

# Laboratory Waste Disposal

The objective of the programme of risk management/control currently implemented at the Department of Chemistry of the University of Aveiro is to provide a healthy environment for students, staff, visitors to the Department and the surrounding community, and also to abide by the laws and regulations of the Portuguese Government. One of the key aspects of this programme is related to the correct disposal of chemical residues.

As a rule, **it is not allowed to intentionally eliminate chemical residues or dangerous substances directly to the Environment.**

This restriction includes the elimination of residues by any method such as normal sewage disposal, using the rubbish bins or evaporation inside the fume cupboards. The Chemistry Department will provide a correct disposal procedure for all chemical residues by sub-contracting specialized companies for that purpose.

In order to fulfill these objectives it is crucial to promote good laboratory practices (both in research and teaching activities) which lead preferentially to small amounts of chemical residues. The implementation of good practices for the prevention of environmental pollution is further expected to develop in each researcher the social consciousness for the correct management of chemical waste.

## 1. Procedure for the elimination of residues

1. Identify the category to which the chemical residues belong.
2. Store the chemical residues in appropriate vessels. These should allow a correct seal of its contents, be when possible of small internal volume and adequate to the chemical residue to be disposed. Solvents should be kept inside adequate plastic containers with an internal volume smaller than 5 L. Metallic containers should be avoided.
3. ALL recipients with chemical residues should be LABELLED (initial date of storage, contents and laboratory – see annex 1). The label from the previous use of the container should be completely removed or, at least, completely erased.
4. Halogenated solvents should be segregated from those non-halogenated. The remaining liquid residues should also be separated from latter two types of

solvents. Solvents should be kept inside adequate, and properly labelled, plastic containers.

5. The Department of Chemistry recycles the following solvents: acetone, chloroform, dichloromethane, petroleum ether, ethanol, diethyl ether and toluene. These solvents, provided that they have the adequate conditions to be recycled, should be kept inside adequate labelled containers. These should be delivered to the distillation room for the recycling procedure.
6. There are chemical residues which, due to their high reactivity or toxicity, must not be eliminated alongside solvents. These residues should be separated from other incompatible products and stored until their elimination. It is advisable that the following non-recyclable compounds should be segregated for adequate elimination. Please study your own case in order to proceed with the best and safer way to store your chemical waste. The given categories have been designated from A to K. Attention: even though some compounds could belong to the same category, their mutual reactivity must be taken into consideration for additional separations of chemical waste.

**Container A:** Organic non-halogenated solvents and solutions of organic non-halogenated compounds;

**Container B:** Organic halogenated solvents and solutions of organic halogenated compounds;

**Container C:** Organic solid waste;

**Container D:** Aqueous solutions neutralized to a pH between 6 and 8;

**Container E:** Inorganic toxic residues and salts of heavy metals and their respective solutions;

**Container F:** Flammable toxic compounds;

**Container G:** Mercury and residues of mercury salts;

**Container H:** Metal residues. Each metal should be disposed individually.

**Container I:** Inorganic solid waste;

**Container K:** Selective disposal of glass, metal and plastic.

7. These products should be stored following the guidelines for the storage of chemical products, including the aforementioned segregation rules.
8. Due to the current confined space for storage of residues in the Department of Chemistry, these should be kept, if possible, inside each laboratory. Solvents are excluded and could be directly delivered at the Chemistry stores. The directing board of the Department of Chemistry will provide a way for the safe and correct elimination of the chemical residues with a periodicity of at least twice per year (at the end of each academic semester). If justifiable, other or additional dates for the elimination procedure will be created.
9. The delivery of products for destruction should be accompanied in all instances by the adequate form (correctly filled) identifying the chemical nature of each residue.
10. Everyone is morally obliged to use the smallest possible amount of dangerous substances and also to produce small quantities of chemical waste.

## 2. Selective removal of glass

Not every disposed glass can be recycled. All labware is made of non-recyclable glass and should be segregated into appropriate containers. Only chemical flasks purchased from commercial sources, and after being carefully washed, can be disposed using the green container (called "vidrão").

## 3. Removal of mercury

Mercury is a highly toxic substance. Once inhaled, mercury vapours deposit in the lungs, being ultimately absorbed and transported in the blood to various organs in the human body. Its toxicity occurs essentially at the central nervous system, kidneys and liver.

**Please note:** it is not necessary to spill a large amount of mercury to overrun the safety admissible limits in the air. Because of this it is important to avoid at all costs mercury spillage, specially from broken thermometers.

In the case of an accidental mercury spillage (e.g., broke thermometer), please proceed as described below:

- i) Try to reduce the spillage to a minimum. It is important to avoid floor and/or benches contamination.
- ii) By using a Pasteur pipette collect the possible maximum amount of spilled mercury.
- iii) Contact immediately Dr. Dulce Helena (Extension No. 23587) who, by using an appropriate Kit, will proceed with the decontamination of the affected area(s) and will provide a safe and correct way to dispose the residues.