Hydrazine

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Hydrazine is colorless, fuming, oily liquid with an ammonia-like odor [CDC].

Vapours may form explosive mixtures with air when the substance is heated above its flash point [IARC].

Hydrazine exists as anhydrous hydrazine, or as hydrazine hydrate [IARC].

Usage and exposure

Hydrazine is used in agricultural chemicals (pesticides), chemical blowing agents, pharmaceutical intermediates, photography chemicals, textile dyes, as fuel for rockets and spacecraft (rocket propellant).

It is used in the manufacture of paints, inks and organic dyes, polyurethane coatings, and adhesives.

In addition, hydrazine has several direct applications as an oxygen scavenger, a corrosion inhibitor (boiler water treatment for corrosion protection), and reducing agent.

Small amounts of hydrazine have been detected in tobacco smoke [EPA, IARC].

Exposure predominantly occurs in the workplace, with highest exposures in facilities where hydrazine is handled as rocket propellant and in the refilling of fighter aircrafts. No exposure of the general population has been identified [IARC].

Routs of exposure

Inhalation, skin absorption, ingestion, skin and/or eye contact [CDC].

Target organs

Eyes, skin, respiratory system, central nervous system, liver, kidneys [CDC].

Metabolism

Organ toxicity after accidental or intentional exposure to hydrazine demonstrated absorption into the systemic circulation and distribution to target tissues. After occupational exposure, hydrazine was absorbed and excreted in the urine [IARC].

Health hazards

Symptoms of acute (short-term) exposure to high levels of hydrazine:

Skin contact can cause irritation and burns [CDC, EPA, PHE].

Eye exposure can lead to irritation, inflammation and burns; exposure to very high concentrations can cause temporary blindness [CDC, EPA, PHE].

Inhalation causes irritation the nose throat and lungs; in severe cases fluid can accumulate in the lungs, causing severe lung damage [CDC, EPA, PHE].

Ingestion may cause a burning sensation in the mouth and throat and abdominal pain, exposure to high concentrations can cause burns to the gastrointestinal tract [CDC, EPA, PHE].

Other effects which may occur due to inhalation or skin contact include headache, dizziness, low blood pressure, tiredness, confusion, fitting and coma; hydrazine exposure can also cause damage to the liver and kidneys [CDC, EPA, PHE].

There is strong evidence that hydrazine is genotoxic, primarily from experimental systems. DNA single-strand breaks were observed in a single study of human lung cells exposed to hydrazine. There is strong evidence that hydrazine induces oxidative stress in experimental systems. There is strong evidence that hydrazine alters cell proliferation, cell death, and nutrient supply in experimental systems [IARC].

There is limited evidence in humans for the carcinogenicity of hydrazine. A positive association has been observed between exposure to hydrazine and cancer of the lung.

There is sufficient evidence in experimental animals for the carcinogenicity of hydrazine [IARC].

Hydrazine is probably carcinogenic to humans (Group 2A) [IARC].

References

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