PRODUCT X

Disinfect-Cleaner-Sanitizer-Fungicide-Mildewstat-Virucide*– Deodorizer for Hospitals, Institutional and Industrial Use

Effective in hard water up to 400 ppm hardness (calculated as CaCO3) in the presence of 5% serum contamination

ACTIVE INGREDIENTS:

Octyl decyl dimethyl ammonium chloride	1.650%
Dioctyl dimethyl ammonium chloride	0.825%
Didecyl dimethyl ammonium chloride	0.825%
Alkyl (C14, 50%, C12, 40%; C16, 10%) Dimethyl benzyl ammonium chloride	2.200%
INERT INGREDIENTS:	94.500%
TOTAL:	100.000%

KEEP OUT OF REACH OF CHILDREN

DANGER

HAZARD TO HUMANS AND DOMESTIC ANIMALS

PRECAUTIONARY STATEMENTS

CORROSIVE: Causes severe eye and skin damage. Do not get into eyes, on skin or clothing. Wear goggles or face shield and rubber gloves when handling Product X. Harmful or fatal if swallowed. Wash thoroughly with soap and water after handling.

ENVIRONMENTAL HAZARDS: This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. For guidance contact your State Water Board or Regional Office of the EPA.

PHYSICAL AND CHEMICAL HAZARDS: Do not use or store near heat or open flame.

STATEMENT OF PRACTICAL TREATMENT: In case of contact, immediately flush eyes or skin with plenty of water for at least 20 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If ingested, call a physician immediately.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

Manufactured by
Company Y Chemical Company, Sometown, Somestate 12345

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

DIRECTIONS FOR USE

Product X is a germicide, soapless cleaner and deodorant which is effective in water up to 400 ppm hardness in the presence of organic soil (5% serum). When used as directed, will not harm tile, terrazo, resilient flooring, concrete, painted or varnished wood, glass or metals.

FOR USE IN VETERINARY CLINICS, ANIMAL CARE FACILITIES, LIVESTOCK FACILITIES AND ANIMAL QUARANTINE AREAS

Apply Product X to walls, floors and other hard (inanimate) non-porous surfaces with a cloth, mop or mechanical spray device so as to thoroughly wet surfaces. Prepare a fresh solution daily or when use solution becomes visibly dirty.

Disinfection – To disinfect hard surfaces, use 1 fluid ounce of Product X per gallon of water. Apply by immersion, flushing solution over treated surfaces with a mop, sponge or cloth to thoroughly wet surfaces. Allow treated surfaces to remain moist for at least 15 minutes before wiping or rinsing. Product X will disinfect hard non-porous surfaces in veterinary clinics, animal care facilities, livestock facilities and animal quarantine areas. *For heavily soiled areas, a preliminary cleaning is required.*

2 oz. gallon use-level. The activity of Product X has been evaluated in the presence of 5% serum and 400 ppm hard water by the AOAC use dilution test and found to be effective against a broad spectrum of gram negative and gram positive organisms as represented by:

Pseudomonas aeruginosa	Pasteurella multocida
Enterobacter aerogenes	Enterococcus faecium
Staphylococcus aureus	Streptococcus faecalis
Salmonella choleraesuis	Shigella dysenteriae
Escherichia coli	Brevibacterium ammoniagenes
Streptococcus pyogenes	Salmonella typhi
Klebisella pneumoniae	Serratia marcescens
Streptococcus agalactiae	Actinomyces pyogenes

Boot bath: Use 1.5 fluid ounces per gallon in boot baths. Change solution daily and anytime it becomes visibly soiled. Use a bristle brush to clean soil from boots before disinfecting with Product X.

Disinfecting trucks and farm vehicles: Clean and rinse vehicles and disinfect with 1 fluid ounce per gallon of Product X. If desired, rinse after 12 minutes contact or leave unrinsed. Do not use Product X on vaccination equipment, needles or diluent bottles as the residual germicide may render the vaccines ineffective.

Sanitizing-Non-Food Contact Surfaces (such as floors, walls, tables, etc.). At 1 oz. per 2% gallon use-level, Product X is an effective sanitizer against Staphylococcus aureus and Klebsiella pneumoniae on hard porous and non-porous environmental surfaces. Treated surfaces must remain wet for 60 seconds.

Some products may have multiple uses (i.e., cleaning versus disinfection) and require different dilutions and contact times for such actions.

This section describes what disease organism the product controls, as well as where, how and when to use it.

Specialty applications for the product (i.e., boot baths, vehicle disinfection) will also be listed.

See Cavicide label

Fig. 7.11

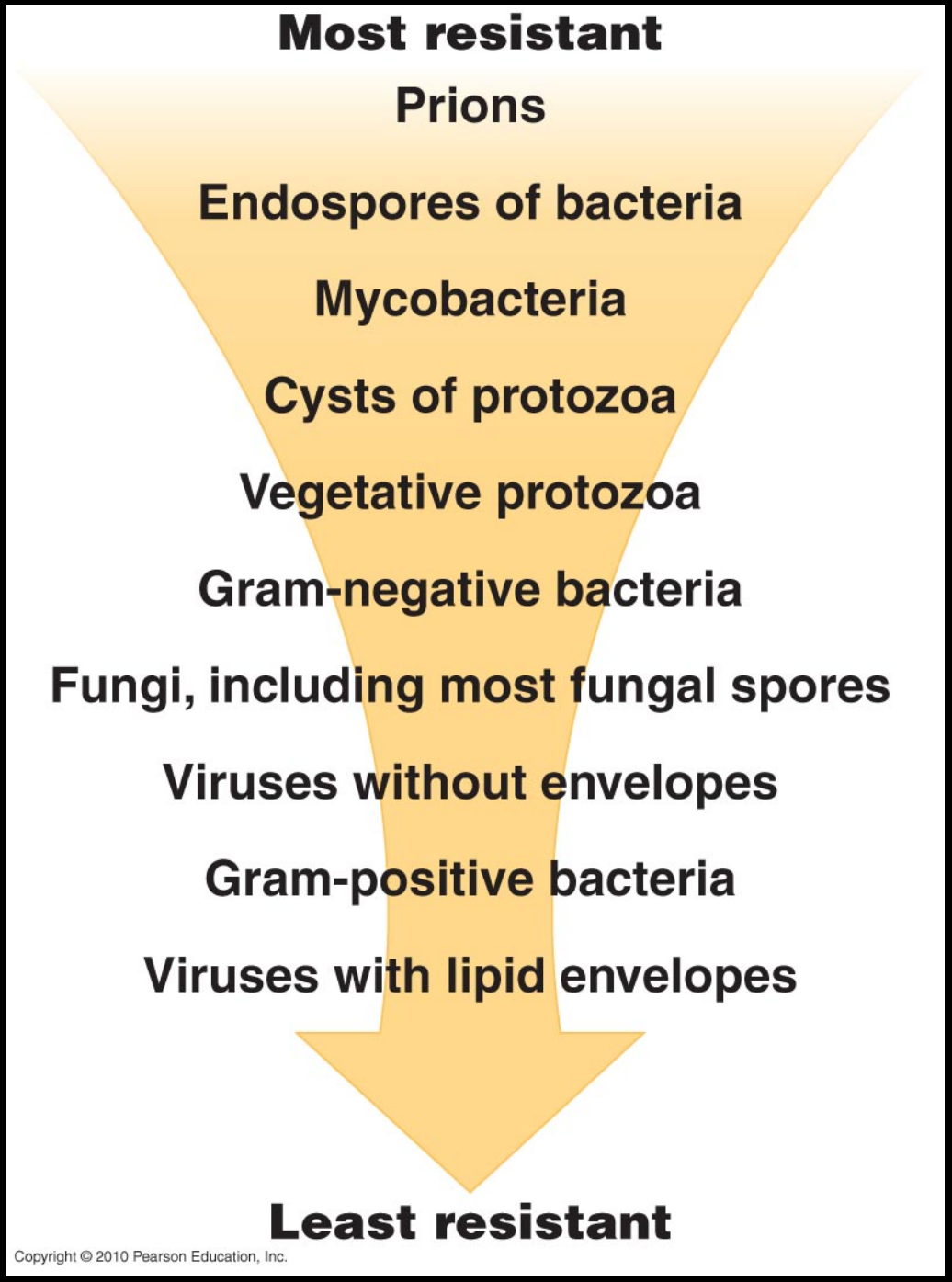


Fig. 7.5