



Sodium hypochlorite

General Information

Key Points

- sodium hypochlorite is a green/yellow liquid with the characteristic smell of chlorine
- it is a major ingredient in household bleach (present at up to 10%)
- it is also used as a disinfectant for swimming pools, can be used to disinfect drinking water, in some medical treatments and in the manufacture of paper and pulp
- accidental skin or eye exposures to sodium hypochlorite in domestic products are common
- children may be exposed to sodium hypochlorite in bleach following accidental ingestion
- mixing sodium hypochlorite bleach with other cleaning products may produce dangerous gases
- ingestion of small amounts of household bleach is unlikely to cause any serious or long term health effects
- ingesting large amounts of household bleach or any amount of industrial strength bleach is more likely to cause serious health effects

Public Health Questions

What is sodium hypochlorite?

Sodium hypochlorite is a green/yellow liquid with the characteristic smell of chlorine. It was first used as a bleaching agent and was then discovered to be effective in controlling wound infections. Subsequently, it is most commonly known as household bleach. It is also produced naturally in the human body in very small amounts.

What is sodium hypochlorite used for?

Today, approximately 70% of the total amount of sodium hypochlorite produced is used to make bleach used for household cleaners and laundry additives, used for their bleaching, disinfecting and stain-removing properties.

Household bleach usually contains approximately 5% sodium hypochlorite although some may contain up to 10%. Industrial bleaches are usually more concentrated, containing up to 50% sodium hypochlorite.

Perhaps one of the most important applications of sodium hypochlorite is in the disinfection of public water supplies to prevent the transmission of waterborne diseases such as cholera and typhoid. Consumer products for disinfecting water on a smaller scale are available. Sodium hypochlorite is found in low concentrations (2%) in some commercially available sterilising fluids used to disinfect baby feeding equipment.

It is also used for a number of industrial processes such as commercial laundering, the manufacture of paper and pulp, for industrial chemical synthesis, medical treatments and the disinfection of swimming pools.

How might I be exposed to sodium hypochlorite?

Accidental skin or eye exposures to sodium hypochlorite in domestic products are quite common. Children may be exposed to sodium hypochlorite in bleach if they touch or ingest it. Products containing sodium hypochlorite stored in the home should be kept out of the reach of children and in an appropriate container. Individuals may be exposed to gases formed by the inappropriate mixing of cleaning products such as those released when sodium hypochlorite is mixed with acidic solutions (such as vinegar) or alkaline solutions (such as ammonia).

If I am exposed to sodium hypochlorite how might it affect my health?

The presence of sodium hypochlorite in the environment does not always lead to exposure. In order for it to cause any adverse health effects you must come into contact with it. You may be exposed to sodium hypochlorite by drinking the substance or by skin contact with it. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are

exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Ingestion of small volumes (up to 200 mL in adults; 50 mL in children) of household bleach (<10% sodium hypochlorite) usually causes minimal health effects. It is mild to moderately irritating and may in some cases cause burns to the mouth throat and airways. Ingestion of small amounts is not expected to cause severe or permanent damage and recovery is usually rapid.

Ingestion of any amount of industrial strength bleach (>10% sodium hypochlorite) or large amounts (approximately 300 mL in adults; 100 mL in children) of household bleach may cause abdominal pain, vomiting, diarrhoea, breathing difficulties amongst other serious effects which can be life threatening.

If sodium hypochlorite is mixed with acidic products, chlorine gas is produced. Minor exposures, such as those usually seen when cleaning products have been mixed together, may result in a burning sensation of the eyes and throat, coughing and sore throat. More substantial exposure may cause breathing difficulties and swelling of the airways. Exposure to high concentrations of chlorine may be potentially fatal due to the onset of a serious condition called pulmonary oedema, where fluid enters the lung and limits the body's ability to absorb oxygen from the air. In most cases, symptoms usually disappear within 1-4 weeks and people usually do not suffer any long-term effects. However, a small proportion of individuals may acquire a long-term sensitivity to inhaled chemicals known as 'reactive airways dysfunction syndrome' or RADS.

If sodium hypochlorite is mixed with an ammonia-containing cleaning product, chloramines may be produced which are also highly irritating to the respiratory tract.

Can sodium hypochlorite cause cancer?

The international agency for research on cancer (IARC) has stated there are no data in humans and not enough in laboratory animals to assess if sodium hypochlorite can cause cancer. Sodium hypochlorite is not thought to cause cancer in humans.

Does sodium hypochlorite affect pregnancy or the unborn child?

Exposure to household or industrial strength bleach at levels that do not affect the mother are unlikely to affect the health of the unborn child.

Sodium hypochlorite is used to disinfect (i.e. chlorinate) public water supplies and has an important role in preventing waterborne diseases such as cholera. On examining the evidence, the UK Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) concluded that there was no consistent link between chlorinated drinking water and negative birth outcomes.

How might sodium hypochlorite affect children?

Children are likely to be effected by sodium hypochlorite in the same way as adults.

What should I do if I am exposed to sodium hypochlorite?

You should remove yourself from the source of exposure.

If you have got sodium hypochlorite on your skin, remove soiled clothing (not above the head), wash the affected area with lukewarm water and soap for at least 10 – 15 minutes and seek medical advice.

If you have got sodium hypochlorite in your eyes, remove contact lenses, irrigate the affected eye with lukewarm water for at least 10 – 15 minutes and seek medical advice.

If you have inhaled or ingested sodium hypochlorite seek medical advice.

Additional sources of information

NHS Choices - Poisoning <http://www.nhs.uk/Conditions/Poisoning/Pages/Introduction.aspx>

NHS Choices – How do I deal with minor burns? <http://www.nhs.uk/chq/Pages/1047.aspx>

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

This information contained in this document from the PHE Centre for Radiation, Chemical and Environmental Hazards is correct at the time of its publication.

First published: October 2016

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