

Carcinogenic chemical agents

1



Introduction

2



Identification

3



Routes

4



Replacement

5



Preventive measures

In general, **carcinogenic chemical agents can only be marketed if authorised.**

1

Objective:

To identify carcinogenic chemical agents, learn the routes into the body, and find out how to protect yourself when handling them.

2

Area of application: laboratories and workshops in which carcinogenic chemical agents are handled.

3

What is a carcinogenic chemical agent?

It is a substance or mixture of substances that **induces cancer or increases its incidence.**

4

Classifications:

Category 1A

Substances that **are known** to be carcinogenic, based on the existence of **human evidence.**

Category 1B

Substances that **are known** to be carcinogenic, based on the existence of **animal evidence.**

Category 2

Substances that **are suspected** of being carcinogenic for humans.

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Preventive measures

To identify carcinogenic chemical agents, **consult the label and/or the safety data sheet (SDS)**

Consult point 2 on the identification of hazards in the corresponding safety data sheet (SDS), which provides the information required to identify a carcinogenic chemical agent.

Category	Pictogram	Signal word	Indications of hazards	H-phrase	R*-phrase
1A or 1B		Danger	May cause cancer May cause cancer by inhalation	H350 H350i	R45 R49
2		Warning	Suspected of causing cancer	H351	R40



* Special risks attributed to hazardous substances and preparations, according to RD 363/1995 and RD 255/2003

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Preventive measures

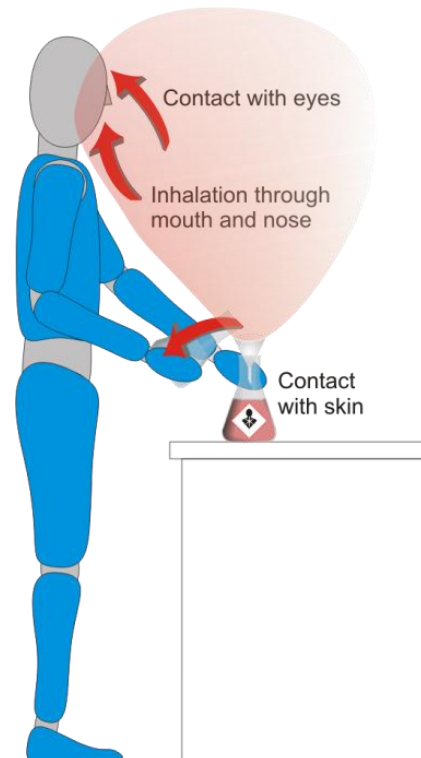
Routes are the ways chemical agents enter the organism. The main route is respiratory.

RESPIRATORY ROUTE

The route into the body of any chemical agent that is in the air in the form of a gas, vapour, fumes, powder, fibre, etc. that is taken into the lungs when the individual breathes in – **inhales the surrounding air through the nose or mouth**. Depending on the volume and shape of the particles, they will reach different distances along their passage through the respiratory system.

DIGESTIVE ROUTE

The route for chemical agents that involves their **ingestion**, generally due to **involuntary** action that is almost always associated with unhygienic practices and habits.



DERMAL ROUTE

The route for chemical agents that, when they come into **contact with the skin**, can cross it and reach the blood. The blood then distributes the chemicals around the body. Contact with eyes (irritation, etc.) is part of this route.

PARENTERAL ROUTE

The route for chemical agents **through injuries to the skin** or direct inoculation with the toxin.

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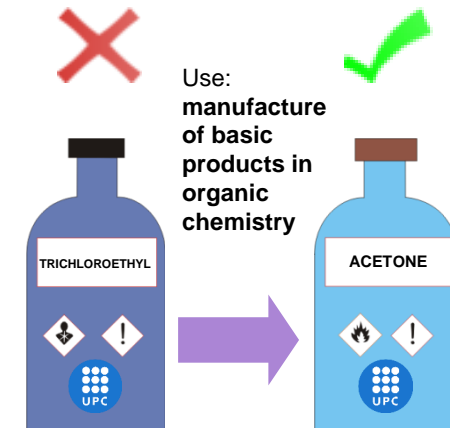


Preventive measures

If the carcinogenic agent is replaced by another chemical agent, the risk of exposure is eliminated.

Generally, chemical agents that are **carcinogenic do not have a universal replacement**, but can be substituted in certain applications by other chemical agents that are not mutagenic or by alternative processes.

Example CARCINOGEN IC chemical agent	Category	Applications	Alternative/Substitute
Benzene	Carc. 1A Muta. 1B	Laboratory analysis in industrial chemistry	- Anisole, cyclohexane, heptane, toluene
		Manufacture of other basic products in organic chemistry	- Toluene
Trichloroethyl	Carc. 1B Muta. 2	General solvent for oils, wax, etc.	- Non-chlorinated organic solvents (hydrocarbons, alcohols, ketones, ethers and esters)
		Cleaning of electrical equipment	- Solvent composed mainly of methoxynonafluorobutane
Formaldehyde	Carc. 2	Fixative for anatomical parts and tissues	- Glyoxal (ethane 1,2-dion), ethanol, polyvinyl alcohol, propylene glycol, ethanol
		Manufacture of printed circuits	- Sodium hypophosphite



Carcinogen 1B
Mutagen 2

Non-carcinogenic

For more information on potential substitutes, consult the **INFOCARQUIM (INFOrmació sobre CARcinògens QUÍMics)** database on the **INSHT website**: <http://infocarquim.insht.es:86/Forms/About.aspx>

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Preventive measures (1/2)

If the carcinogenic chemical cannot be replaced, observe the following preventive measures.

- ✓ Before handling the carcinogenic chemical:
 - Check the **relevant information** (hazards, precautions, etc.) on the **safety data sheet (SDS) for the chemical**.
 - Read and follow the health and safety measures on the SDS for the chemical.
- ✓ **Work with sealed equipment** to prevent exposure to carcinogenic chemicals due to accidental emissions at critical parts of the system (valves, joints, etc.).
- ✓ **Limit the amounts and concentrations** of the carcinogenic chemical to reduce exposure.
- ✓ **Limit the number of workers** who handle carcinogenic chemicals and reduce exposure time.
- ✓ **Delimit and signpost work areas** where carcinogenic chemicals are handled.

Danger! Carcinogenic chemicals in the work area



Chemical handled: benzene

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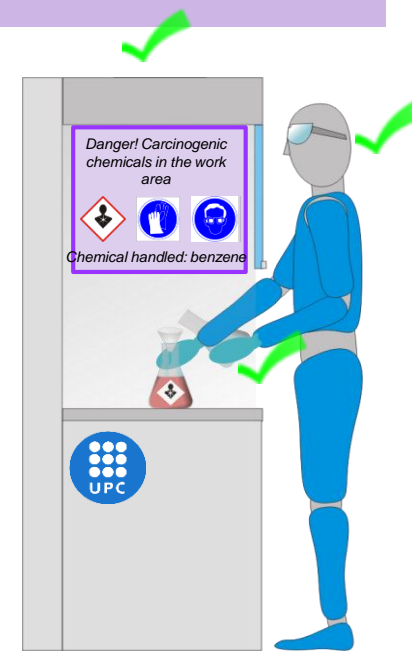
Preventive measures (2/2)

If the carcinogenic chemical cannot be replaced, observe the following preventive measures.

- ✓ **Handle** carcinogenic chemicals **in the fume cupboard** to prevent the inhalation of vapours and aerosols.
- ✓ **Use the following (minimum) personal protective equipment:**
 - **nitrile and/or neoprene chemical protection gloves** to protect the skin,
 - **safety goggles** to protect the eyes.

Consult the safety data sheet for the chemical to ensure the right PPE is used. If you have any queries, contact the manufacturer.
- ✓ **Wear appropriate clothes** (lab coat or similar) to prevent contaminating your street clothing. Do not wash work clothes at home. Use disposable lab coats or overalls as an alternative.
- ✓ **Store** carcinogenic chemicals in a chemical storage cabinet with **access limited** to authorised personnel.
- ✓ **Health surveillance** is **compulsory** for workers exposed to carcinogenic chemicals. Request a medical appointment by clicking on this link:

<https://www.upc.edu/prevencio/ca/salutupc>



Fume cupboard

US OBLIGATORI
DE GUANTS
DE PROTECCIÓUS OBLIGATORI
DE PROTECTORS
OCULARS

Compulsory personal protective equipment

For more information on chemicals, **consult the chemicals section on the Occupational Health and Safety website:**
<http://www.upc.edu/prevencio/ca/seguretat-higiene/productes-quimics>