

Sodium Hypochlorite/Calcium Hypochlorite (Clorox, Bleach) Chemical Fact Sheet 2/86

CHEMICAL FACT SHEET FOR:
Sodium Hypochlorite and Calcium Hypochlorite

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1. DESCRIPTION OF CHEMICAL

- Generic name: Sodium and calcium hypochlorites
- Common name: Bleach
- Trade name: Clorox, Purex
- EPA Shaughnessy code: 014701 (Calcium Hypochlorite); 014703 (Sodium Hypochlorite)
- Chemical Abstracts Service (CAS) number: 7681-52-9 (Calcium) 778-54-3 (Sodium)
- Year of registration: 1957
- Pesticide type: Disinfectant, algaecide or sanitizer
- Chemical family: Inorganic salts
- U.S. and foreign producers: Jones Chemical Inc., Allied Chlorine Corp., Kuehne Chemical Company, Olin Corporation, Surpass Chemical Company, Penwalt Chemical Corporation, PPG Industries.

2. USE PATTERNS AND FORMULATIONS

- Application sites: Porous and nonporous food contact and nonfood contact surfaces, swimming pool water, drinking water, waste water and sewage, pulp and paper mill process water.
- Percent of pesticide applied to nonporous food contact surfaces, 100 to 200 ppm available chlorine; porous food contact surfaces, 600 ppm; nonfood contact surfaces, 600 to 1000 ppm; swimming pools start-up, 5 to 10 ppm available chlorine and maintain at 1.0 ppm to 1.5 ppm; drinking water, 0.2 ppm available chlorine; waste water, 0.5 ppm; pulp and paper mill process water, 5 to 10 ppm initial dose and subsequent dose of 1 ppm available chlorine.
- Application rates: N/A
- Types of formulations: liquid (sodium hypochlorite) granular, powder and, tablet (calcium hypochlorite)
- Usual carriers: Water
- **Efficacy review results: Product-by-product efficacy data requirements normally levied on disinfectants and sanitizers have been waived because the Agency has concluded that the published literature can reasonably be extrapolated to the full range of these products.**

3. SCIENCE FINDINGS

Chemical Characteristics

- Physical state: clear liquid, (sodium hypochlorite) granular, powder, and tablet, (calcium hypochlorite)
- Color: clear liquid, (sodium hypochlorite) white, (calcium hypochlorite)

- Odor: chlorine
- pH: Sodium Hypochlorite: 9.75-10.50; Calcium Hypochlorite: 12.59-13.11, concentrated aqueous solutions.
- Boiling point: N/A
- Melting point: N/A
- Flash point: N/A

Toxicity Characteristics

- Toxicity category and value for sodium hypochlorite:
 - Acute oral toxicity: IV; LD50, 192 mg/kg
 - Acute dermal toxicity: III; LD50, > 3,000 mg/kg
 - Primary eye irritation: I; Corrosive
 - Primary skin irritation: I; Corrosive
- Toxicity category and value for calcium hypochlorite:
 - Acute oral toxicity: III; LD50, 850 mg/kg
 - Acute dermal toxicity: II; LD50, > 2g/kg
 - Acute inhalation: III; LC50, < 20mg/l
 - Primary eye irritation: I; Corrosive
 - Primary skin irritation: I; Corrosive

Physiological and Biochemical Behavioral Characteristics: N/A

Environmental Characteristics: N/A

Ecological Characteristics

- Values for sodium hypochlorite:
 - Acute oral-bobwhite quail: LD50, > 2510 mg/kg
 - Acute dietary-mallard duck: LC50, > 5220 ppm
 - Acute dietary-bobwhite quail: LC50, > 5620 ppm
 - Acute fish-rainbow trout: LC50, 0.18-0.22 mg/l
 - Acute fish-bluegill sunfish: LC50, 0.44-0.79 mg/l
 - Acute invertebrate-daphnia: LC50, 0.033-0.048 mg/l

Tolerance Assessment

- An exemption from the requirement for a tolerance was established (40 CFR 180,1054) for residues of calcium hypochlorite which may occur in or on raw agricultural commodity potatoes resulting from the use of washing solutions containing calcium hypochlorite. After reexamining the exemption from the requirement for a tolerance, the Agency has determined that the exemption is still appropriate under current scientific standards.
- Food processing plants, dairies, canneries, breweries, wineries, beverage bottling plants and eating establishments use hypochlorites for sanitizing premises and for disinfecting equipment and utensils.

A

incidental food additive regulation allowing the use of sodium or calcium hypochlorites as a terminal sanitizing rinse on food processing equipment has been established (21 CFR 178.1010). A food additive regulation permitting the use of sodium hypochlorites in washing or assisting in lye peeling of fruits and vegetables has been established (21 CFR 173.315) by the Food and Drug Administration (FDA).

- The provisions of the Federal Food Drug and Cosmetic Act (FFDCA) (40 CFR Part 180 require the establishment of a tolerance for exemption

from the need for a tolerance) for the use of calcium hypochlorite on mushroom pins (preharvest); sweet potatoes (postharvest), pimento seeds, tomato seeds, pecans (postharvest), fish fillets. EPA plans to

propose to issue an exemption from the requirements of a tolerance for these uses.

- The provisions of the Federal Food Drug and Cosmetic Act (21 CFR 173 Subpart D - Specific Usage Additives) require the establishment of a food additive regulation for calcium hypochlorite in sugar syrup and raw sugar. Applicants whose product labeling contains such uses must

either obtain a food additive regulation for the uses from the Food and Drug Administration within 12 months from the date of issuance of this standard or delete the claims from the labeling.

- Reported Pesticide Incidents: N/A

Summary Science Statement

- Based on a review of the available product chemistry, toxicity, environmental fate, and ecological effects data on sodium and calcium hypochlorites, the Agency has determined that any hazards associated with the uses of sodium and calcium hypochlorite are relatively small.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

- Uses: Final sanitizing rinses on food processing equipment and utensils; disinfection of nonporous hard surfaces; algicides/slimicides for water treatment systems; disinfection of poultry drinking water; disinfection of human drinking water, swimming pool water, hubbard/immersion tank water, spas/hot tubs, hydrotherapy pools, and human drinking water systems; laundry sanitizers; toilet bowl sanitizers.
- Formulations: Liquid sodium hypochlorite solutions; solid (granular, powder, or tablet) calcium hypochlorite.
- Sodium and calcium hypochlorite single active ingredient products are eye irritants, but the potential for hazard from use of these products may be mitigated with appropriate precautionary labeling.
- The hypochlorites are the most widely used chemicals for disinfecting water supplies, are generally recognized as safe for use as post harvest fungicides on agricultural commodities, and are listed as sanitizers, for use as terminal sanitizing rinses of food handling equipment. In the absence of significant long term dietary exposure to the hypochlorites from these patterns of use, there is no need for chronic or subchronic studies. If it comes to the attention of the Agency that hazards due to long term dietary exposure may be significant, then long term studies will be required.
- Unique warning statements: None.

5. SUMMARY OF MAJOR DATA GAPS

- There are no data gaps.

6. CONTACT PERSON AT EPA

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