



Phenol

General Information

Key Points

- phenol is usually in the form of colourless or white crystals; it has a sickly sweet smell and a sharp burning taste
- it is used in antiseptics, lozenges, lotions, salves, ointments, cosmetics, paints, polishes, adhesives, lacquers, varnishes and solvents
- phenol in the environment is mostly as a result of human activity and most of this enters the environment by air
- low level exposure from the correct use of products that contain phenol would not be expected to cause any adverse health effects
- exposure to high concentrations can result in serious health effects
- high concentrations may cause irritation, burns and discolouration to skin, mouth, throat, eyes and airways
- as phenol is an anaesthetic burns may not be noticed straight away, even if they are very serious
- phenol can be absorbed by the body, this may result in nausea, vomiting, diarrhoea, a fast heart rate and sweating
- following exposure to high concentrations, drowsiness, breathing and heart problems and lung and kidney damage can occur

Public Health Questions

What is phenol?

Phenol (also known as carbolic acid) is an aromatic organic compound, usually in the form of colourless or white crystals. It has a sickly sweet smell and a sharp burning taste. Phenol is a part of coal tar and is formed during the natural decomposition of organic materials.

What is phenol used for?

The major use of phenol is in the manufacture of synthetic fibres including nylon, phenolic resins including bisphenol A and other chemicals. It is used in chemical skin-peelers, nerve injections, topical anaesthetics and as a disinfectant. It is also present in low concentrations in a number of over-the-counter products including antiseptics, lozenges, lotions, salves and ointments such as calamine lotion. Phenol is found in small quantities in cosmetics, paints, polishes, adhesives, lacquers, varnishes and solvents. It is allowed in consumer products up to 2.5% and soaps and shampoos up to 1% in the EU. It may also be found in smoked meat and fish products, and as a part of smoked flavourings.

How does phenol get into the environment?

Phenol in the environment is mostly present as a result of human activity and most of this enters the environment by air. Wood burning at home and waste burning, coal-fired power stations, cigarette smoking, exhaust gases and the natural breakdown of benzene by bacteria are all potential sources of phenol. Phenol may enter soil by the spreading of animal manure or sewage sludge, and may be present from historical manufacture of coal gas and coke. Phenol is not expected to remain in the environment for very long before being broken down.

How might I be exposed to phenol?

Tobacco smoke is an important source of exposure to phenol. The general public also may be exposed to low levels of phenol in food and consumer items such as floor waxes, cosmetics, antiseptics and disinfectants (see above for the uses of phenol).

Exposure to phenol may also occur if it is used where you work; safe levels are enforced to protect employees who may be exposed to phenol at work. Such levels are below those that are thought to cause harmful effects. Occupations in which workers may be exposed to phenol include processing of phenolic resins, production of phenol derivatives, caprolactam, cokes or insulation materials, wood workers, those in iron and steel foundries or synthetic fibre and fibrous glass wool factories.

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

The presence of phenol 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 phenol by breathing, eating, or drinking it 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.

Phenol is used in small amounts in a range of medicinal and household products. Low level exposure from the correct use of these products would be not expected to cause adverse health effects.

Exposure to high concentrations of phenol can cause a range of health effects including irritation, burns and discolouration to wherever they make contact (skin, mouth, throat, eyes, airways). As phenol is an anaesthetic these burns may not be noticed straight away even if they are very serious. Phenol is absorbed into the body very quickly following contact. Effects which may follow include nausea, vomiting, diarrhoea, a fast heart rate and sweating. In severe cases drowsiness, breathing and heart problems, lung and kidney damage, and death can occur.

Limited evidence suggests breathing phenol vapour for a long time (years) may cause progressive weight loss, excess production of saliva, muscle pain, weakness and liver damage.

Ingestion of phenol over a long time may cause gut irritation, effects on the heart, nervous system, lung and decreased body weight. Drinking water contaminated with phenol for long periods of time has caused mouth sores, nausea and diarrhoea in some people with others also reporting dark urine.

Can phenol cause cancer?

The international agency for research on cancer (IARC) has stated there is not enough data in laboratory animals or humans to assess if phenol can cause cancer. Phenol is not thought to cause cancer.

Does phenol affect pregnancy or the unborn child?

Limited data indicate that exposure to phenol at concentrations that do not harm the mother are unlikely affect the health of the unborn child.

How might phenol affect children?

Children exposed to phenol would be expected to have similar symptoms to those seen in adults. Where appropriate, it is important to ensure household products that contain phenol are stored in a safe container and are kept out of the reach of children.

What should I do if I am exposed to phenol?

Low level exposure from the correct use of products that contain phenol would not be expected to cause any adverse health effects.

Please see below for advice following accidental exposure to phenol.

You should remove yourself from the source of exposure.

If you have got phenol 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 phenol 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 phenol 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?CategoryID=72>

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

For queries relating to this document, please contact: generaltox@phe.gov.uk

© Crown copyright 2016, www.gov.uk/phe

Re-use of Crown copyright material (excluding logos) is allowed under the terms of the Open Government Licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ for terms and conditions.