Public Health England

Protecting and improving the nation's health

Hydrogen cyanide

General Information

Key Points

- hydrogen cyanide is a colourless or light blue liquid or gas and is extremely flammable
- combustion processes such as building fires, cigarette smoke or vehicle exhausts produce hydrogen cyanide
- uses for hydrogen cyanide include manufacture of paints, plastics, synthetic fibres and other chemicals
- hydrogen cyanide may also be used as a pesticide, in metal cleaning, gardening, ore-extraction, electroplating, dying, printing and photography
- cigarette smoke is considered to be the greatest source of exposure to hydrogen cyanide for those who don't eat foods that may release it
- hydrogen cyanide is very toxic, its prevents oxygen from being used in the body
- minor exposures may result in flushing, light-headedness, dizziness and headache which usually cease on removal from the exposure
- exposure to large amounts can be quickly fatal
- effects from skin contact require large areas to be exposed

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Public Health Questions

What is hydrogen cyanide?

Hydrogen cyanide is a colourless or light blue liquid or gas and is extremely flammable. It has a faint bitter almond odour, though not everyone is able to detect this. Other names for hydrogen cyanide include prussic acid and hydrocyanic acid.

What is hydrogen cyanide used for?

Hydrogen cyanide is an important industrial chemical and over a million tonnes are produced globally each year. There are many uses for hydrogen cyanide, primarily in the manufacture of paints, plastics, synthetic fibres (e.g. nylon) and other chemicals. Hydrogen cyanide and other cyanide compounds have also been used as a fumigant to control pests. It also has uses in metal cleaning, gardening, ore-extraction, electroplating, dying, printing and photography. Sodium and potassium cyanide and other cyanide salts may be made from hydrogen cyanide.

How does hydrogen cyanide get into the environment?

Hydrogen cyanide is released from a number of natural processes including by bacteria and fungi and from volcanic activity. Hydrogen cyanide may enter the environment from certain industrial processes, from release during combustion or from accidents involving its transport. A wide range of combustion processes produce hydrogen cyanide gas in the smoke or fumes; including building fires, cigarettes, vehicles exhausts and fires involving nitrogen containing materials such as polyurethane foams. Hydrogen cyanide does not generally enter soils and does not remain in water for a long time.

How might I be exposed to hydrogen cyanide?

Because it is widely used, exposure may occur in a number of situations. Exposure may occur in the workplace although safe levels are enforced to protect the employees. Such levels are below those that are thought to cause harmful effects.

Hydrogen cyanide is released from natural processes and so exposure will occur at very low levels throughout the environment. Hydrogen cyanide is not used domestically but may be released from a number of combustion processes, exposure may occur from smoke from cigarettes, house and other fires (especially those involving plastics) or from car exhaust fumes.

Smoking is considered to be the greatest source of exposure to hydrogen cyanide for the general population.

Hydrogen cyanide may be released from some raw and unprocessed edible plants when they are damaged (e.g. ground or chewed) or digested by the body. Notable examples are the kernels of apricots, wild “bitter” almonds and black cherries; bamboo shoots; lima beans and cassava. The Food Standards Agency (FSA) advises against eating raw, unprocessed

apricot kernels, bitter almond kernels and powdered forms of them. For more information on cyanide exposure and food please see FSA - Advice on apricot kernels and bitter almond kernels: http://www.food.gov.uk/news-updates/news/2016/15138/advice-on-apricot-kernels-and-bitter-almond-kernels.

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

The presence of hydrogen cyanide 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 hydrogen cyanide by breathing, eating, or drinking the substance or by skin or eye 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.

Hydrogen cyanide is very toxic, it prevents the body from using oxygen properly. Early signs of exposure to hydrogen cyanide include headache, a feeling of sickness, dizziness, confusion and drowsiness. Substantial exposure may rapidly lead to unconsciousness, fitting, coma and possibly death. If a substantial exposure is survived, there may be long-term effects from damage to the brain and other nervous system damage. Effects from skin contact requires a large surface of the skin to be exposed

Can hydrogen cyanide cause cancer?

Hydrogen cyanide is not considered to be a cancer-causing chemical.

Does hydrogen cyanide affect pregnancy or the unborn child?

There are limited data available on the effects of exposure to hydrogen cyanide during pregnancy. Therefore, is not possible to draw any definitive conclusions. Effects on the unborn child are more likely to occur at levels that harm the mother.

How might hydrogen cyanide affect children?

Children exposed to hydrogen cyanide are likely to experience similar health effects as adults.

What should I do if I am exposed to hydrogen cyanide?

It is very unlikely that the general population will be exposed to a level of hydrogen cyanide high enough to cause adverse health effects. However, if you have any health concerns regarding exposure to phosgene seek guidance from your GP or contact NHS 111

Additional sources of information

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

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

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