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GUIDELINES FOR SEGREGATION AND DISPOSAL OF LABORATORY WASTE AND EFFLUENTS

General guidelines:

- Segregation of waste shall be considered as scientific and social responsibility of all the faculty, staff and students working in any laboratory using chemicals and laboratory wares.
- All the teachers, entire laboratory staff and students should be trained to carry out waste segregation in designated waste containers with appropriate labelling.
- The first practical for each academic year of BSc and MSc must be used to educate students on waste identification, separations and protocols for collection of different waste.
- All experiment must be evaluated for its chemical usage and waste generation. Each and every type of chemical waste generated during practicals must be assigned to different waste containers before the start of practical.
- All labs must follow the Four R's' (Refuse, Reduce, Reuse & Recycle) in order to reduce the waste generated on campus.
- All the teachers, entire laboratory staff and students must take pledge to comply with chemical waste handling guidelines.

Specific Guidelines for Waste Identification and Segregation

(A) Categorise Liquid waste as - Organic (halogenated and non-halogenated), aqueous acid, aqueous neutral/basic

1) Liquid Waste (Organic halogenated solvents): This category of waste primarily would consist of solvents like dichloromethane, chloroform, and any other chlorine containing solvents.*Thelabsusingthesesolventswillneedtocollectthesolventwasteinlabelledcontainers*

2) Liquid Waste (Organic non-halogenated solvents): This category of waste primarily would consist of solvents like ethyl acetate, hexanes, methanol, etc. *The labs using these solvents will need to collect the solvent waste in labelled containers*

3) Aqueous acid waste: This category of waste primarily would consist of aqueous waste with pH<7 like waste generated in titrations, reactions, work-up, chromatographic analysis etc.

i) The labs generating aqueous acid waste will need to collect the waste in labelled containers.
ii) For concentrated acidic solutions, dilution with water is recommended.

4) Aqueous neutral/basic waste: This category of waste primarily would consist of aqueous waste with pH≥7 like waste generated in titrations, reaction, work-up, chromatographic analysis etc.

i) The labs generating aqueous neutral/basic waste will need to collect the waste in labelled containers.
ii) For concentrated basic solutions, dilution with water is recommended

(B) Categorise Solid waste as - Organic, Inorganic, heavy metals and other waste (chemical wipes, tissue papers, gloves etc.)

1) Solid Chemical waste: - This category of chemicals consists of hazardous solid chemicals which are organic, inorganic and heavy metals. The segregation of waste is done according to the nature of the compounds.

i) Collectwastelikesilica,resin,celite,organic/inorganiccompoundsassolidwaste.
ii) Waste containing heavy metal like mercury, chromium, lead, tin, cadmium etc. should be collected separately.

2) Other solid waste - chemical wipes, tissue papers, gloves etc: This category of waste consists of chemicals or contaminated PPE or tissue papers. Thesegregation of waste to be done according to the nature of the waste as follows.

i) Collect the solid waste like chemical wipes, tissue papers, and gloves in a container labelled as burnable non-hazardous solid waste.
ii) Collectwasteliketissuepapers,gloves,paperwhicharecontaminatedwithchemicals in a container labelled as burnable hazardous solid waste.

(C) Glassware Waste

1) Broken Glassware: This category of waste consists of broken glassware like beakers, flasks, burettes, pipettes etc. - Collect broken glassware in appropriate rigid containers like plastic barrels with lid.
2) Glass containers: This category includes empty solvent bottles, reagent bottles etc – All the bottles must be cleaned thoroughly (with either solvent or water) before segregating it as glassware waste.

Guidelines for waste collection area Solid/liquid waste container

i) The waste container must have a label with following information: name of the chemical, quantity, composition (in case of mixture) and user name. Department address and details of person who could be contacted in case of emergency must be given at end of above label.
ii) The waste container must be stored in a secondary container which has the capacity to hold complete volume of waste container in case of leakage.
iii) The waste collection area in each laboratory must be marked with proper signage.

Specific instructions:

i) Specific reactive metal waste like Palladium on carbon, reactive metal hydrides should quenched/deactivated and stored in labelled container as solid or liquid waste

appropriately. ii) Solvents suspected of forming peroxides such as tetrahydrofuran, diethyl ether should be checked periodically.

ii) Chemicals prone to explosion like nitrates, azides, organic nitro compounds etc. should be quenched/deactivated.

Guidelines for Disposal

1) It is recommended that the all-laboratories work with government approved waste handling facilities listed below for disposal of segregated waste. More information can be found at http://goaspcb.gov.in/Hazardous-Waste-Management

Biosafety practices & Disposal of Biological/Animal wastes

As a part of biosafety practice UU follows the biosafety guidelines of DBT, GOI. Fresh Students/ research scholars are appraised off the bioethics and biosafety aspects during the induction program conducted by the concerned Department.

For the management of Biological/animal wastes, the guidelines and recommendations of IEC and animal ethics committee are usually followed under the supervision of the respective committees.