



Episode 5: Disinfectant Technologies Overview

What are considerations when you select a technology?

Most will look at the “germs” or pathogens they are trying to kill. The type of facility, the cleaning and disinfection practices to make sure that they have time to kill the pathogens before the disinfectant dries as some take longer than others. Also the safety of the products, if they are dilutable, and how the product is delivered (format). There are many technologies and cost, safety and overall performance are key factors when considering the best chemistry.

What types of technologies are there for disinfectants?

Over time these have evolved. Back in the day, pre me, there was chlorine and iodine, then technologies emerged such as phenolics and quats, with more recent additions such as peracetic acid, hydrogen peroxide and NaDCC (chlorine products).

What are key things to compare the different technologies?

As mentioned before when selecting, as well as speed, safety, user experience, impact on the environment and also compatibility with both cleaning tools and the surfaces which are cleaned are very important. If a product/technology kills the bugs well, it might be harsher on people and assets. All of these variables should be considered.

How are the products broken down?

Many will consider the following buckets of product:

Sporicidals – those disinfectants that are effective against bacterial spores.

Dilutables – those that can be diluted

Ready to use – those that are immediately ready for use



Sporicidal Technologies

Sodium Hypochlorite – aka bleach

Sodium hypochlorite, commonly known as bleach, is most frequently used as a disinfecting agent. It is a broad-spectrum disinfectant that is effective for the disinfection of viruses, bacteria, fungi, and mycobacterium. Many sodium hypochlorite products are sporicidal. However, sodium hypochlorite is NOT as effective as a cleaner. Sodium hypochlorite is known to be corrosive to metals, therefore, it is important to wipe down metal surfaces with water or ethanol after treating them with a bleach solution. It also can discolor some fabrics / surfaces.

PAA

Peracetic acid, is characterized by a very rapid action against all microorganisms. A special advantage of peracetic acid is its lack of harmful decomposition products (i.e., acetic acid, water, oxygen, hydrogen peroxide); it enhances removal of organic material and leaves little residue. It remains effective in the presence of organic matter and is sporicidal even at low temperatures. Peracetic acid can corrode copper, brass, bronze, plain steel, and galvanized iron, but these effects can be reduced by additives and pH modifications. It is an effective non-bleach sporicidal option. The biggest downside is it is corrosive at a concentrate level and can have a foul vinegar smell.

NADCC

Sodium dichloroisocyanurate (NaDCC) is a broad-spectrum disinfectant agent used for bacteria, viruses and also *Clostridium difficile*. It is fairly compatible with assets and the smell is not as strong as bleach.

Dilutables

Phenolics

Phenolics are active ingredients in some household disinfectants. They are also found in some mouthwashes and in disinfectant soap and handwashes. Phenols are toxic to cats and newborn humans. Phenol is one of the oldest known disinfectants, and is relatively inexpensive.

Quats

Quaternary ammonium compounds ("quats"), such as benzalkonium chloride, are a large group of related compounds. Some concentrated formulations have been shown to be effective low-level disinfectants. Quaternary ammonia at or above 200ppm plus alcohol solutions exhibit efficacy against difficult to kill non-enveloped viruses such as norovirus, rotavirus, or polio virus. They are higher concentrates, and relatively inexpensive. Newer synergous, low-alcohol formulations are highly effective broad-spectrum disinfectants with quick contact times (3–5 minutes) against bacteria, enveloped viruses, pathogenic fungi, and mycobacteria. Quaternary ammonium compounds are good cleaning agents and are widely used as disinfectants for noncritical environmental surfaces in healthcare settings.



AHP®

Accelerated hydrogen peroxide (AHP) cleaner/disinfectants have become popular for soft and hard surface disinfection in healthcare settings. They are generally fast-acting against a broad spectrum of pathogens and are safe for users. Ingredients break down to oxygen and water after use. Many find them preferable due to the safety profile and the fact they are excellent cleaners.

Ready to Use

Quat alcohol / solvents

With the addition of alcohol to the quaternary ammonium chlorides, kill times for microorganisms is faster thus contributing to an overall faster contact time. The alcohol-quat formulations are tuberculocidal thus classified as intermediate level disinfectants. There is also demonstrated increased activity against some hydrophilic (nonenveloped) viruses. Alcohol-quaternary ammonium products that have high percentage of alcohol in their formulations will have a broader range of efficacy against pathogenic microorganisms plus faster kill times. They may need to be applied multiple times to achieve the contact time and their safety profile is not as good as accelerated hydrogen peroxide.

Accelerated Hydrogen Peroxide

Accelerated hydrogen peroxide (AHP) cleaner/disinfectants have become popular for soft and hard surface disinfection in healthcare settings. They are generally fast-acting against a broad spectrum of pathogens and are safe for users. Ingredients break down to oxygen and water after use. Many find them preferable due to the safety profile. Many find them preferable due to the safety profile and the fact they are excellent cleaners.



Here is a table comparing characteristics and performance:

	AHP®	Quat Alcohol	Bleach	Peracetic Acid (PAA)	Phenolics	Quaternary Ammonium Compounds	NaDCC
Speed	1-5 minute dwell	2-5 minutes, may dry before impact	1-10 Minutes	2-5 minutes	10 minutes	3-10 minutes	1-4 Minutes
Sporicidal	No	No	Yes	Yes	No	No	Yes
EPA Toxicity	None	Caution / Warning / Danger	Caution / Warning / Danger	Caution	Warning / Danger	Caution	Caution
Health Effects	None	Nasal irritation, can irritate or burn skin and eyes, flammable	Corrosive to eyes and respiratory irritant	Corrosive to eyes and skin (Concentrate) Sensitizer to respiratory	Corrosive to eyes and skin; hyperbilirubin	Dermatitis and nasal irritation	Dermatitis and nasal irritation
PPE	No special requirements	PPE, increased ventilation	PPE, increased ventilation	PPE at concentration, at dilution gloves required, ventilation	PPE, increased ventilation	PPE, proper ventilation	PPE, increased ventilation
Odor	Mild	Strong	Strong	Pungent vinegar	Mild	Mild	Medium
Compatibility with Cleaning Tools	Excellent	Good	Damages over time – reduces life	Good	Good	Quat binding may impair performance	Yes
Compatibility with Surfaces	May damage	May damage	Damage	May damage	May damage	Good	Good
Favorable Environmental Profile	Yes	No	No	No	No	No	No