

# CAUSATIVE AGENT: PRESERVATIVES

SKIN ALLERGEN, SKIN IRRITANT, LUNG SENSITIZER

## DEFINITION

Compound added to slow or prevent bacterial growth and/or unwanted changes in chemical property; exposure may lead to skin irritation or allergy as well as lung sensitization (i.e. allergy).

## HEALTH EFFECTS

- Allergic contact dermatitis: an allergic reaction of the skin triggered by exposure to a chemical allergen
- Irritant contact dermatitis: a skin rash triggered by over-exposure to water, solvents, friction, or contact with irritating substances (e.g. soaps, detergents)
- Occupational asthma: asthma (i.e. airway obstruction) or the exacerbation of pre-existing asthma resulting from an exposure in the workplace
- Cancer resulting from exposure to carcinogenic compounds

## EXAMPLES

- |                            |   |                       |
|----------------------------|---|-----------------------|
| • Adhesive                 | (glue-laminated timber")  | • Pigment suspensions |
| • Antimicrobial            | • Latex emulsions   | • Polymers            |
| • Bleaching agent          | • Metal working fluids (i.e. coolants, cutting oils, drilling fluids, lubricants, machining fluids) | • Pulp slurries       |
| • Blockboard               | • Paints  | • Resin               |
| • Chelation agent          | • Particle boards   | • Sizing agents       |
| • Defoamer                 | • Parquets  | • Starch solution     |
| • Dye solutions            |   | • Vehicle exhaust     |
| • Fiber board              |   | • Vinyl flooring      |
| • Flame resistant clothing |   | • Wood cleaner        |
| • Glulam                   |   | • Wood products       |

## KEY COMPOUNDS

Review cleaning products' Safety Data Sheets to identify the presence of these compounds. Follow the appropriate precautionary measures.

- |   |  |  |
|---|--|--|
| • 2,2-dibromo-3-nitrilopropionamide (DBNPA)   | an IARC Group 1 carcinogen                                     | • Dazomet  |
| • Aldehydes (e.g. acetaldehyde, formaldehyde, glutaraldehyde)   | • Alkaline copper quaternary (ACQ)                             | • Dichlorophen   |
| – Acetaldehyde is classified by the International Agency for Research on Cancer (IARC) as a Group 2B carcinogen | • Ammonium compounds (e.g. ammonium bromide, ammonium sulfate) | • Ethylenediaminetetraacetic acid (EDTA)   |
| – Formaldehyde is classified as   | • Bronopol   | • Ethoxyquin   |
|   | • Chlorine dioxide   | • Formaldehyde releasers [e.g. diazolidinyl urea (DIAZ), dimethyloldimethyl (DMDM) hydantoin, imidazolidinyl urea, quaternium 15 (Q-15)] |
|   | • Chlorothalonil   |  |
|   | – Classified as an IARC Group 2B carcinogen                    |  |
|   | • Creosotes  |  |
|   | – Classified as IARC Group 2A                                  |  |

# CAUSATIVE AGENT: PRESERVATIVES

## KEY COMPOUNDS (CONTINUED)

- Hexahydrotriazine
- Inorganic arsenic compounds [(e.g. ammoniacal copper arsenate (ACA), chromated copper arsenate (CCA)]
  - Classified as IARC Group 1 carcinogens
- Iodopropynyl butylcarbamate (IPBC)
- Isothiazolinones [e.g. benzisothiazolinone (BIT), methylchloroisothiazolinone (MCI), methylisothiazolinone (MI), octylisothiazolinone]
- Methylene bithiocyanate (MBT)
- Parabens (e.g. methylparaben, ethylparaben, propylparaben, butylparaben) pentachlorophenol
  - Classified as IARC Group 1 carcinogens
- Peracetic acid
- Polyethylene glycol
- Sodium bromide
- Sodium hypochlorite
- Tetrakis hydroxymethyl phosphonium sulfate (THPS)
- Thiabendazole
- Thiocyanomethylthio-benzothiazole (TCMTB)

**SECTORS:** Forestry, mining, pulp and paper .

## JOB

### Forestry

Entomologist, field worker/researcher, harvester, logging labourer, pesticide handler, tree planter, timber miller

### Mining

Camp attendant, cook, miner (i.e. surface or underground), service crew

### Pulp and Paper

Bleachery worker, maintenance technician, mill operator (e.g. sulfite processes)

## OTHER CONSIDERATIONS

- Some preservatives have workplace exposure limits

## HOW COMMON ARE THE HEALTH EFFECTS?

Approximately 63,000 workers in Ontario are exposed to formaldehyde.

Approximately 8,600 workers in Canada are exposed to acetaldehyde and 4,300 to pentachlorophenol.

14.2% of patients with occupational contact dermatitis tested positive for preservative contact allergy.

## KEY PREVENTION STRATEGIES

### Substitution

- Use mild skin care products (i.e. mild soap for cleansing, mild detergent for industrial cleaning, waterless hand cleanser for oil and grease removal)
- Replace biocide (e.g. chlorine) use with ultraviolet light (UV) technology

### Engineering Controls

- Use automated cold sterilization machines
- Use tools to prevent direct contact with preservatives or products containing preservatives

### Administrative Controls

- Provide training on proper glove use (i.e. use cotton liners with nitrile gloves), skin care (i.e. moisturize after hand-washing and throughout the day) and hand washing (i.e. use lukewarm water; avoid hot)
- Rotate workers throughout the work shift to minimize their exposure to preservatives

### Personal Protective Equipment

- Use appropriate respirator and gloves (consult manufacturer)
- Avoid gloves made from natural rubber latex (if necessary, use low-protein and powder-free styles)

# CAUSATIVE AGENT: PRESERVATIVES

---

## SOURCES

CAREX Canada, 2017. Profiles & Estimates.

International Labour Organization, 2018. International Hazard Datasheets on Occupations (HDO).

Rossmore, H.W., 1994. Handbook of Biocide and Preservative Use. Springer Science & Business Media.

Schwensen, J.F., Friis, U.F., Menne, T., Flyvholm, M.A., Johansen, J.D., 2017. Contact allergy to preservatives in patients with occupational contact dermatitis and exposure analysis of preservatives in registered chemical products for occupational use. International Archives of Occupational and Environmental Health 90, 319-333.

United States Environmental Protection Agency, 2017. Overview of Wood Preservative Chemicals.



Centre for  
Research Expertise  
in Occupational Disease