

Surface Disinfection Protocol

What is HOCl (Hypochlorous Acid)?

Hypochlorous acid (HOCl) is a strong oxidant that exists as a natural endogenous constituent in humans and animals and is an important part of the innate immune system. HOCl is involved in the last step of the Oxidative Route in the fight against infection and invasion of foreign substances. HOCl is also a weak acid that is a potent disinfectant. Chlorine based disinfectants have been in use since the 1700's, came into widespread use in the early 1900's, and are still widely used as disinfectants and cleaning agents in the present day. In chlorine-based disinfectants, free chlorine exists in mainly two different forms, hypochlorous acid (HOCl) and hypochlorite ion (OCl⁻). HOCl is much more effective than OCl⁻ as a disinfectant, and the pH of the solution affects the proportions of these two forms. Hypochlorous acid (HOCl) is the most effective disinfectant in the chlorine family available in dilute solution. It is suggested that HOCl is 80 to 120 times more efficacious than sodium hypochlorite. HOCl forms when chlorine is dissolved in water. However, the HOCl is not stable in this state and will revert back within minutes to hours depending on the pH.

Another way to produce hypochlorous acid is to introduce electrolysis of a water (H₂O) and salt (NaCl) mixture. This will allow the production of HOCl in an inexpensive and safe manner that is easy to produce and can be kept stable for up to 48 hours or longer with simple and minor adjustments of the pH. This form of HOCl is sometimes termed electrolyzed water (EW) and is currently in use in many industries including the food industry, grocery stores for food sanitation, dairy processing facilities, hospitals and health care facilities, the water treatment industry, and many others as a highly effective disinfectant. HOCl is an effective disinfectant, currently on the EPA list as effective against the human coronavirus and considered safe in and on food, dairy and potable water.

Science Associated with this Topic

1. Disinfectant Products
 - Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008
 - <https://www.cdc.gov/ncidod/diseases/tb/infodisinfection.pdf>
2. ORP
 - <http://www.sbcontrol.com/poolspa.pdf>
 - <http://www.sbcontrol.com/orpuse.pdf>
3. Chlorine basics
 - https://iccontrols.com/wp-content/uploads/art-8-2_chlorine_theory_and_measurement.pdf
 - <https://www.amazon.com/Handbook-Chlorination-Alternative-Disinfectants-4th/dp/0471292079>



4. HOCl

- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1853323/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1932820/>
- <https://www.ecoloxtech.com/pdf/nvstudy1.pdf>
- <https://www.ecoloxtech.com/pdf/nvstudy2.pdf>

5. Fogging HOCl

- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1932820/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4363024/>

6. EPA

- https://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/advancedsearch/externalSearch.do?p_type=CASNO&p_value=7790-92-3
- <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

7. CDC

- <https://www.cdc.gov/safewater/chlorination-byproducts.html>
- <https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html>