BLEACH RELATED INCIDENTS

Our department is the lead agency investigating pesticide related illnesses; most have to do with exposure to antimicrobial or disinfectants. And of those antimicrobial related incidents, most of those are bleach (hypochlorite solution) related incidents.

There are practical things that we can **all** do to ensure that these products are used and stored safely:

Read the Label: Dilution rates, 'What to do in case of accidental exposure', and what to wear while using the product (gloves, eyewear, etc.) is listed on the bottle.

Keep away from children and other people who are not using the product.

Never put the product in a container meant for food and / or drink.

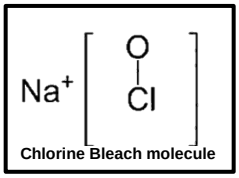
If you wish to make a solution (diluted product) in a spray bottle as an example, be sure to clearly mark the container with its contents.

Background of Hypochlorite (Bleach)

In Los Angeles County, between the fiscal years of 2012 and 2015, over 800 pesticide related cases were closed. Of those cases, 46 % were classified as 'antimicrobial'. A majority of those antimicrobial cases were hypochlorite related. Hypochlorite solution is implicated in a large proportion of the disinfectant exposures reported to poison control centers in the United States. Most are solutions of **sodium** or **calcium hypochlorite**. Sodium and calcium hypochlorite solutions are mildly corrosive to eyes, and mucous membrane burns have been reported.

Bleach-based products **should never be mixed** with acid or ammonia solutions, because chlorine gas is produced, resulting in irritated lungs, and throat. The applicator can quickly become overwhelmed by the fumes. Depending on the situation, this acute exposure may lead to immediate medical care. Prolonged exposure or exposure to high concentrations carries the potential of severe toxic pneumonitis.

Great effort should be made to discourage mixing of these materials with acid or ammonia.
Excerpt from: Recognition and Management of Pesticide Poisoning, USEPA. Page 203.
http://npic.orst.edu/RMPP/rmpp_main2a.pdf



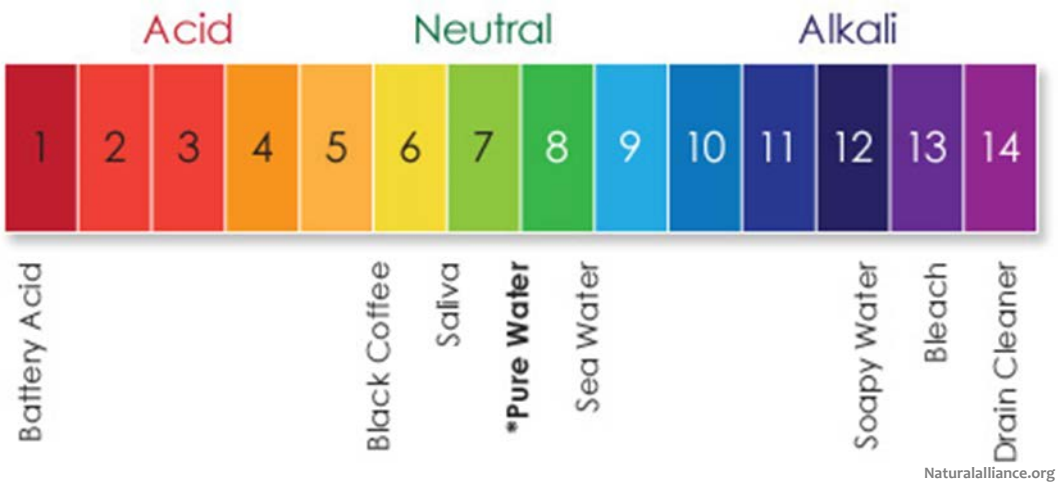
What is it about bleach that makes it a great disinfectant, but can make me sick?
There are many different brands of laundry bleach available, and the concentration of sodium hypochlorite can vary significantly. Some brands are as high as 5.25% sodium hypochlorite, but many other brands have lower concentrations.

pH Effect

When sodium hypochlorite is dissolved in water, the resulting solution is quite basic (alkali) due to the production of OH^- ions by the following reaction:

NaOCl (*solid*) + H_2O(*liquid*) → HOCl (liquid solution) + NaOH (liquid solution)

The balance of ions is very sensitive. If the solution is mixed with an acid, the solution becomes volatiles and creates a poisonous gas. A different type of gas is created if it is mixed with an alkali product, such as a cleanser. These conditions result in terrible odor that creates a burning sensation in the throat, lungs, and bad headache.



When the pH is between 2– 7, the balance or *equilibrium* favors HOCL. As the pH falls below 2, the main form is Cl_2. At a pH of 7.4, HOCl and OCl^- are about equal, and as the pH goes above 7.4, increasing proportions of OCl^- are present. Maximum disinfecting efficacy is achieved at pH 4–5, because the chloride is active, and performs the disinfecting work. Changing the pH (especially below 4) of the solution too much and you have created a hazard to yourself and anyone else in the room. **Chlorine gas is quite toxic.**

Free chlorine – combined forms of HOCl (hypochlorous acid), OCl^- (hypochlorite anion) and Cl_2 (dissolved chlorine gas) in aqueous solution

New from CDPR

REMINDER: Disinfecting wipes are pesticides and must be used according to label directions.

Disinfecting wipes are antimicrobial products that are used to kill germs. Many teachers and other school staff use disinfecting wipes daily for health and safety purposes. Disinfecting wipes are registered pesticides and like all pesticides, must be used according to the label directions, including keeping them out of the reach of children.

Microfiber cloths are a reusable, less expensive alternative to disinfecting wipes that do an effective excellent job at cleaning dirt, grime, and germs from nonporous surfaces with nothing more than rinsing and wringing the cloth out with water before and after use.

Beginning July 1st, 2016 all school staff members who use disinfecting wipes will be required to participate in training to learn about the safe use of pesticides around children. DPR's online course will be available in early 2016.

Questions about this or anything else Healthy Schools Act related? Feel free to email us at school-ipm@cdpr.ca.gov.

Excerpts from: **Fact Sheet –Disinfection Using Chlorine Bleach, Oregon State University, Research Office**

SEE ALSO California Department of Pesticide Regulation's (CDPR) series:

Using Disinfectants, Sanitizers, Medical Sterilants, and Other Antimicrobials in the Workplace

WHAT YOU NEED TO KNOW **about**

New from CDPR: updates to Healthy Schools Act