Formaldehyde: A deadly disinfectant

Formaldehyde is an effective disinfectant but can cause damage to those who come in contact with it. It is a colourless, pungent gas with a strong smell. Formaldehyde is a chemical that is derived from methanol (wood alcohol). It is found in a variety of products, including glues, paints, and photographic film. Formaldehyde is also used in the manufacturing of paper, textiles, and plastics.

Precautions

1. Use other disinfectants, such as alcohol or disinfectant wipes, whenever possible.
2. Use halogen disinfectants. Glutaraldehyde-based disinfectants are the least hazardous.
3. Use formaldehyde-based disinfectants only in critical hospital situations.
4. Conduct regular maintenance on ventilation systems to prevent FAH vapours from entering the treatment rooms.
5. Use other sterilisation methods, such as steam or ethylene oxide, if possible.

Formaldehyde is flammable and explosive but only at high concentration levels. Diluted FAH is also an irritant.

Formaldehyde levels in formalin-based fixatives are in the range of 37-40%, water and usually 10-15% formaldehyde. Formaldehyde and its derivatives are used in the manufacturing of glues, adhesives, paints, and plastics. Formaldehyde is also used as a chemical antiseptic, preservative, and embalming agent.

Bio-medical Waste

Formaldehyde is used in the medical field, especially in hospitals, to disinfect medical equipment and surgical instruments. However, formaldehyde can cause various health problems, including respiratory, skin, and eye irritation, as well as headaches and dizziness.

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Formaldehyde is used as a steriliser in dialysis units as well as on patients’ dialysis tubes.
The most probable route of human exposure to formaldehyde is inhalation. It can cause symptoms ranging from mild irritation to severe difficulty in breathing.

### Health effects

#### Acute effects

Inhalation:
- The most probable route of human exposure to formaldehyde is inhalation. Inhalation can cause respiratory symptoms such as coughing, chest pain, and shortness of breath. High concentrations can cause immediate effects such as tightening of the chest, irregular heartbeat, severe headache, and intense tearing of the eyes.

#### Chronic effects

Exposure to formaldehyde over long periods can lead to chronic health effects, including:
- **Upper respiratory tract irritation:** Such effects include coughing, chest pain, and shortness of breath.
- **Lower respiratory tract irritation:** Effects on the lower respiratory tract include bronchitis, emphysema, and chronic obstructive pulmonary disease.
- **Skin irritation:** Contact with formaldehyde solutions can cause skin irritation, including redness, itching, and discomfort.
- **Eye irritation:** Formaldehyde can cause tearing, redness, and irritation of the eyes.
- **Nose irritation:** Exposure to formaldehyde can cause a runny nose and nasal congestion.

### Formdehyde usage and awareness in Delhi hospitals

Formaldehyde is used in various medical applications in hospitals. In Delhi, the Indian Council for Medical Research (ICMR) has conducted a survey of 100 hospitals to understand the prevalence of formaldehyde usage. The survey found that formaldehyde is widely used in hospitals for various purposes, including:

#### Applications

- **Disinfection:** Formaldehyde is used for disinfecting surgical instruments and other medical equipment.
- **Preservation:** It is used to preserve biological specimens and tissues.
- **Chromatography:** Formaldehyde is used in chromatography to separate and analyze chemical compounds.
- **Processing:** It is used in the processing of medical equipment and instruments.

#### Awareness

Hospitals are increasingly becoming aware of the health risks associated with formaldehyde exposure. However, there is a need for better training and awareness among hospital staff regarding the proper handling and disposal of formaldehyde solutions.
**Formaldehyde and its Effects**

**Exposure Routes**

Formaldehyde is a toxic substance that can be inhaled, absorbed through the skin, or ingested. It is commonly found in products such as cleaning agents, disinfectants, and formalin solutions.

**Health Effects**

- **Eye irritation:** Splashes of formaldehyde can cause irritation and can lead to overexposure if the worker is not protected.
- **Dependency:** Ingestion, inhalation, skin absorption, and eye contact are common routes of exposure. The effects of exposure can vary depending on the duration of contact.
- **Route of exposure:** The effects can range from simple reddening of the skin to severe dermatitis. Eye contact results in burning, tearing, liquid FAH solutions contact the skin, and FAH can destroy the skin's natural barriers. FAH is also a suspected human carcinogen.

**Formaldehyde Usage and Awareness in Delhi Hospitals**

Studies have found that formaldehyde can damage the generic make-up of certain cells, which may cause birth defects.
Formaldehyde: A deadly disinfectant

Formaldehyde is a colorless gas with a pungent smell. It is used as a disinfectant and as a fixative in histology labs. However, it is also known to cause respiratory problems, eye irritation, and eye, nose, and throat irritation.

Use of formaldehyde should never be stored near, or used with, hydrochloric acid. Chemicals combine to form (bio)chlorinated ethanes which is a powerful cancer-causing agent.

Precautions

- Use other sterilization methods, such as ethylene oxide, when possible.
- Use non-formaldehyde-based sterilization techniques when possible.
- Use formaldehyde solutions for in vitro fertilization (IVF) and histology procedures, where possible.
- Wear protective clothing: Employees working with formaldehyde should wear a respirator, protective goggles, and gloves. This is especially important for personnel who handle formaldehyde solutions.
- Use adequate ventilation: Formaldehyde is a strong irritant and should be handled with care. Adequate ventilation is essential to prevent exposure.

Training programs include formaldehyde awareness training, certification, and regular exposure monitoring.

Hospital 1

The hospital has a centralized ventilation system in place. The hospital has also set up a formaldehyde awareness training program for all employees. Also, they have provided proper protective clothing and equipment to all employees.

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Hospitals worldwide use formaldehyde as a disinfectant and tissue fixative. This chemical is a known cancer-causing agent and is also highly toxic. It reacts violently with perchloric acid, hydrochloric acid and chlorine. It is also flammable and can cause serious fire and explosion hazards and safety precautions. Formaldehyde is toxic at all stages of its life. It is a powerful cancer-causing agent.

Sources and uses

Formaldehyde (FAH) is sold as an antiseptic and hospital sterilising agent. It is mainly used to preserve biological material, such as parts of body tissue to be seen by doctors. It is also used in the production of plywood, non-wood particle board and plasterboard. Formaldehyde is also used in making paper, cotton, rayon, synthetic leather and adhesives. In the form of solutions, it is used as a disinfectant and tissue fixative. This factsheet is an attempt to inform healthcare workers of the potential hazards of FAH exposure. It uses a combination of sources from various organisations to form a comprehensive report on FAH hazards.

Ventilate the work area

Formaldehyde is an effective disinfectant but can cause damage to those who come in contact with it. It is added to a solution to prevent biological contamination in tissue. This solution is used in hospitals to prevent occupational exposure to formaldehyde.

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