

Disinfectant #14: Chlorhexidine: Safe for humans, but at what risk to the environment?

Chlorhexidine or Chlorhexidine Gluconate, is one of the most widely used antiseptics for oral rinses or mouthwashes to reduce dental plaque or oral bacteria as well as skin cleaners for surgical scrubs and preoperative skin preparations. Because of the positive charge carried by the chlorhexidine molecule it reacts with the cell surface of bacteria which is negatively charged and destroys the cell membrane.

This is how we would rate Chlorhexidine disinfectants based on the key decision making criteria: (see below)

Chlorhexidine Disinfectant Report Card

Subject	Grade	Comments
Speed of Disinfection	A to B	Contact times will be dependent upon concentration and level of kill required and range from 30 seconds to 2 minutes.
Spectrum of Kill	B to C	Achieves disinfection against all microorganisms; bacteria, viruses and fungi but efficacy is concentration dependent.
Cleaning Effectiveness	C	Some cleaning studies have shown that Chlorhexidine is not an effective cleaning agent.
Safety Profile	B	Is considered safe to human at the concentrations used for oral rinses and skin cleaners Anaphylactic reactions are well documented.
Environmental Profile	D	Bioaccumulative in the environment and reacts to form more toxic by-products Concerns with Aquatic Toxicity.
Cost Effectiveness	B to C	Products are available from a number of suppliers.

Chlorhexidine is a broad-spectrum antiseptic that is consider to have rapid action, long-lasting or residual activity and is active in the presence of organic matter. It is effective on both gram-positive and gram-negative bacteria, although **it is less effective with some gram-negative bacteria** and also carries virucidal efficacy properties. Chlorhexidine has also been shown to inhibit spores and fungi. Depending on the level of kill (e.g. sanitizing vs. disinfection), Chlorhexidine is effective in contact times of 30-seconds to 2 minutes against vegetative bacteria.

Chlorhexidine is non-flammable. At high concentrations Chlorhexidine is harmful, however at the low concentrations typically used for oral rinses and skin cleaners it can be safely used. **In spite of the relatively non-toxic profile of chlorhexidine, there have been incidences of anaphylactic reactions.** In fact, in the UK, a patient safety alert on the risk of anaphylactic reactions from the use of medical devices and medicinal products containing chlorhexidine has been issued with recommendations that if a patient experienced an unexplained reaction that healthcare providers check whether chlorhexidine was used or was impregnated in a medical device that was used.



From an environmental perspective, **the by-products that chlorhexidine degrades into are reported to be more toxic than chlorhexidine itself.** Further, chlorhexidine can accumulate in the bodies of aquatic creatures and thus will increase the long-term exposure toxicity effects.



The Accelerated Hydrogen Peroxide® (AHP®) branded technology is manufactured by Virox Technologies Inc.
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