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Laboratory Wastes in ICMS

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How to treat laboratory wastes?

- Classification
- Treatment (if needed)
- Label (if needed)
- Collection





Classification of Laboratory Wastes

Solid or Liquid:

- **NO solid waste** in laboratory sink;
- Some liquid waste **MAY** discharge to laboratory sink after treatment.

Hazardous or Non-hazardous:

- Non-hazardous can discharge directly;
- Hazardous waste should dispose separately;
- **Laboratory gloves** are classified as hazardous waste;
- Make use of MSDS.





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KEEP the Laboratory Wastes inside Laboratory!!!



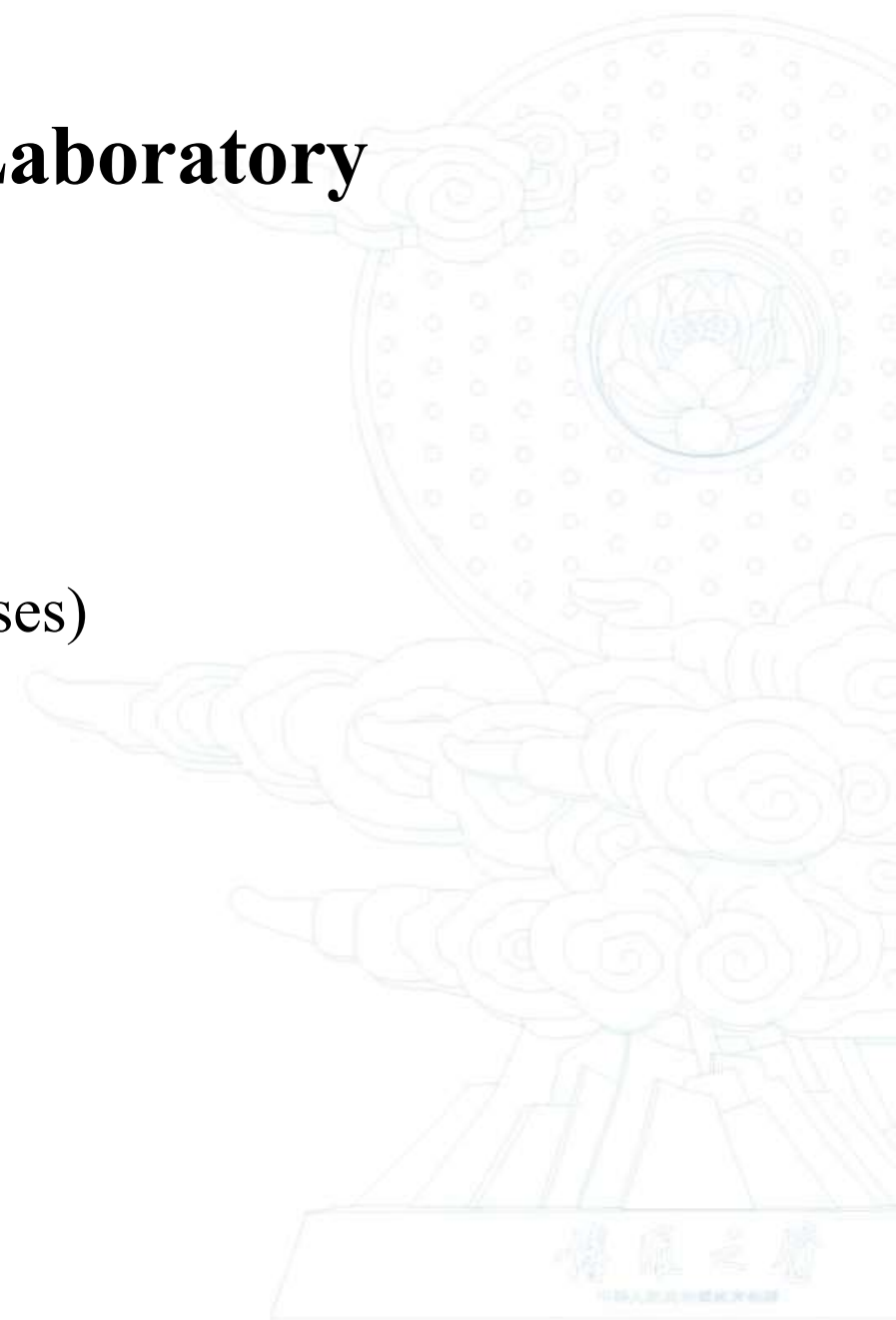
No laboratory wastes in toilet, pantry, corridor, etc....



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Common Wastes found in ICMS Laboratory

- General Wastes
- Sharp Objects
- Chemical Wastes (solid/ liquid)
- Biological Wastes (solid/ liquid/ animal carcasses)
- Broken Glass
- Empty Chemical Bottles
- Others...





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General Waste (household waste)

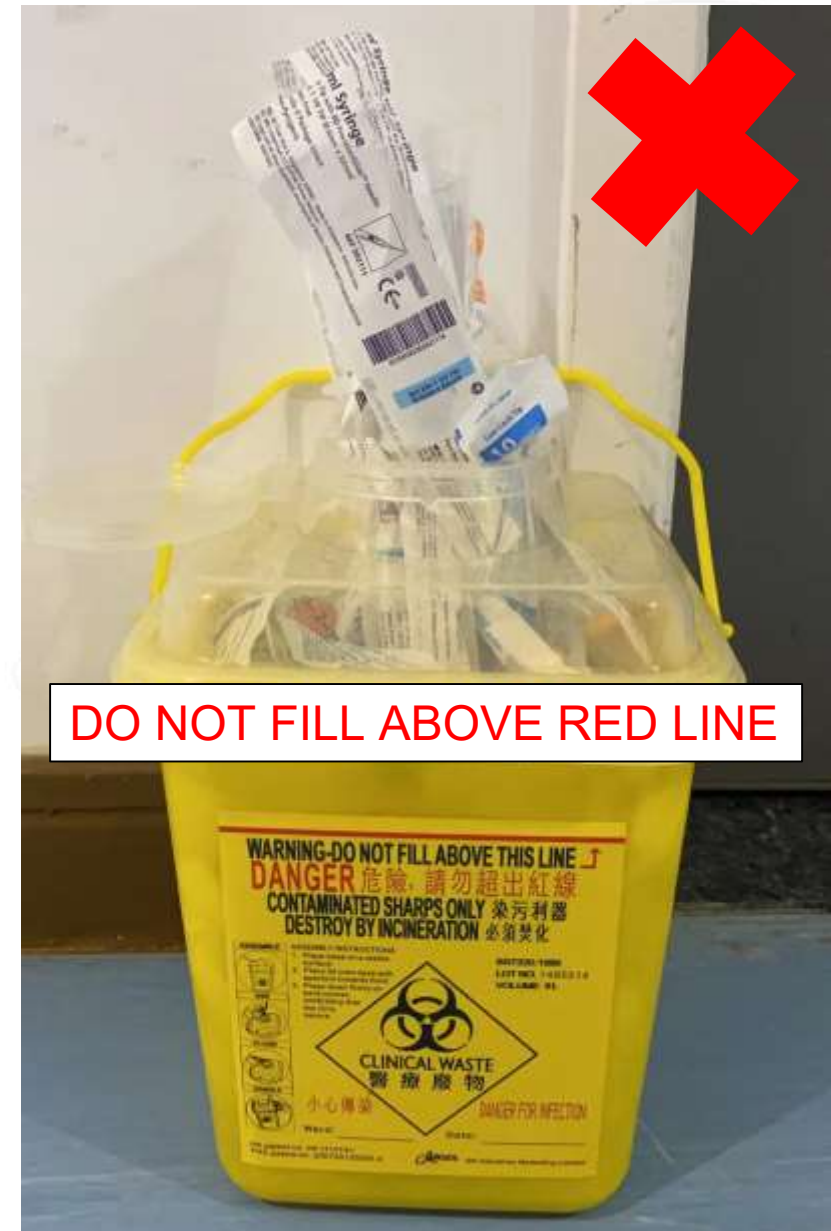
- Objects that are not chemical & biological contaminated;
- E.g. paper, product packaging, cards, herbs, plants, etc.;
- **No Liquid Wastes;**
- **No Wastes from Food or Drink** inside laboratory;
- **No Laboratory Gloves.**





Sharp Objects

- E.g.: syringe needle, razor blade, nail, etc;
- Inform lab technician when the waste reach the red line or consume 75% of the box.





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Broken Glass

- E.g.: broken separating funnel, beaker, measuring cylinder, test tube, etc.;
- Place them into **Broken Glass Box**;
- **No laboratory gloves**;
- Inform lab technician when the waste consume 75% of the box.





Empty Chemical Bottles (Glass/ Plastic)

- Place them onto the collection point at each floor;
- E.g.: 5F-5004b, 6F-6027.





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Chemical Wastes





















Chemical Wastes (Solid)

- Objects that are contaminated with chemical but NOT Highly Hazardous Materials;
- **Laboratory Gloves;**
- **No Liquid Wastes;**
- Yellow Bin + Yellow Bag;
- Located at 6F and 8F (and GF in future).





Hazardous Materials Classification				
2.2 Non-flammable	2.3 Toxic gases	3. Flammable liquids	4.1 Flammable solids	4.3 Dangerous when wet
				
5.1 Oxidizing substances	5.2 Organic peroxides	6.1 Toxic substances	8. Corrosive substances	9. Miscellaneous
				
Highly Hazardous Materials Classification				
1. Explosive	2.1 Flammable gases	2.3 Toxic gases	4.8 Spontaneously combustible	6.2 Infectious substances
				
7. Radioactive material				
				



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Chemical Wastes (Liquid)

- Organic Solvent;
- Waste Oil;
- Heavy Metal Waste (trace metal);
- Toxic Waste;
- Acid and Alkaline.





Organic Solvent

- Halogenated;
- Non-Halogenated;
- **Do NOT discharge any organic solvent into laboratory sink;**
- **NEVER** fill up more than **70% (45L)** of the container
- Discharged into the waste barrels at collection point.





Common Organic Solvent Wastes in ICMS

Non-Halogenated		Halogenated
Acetonitrile 乙腈	n-Heptane 正庚烷	Chloroform, Trichloromethane 三氯甲烷
Methanol 甲醇	Isooctane 異辛烷	Dichloromethane 二氯甲烷
Acetone 丙酮	3-Methyl-1-Butanol 3-甲基-1-丁醇	
1-Butanol 正丁醇	Petroleum ether 石油醚	
Diethyl ether anhydrous 無水乙醚	Aniline 苯胺	
Ethanol 乙醇	2-propanol 2-丙醇	
Ethyl acetate 乙酸乙酯	Triethylamine 三乙胺	
n-Hexane 正己烷		

*Organic Solvent Waste
Barrels only collect the
listed solvent.

For others, please handle
separately.



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Spare Waste Barrel, Not in Use!
請勿使用備用有機廢液桶



**Please pour the organic solvent
into the waste barrel located
under Exhaust System**
**請使用放在排氣系統內的
有機廢液桶**

***If all waste barrels are 70% full,
please inform lab technician for
replacement!**



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Waste Oil

- E.g.: vacuum pump oil, silicone oil, etc.;
- **Do NOT discharge any waste oil into laboratory sink;**
- Discharged at collection point.





Heavy Metal Waste

- Not included Hg and radioactive metal;
- **Do NOT discharge any heavy metal waste into laboratory sink;**
- **Collection:**
 1. Inform lab technician the waste content and MSDS;
 2. Discharged at collection point.





Toxic Waste

- E.g.: Hg, acrylamide, chromate, pyridine, etc.;
- **Do NOT discharge any toxic waste into laboratory sink;**
- **Collection:**
 1. Collect, seal and pack separately as a whole;
 2. Inform lab technician the waste content and MSDS;
 3. Placed at collection point.

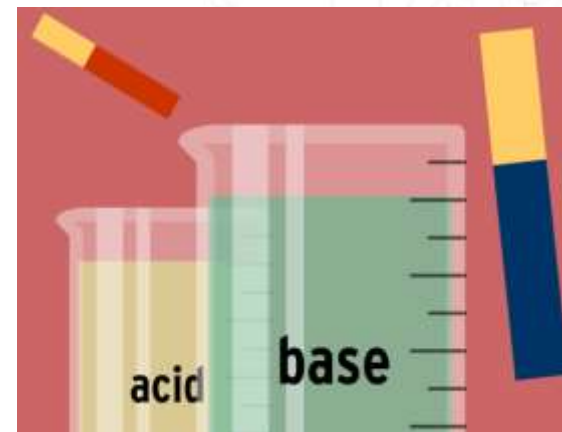


TOXIC RISK
毒性危險



Acid/ Alkaline

- Waste with low conc./ small amount:
 1. Neutralization to pH 6-8;
 2. Dilution;
 3. Discharged at laboratory sink.
- Waste with high conc./ large amount:
 1. Collect, seal and pack separately as a whole (E.g.: one bottle of 1L 98% H_2SO_4);
 2. Inform lab technician the waste content and MSDS;
- Not included: chromic acid (H_2CrO_4), hydrofluoric acid (HF), perchloric acid (HClO_4)...





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Biological Wastes



博雅之聲
中國人民大學圖書館



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Disinfection and Sterilization in ICMS

Autoclaving

- Heat/ Steam sterilization;
- Pressure, Saturated Steam, High Temperature (121°C / 132°C);
- Time: depends on waste (usually 15-20mins or more);
- For pre-disposal treatment and sterilization of waste material;
- Located at SPF Animal Centre, 5F and 7F (and 1F in future);
- **Training is required before use.**





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Disinfection and Sterilization in ICMS

Chemical disinfectant – 75% Alcohol

- Actively against vegetative bacteria, fungi, lipid-containing viruses, **but not spores**;
- Non-toxic and non-corrosive;
- Good for work surface /equipment/ BSC/ skin;
- Flammable, should be away from open flames & heat when in use.





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Disinfection and Sterilization in ICMS

Chemical disinfectant – Virkon

- Peroxide, broad spectrum chemical germicide;
- Available in powder or tablet form;
- Non-corrosive / non-bleaching / biodegradable;
- 1 - 5 % working solution can be stable for 7 days.





Disinfection and Sterilization in ICMS

Physical Sterilization – UV Germicidal Lamp

- Wavelength: 245nm;
- Sterilizing microbiological contaminates on the working surfaces;
- Can cause **eye damage** and **skin burn** by very short exposures (~15 seconds);
- Located at all cell/ bacterial culture room and inside BSC.





Biological Wastes (Solid)

- Objects that are contaminated with biological material such as specimens, bacterial and cell culture materials, nucleic acids, etc.;
- **Laboratory Gloves;**
- **No Liquid Wastes;**
- Yellow Bin + Red Bag;
- Located at SPF Animal Centre, 5F and 7F (and 1F in future).

BIOHAZARD



CAUTION
BIOLOGICAL HAZARD





Biological Wastes (Liquid)

- E.g.: cell/ bacterial culture media, serum, DNA droplet, PCR product, etc.;
- Use **2% Virkon working solution** (available at 5F and 7F) for disinfection ASAP:
 1. Mixed the waste liquid with same volume of Virkon solution.
 2. Allow a contact time of 20-30 minutes for disinfection.
 3. Discharge the treated solution to laboratory sink after dilution and neutralization (pH 6-8).

BIOHAZARD



CAUTION
BIOLOGICAL HAZARD





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Biological Wastes (Toxic)

- Toxic materials mainly generated from western blotting experiment and RNA extraction experiment, e.g. gel;
- Discharged the materials in a collecting glass bottles with a secondary contained;
- Inform lab technician when the waste consume 75% of the bottle.





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Biological Wastes (Animal Carcasses)

- Collected in a bio-hazardous waste bag (red bag);
- Stored in the freezer inside Animal Laboratory;
- Detailed procedures will be discussed in Animal Laboratory Training.





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Container		Collection Limit
Waste barrel (60L)		70% Fullness
Small waste bottle		75% fullness
Autoclavable bottle		75% Fullness
Chemical/ Biological Waste Bag		2/3 of its Capacity
Sharp box		75% Fullness
Broken glass box		75% Fullness



Protect Yourself First!

- **Wear PPE**, e.g.: lab coat, gloves, goggles, etc.;
- Make use of tools, e.g.: **funnel** for pouring solvent waste, **trolley** for transporting large amount of waste

PPE



Tools





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Other Safety Issues in ICMS

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E-Scooter

- **E-scooter and its battery is strictly prohibited inside N22;**
- Will confiscate and pass to SFS for any e-scooter found.





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Smoking

- Smoking (includes e-cigarettes) is banned in all indoor and outdoor areas in UM;
- Except in designated smoking zones in UM.



違法者最高罰款
As infracções são punidas com multa até
Offenders are liable to a maximum fine of
MOP 1500

舉報及查詢熱線
Call the hotline for reporting and enquiries:
Report and enquiry hotline

: 2855 6789



澳門特別行政區政府衛生局
Serviço de Saúde do Governo da Região Administrativa Especial de Macau

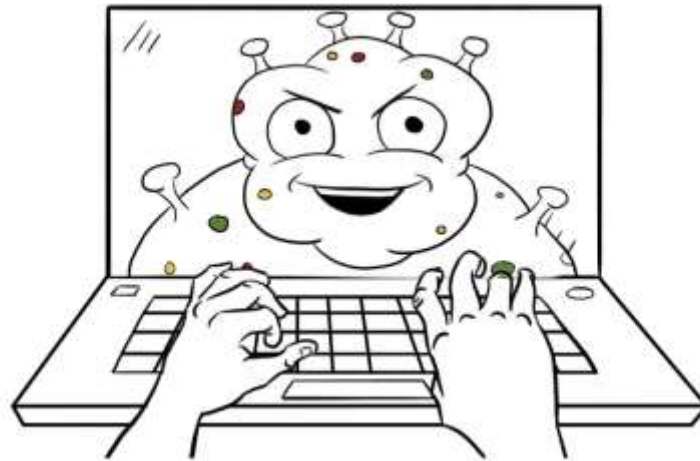




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Computer Safety

- Make sure your storage device is **Virus-Free** before plug into any lab computer;
- ICTO will not provide technical support to our lab computer.





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