Carcinogenic chemical agents

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.

Carcinogenic chemical agents

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

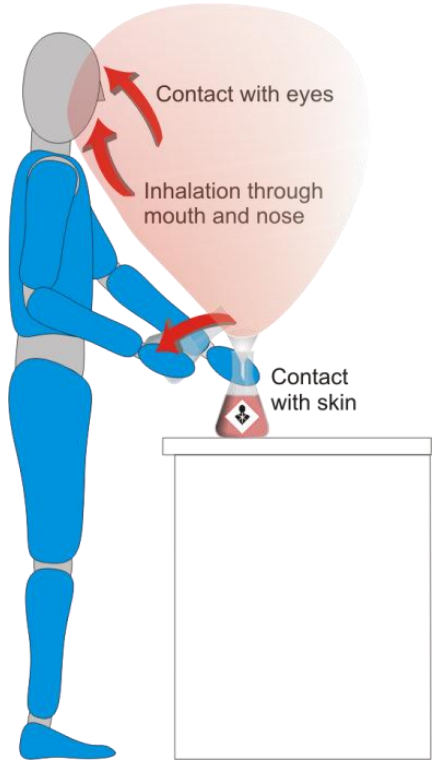
Carcinogenic chemical agents

1 Introduction
2 Identification
3 Routes
4 Replacement
5 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.



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.

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.

PARENTERAL ROUTE

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

Safety and hygiene regulations

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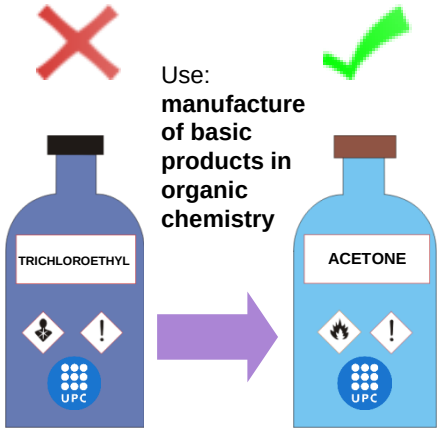
If the carcinogenic agent is replaced by another chemical agent, the risk of exposure is eliminated.

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 CARCINOGENIC 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



Use: **manufacture of basic products in organic chemistry**

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

Carcinogenic chemical agents

Safety and hygiene regulations

If the carcinogenic chemical agent cannot be replaced, implement the following preventive measures

- ✓ Obtain the **right information** (indications of danger, preventive measures, etc.) by reading the **chemical agent's safety data sheet**.
- ✓ **Work with air-tight equipment** so that you are not exposed to a carcinogenic chemical agent, by preventing small accidental leaks at critical points in the system (valves, joints, etc.).
- ✓ **Limit the amounts and concentrations** of the carcinogenic chemical agent to minimise exposure.
- ✓ **Limit the number of workers** who handle carcinogenic chemical agents and reduce the exposure time.
- ✓ **Handle** carcinogenic chemical agents **within a fume cabinet** to prevent inhalation of vapour.

- ✓ **Use at least the following personal protection equipment**:
  - **Nitrile and/or neoprene chemical protection gloves.**
  - **Safety goggles** (wraparound) to avoid contact with the chemical agent through the skin and eyes.
- ✓ **Store** mutagenic chemical agents in a specific cabinet for chemical storage, **with access restricted** to authorised personnel.

For further information on chemical agents, **consult the chemical products section of the prevention website**:
http://www.upc.edu/prevencio/ca/seguretat-higiene/productes-quimics