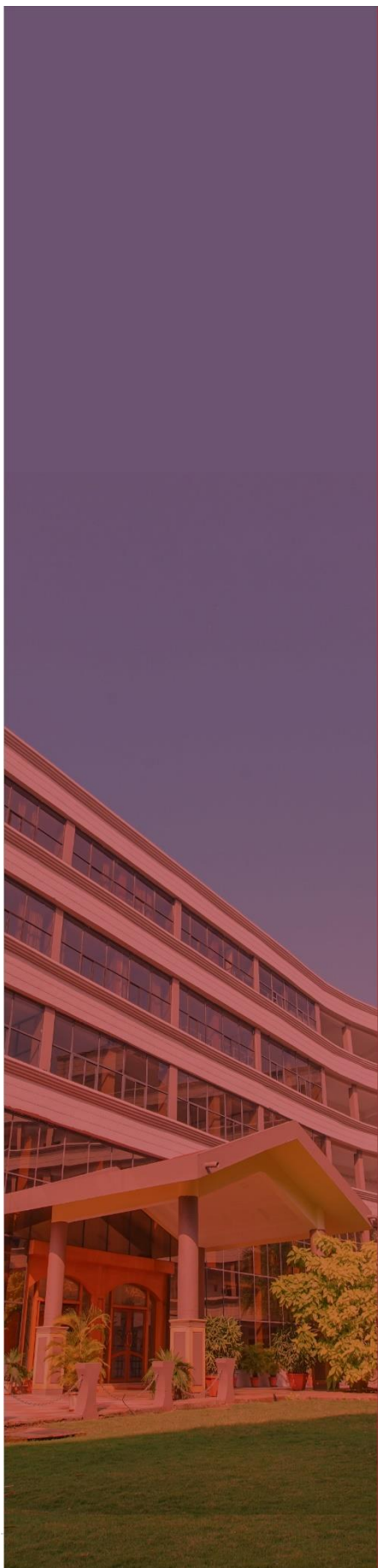


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STANDARD OPERATING PROCEDURE (SOP)


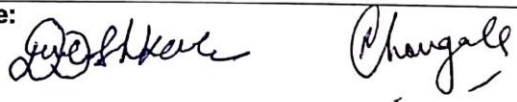
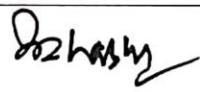
CHEMICAL WASTE DISPOSAL (DEPT. OF MICROBIOLOGY)





**Dr. D. Y. Patil Medical College Hospital & Research
Institute, Kadamwadi, Kolhapur
Department of Microbiology**





STANDARD OPERATIVE PROCEDURES FOR CHEMICAL WASTE DISPOSAL

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SOP CHEMICAL WASTE DISPOSAL
DEPARTMENT OF MICROBIOLOGY



Chemical
Waste
Disposal

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The Ignitability characteristic applies to wastes that are:

- Liquids with a flash point less than 140°F.
- Solids capable of spontaneous combustion under normal temperature and pressure.
- Oxidizing materials.
- Ignitable compressed gases o Examples include ethanol, sodium nitrate, hydrogen gas, xylene and acetone.

The Corrosivity characteristic applies to wastes that are:

- Aqueous solutions with a pH less than or equal to 2 or greater than or equal to 12.5.
- This does not apply to solid or non-aqueous material.
- Examples include hydrochloric acid, nitric acid, and sodium hydroxide.

The Reactivity characteristic applies to the following:

- Materials that react violently or generate toxic fumes when mixed with water.
- Cyanide or sulfide bearing wastes which evolve toxic fumes when mixed with acids or bases.
- Materials that are normally unstable or explosive.
- Examples include sodium metal, reactive sulfides, potassium cyanide and picric acid



1. Hydrochloric acid

- Dilute acids 1 to 10 with water (dilute acids are less dangerous)
- Select a basic material, such as sodium bicarbonate, potassium bicarbonate, calcium bicarbonate, limestone. Strong bases (e.g., sodium hydroxide and potassium hydroxide) must be diluted 1:10 with water prior to utilization.
- Neutralization procedure

1. Slowly add dilute acid to a solution of the basic material selected above. (Always check pH.)

2. Continue the process until a pH between 6 and 8 is obtained.
- Dilute the solution further, approximately 1 to 10, with water.
 - Dispose of the neutralized acid in the sewer system or, in remote areas, by burial in a trench.



2. Glacial acetic acid

Neutralize (pH 6-8) with 5% sodium hydroxide or sodium carbonate and dispose of it in the sewer system, using copious amounts of water.

3. Sodium hydroxide and Ammonia

- Dilute alkali 1 to 10 with water (dilute alkali are less dangerous).
- Select an acidic material. Strong acids (e.g., hydrochloric acid, sulphuric acid) must be diluted 1:10 or greater prior to utilization.
- Neutralization procedure:
 1. Slowly add dilute base to a solution of the acidic material selected Above (Always check pH.)
 2. Continue the process until a pH of between 6 and 8 is obtained.
- Dilute the solution further, approximately 1 to 10, with water.
- Dispose of the neutralized base in the sewer system or, in remote areas, by burial in a trench.

4. hydrogen peroxide

- Mix or absorb the peroxide onto sand or vermiculite.
- Wet with 10% sodium hydroxide.
- In a 45/55-gallon drum or open pit, ignite with a slow burning fuse.



5. Sodium Hypochlorite

- To the sodium hypochlorite solution add a large excess of a bisulfite or a ferrous salt and acidify with dilute sulphuric acid.
- When the reduction is complete, add soda ash or dilute hydrochloric acid to neutralize the solution.
- Dispose of the sewer system with a large excess of water.

6.Sulfuric acid

Diluted and neutralized. After neutralization add the acid slowly to a solution of soda ash and slaked lime, and then flush with a large volume of water then discarded into sewer.



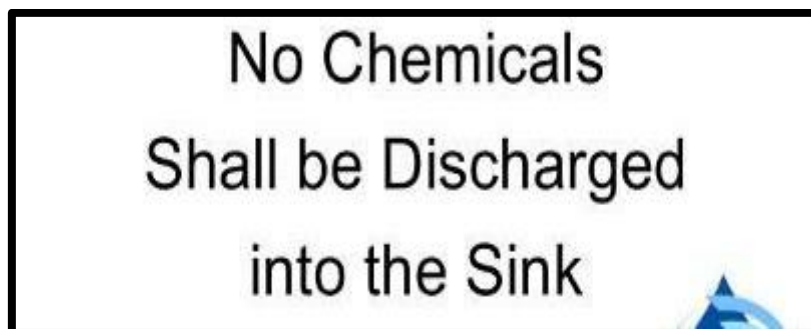
7.Formalin

First step is neutralization and then disposed of in landfills.

8. Phenol

Spill: 25 meters (75 feet) (Solid) 50 meters (150 feet) (Liquid) Fire: 800 meters (1/2 mile) For Phenol in solution, cover with sand and place into sealed containers for disposal.

Collect solid material in the most convenient and safe manner and place it into sealed containers for disposal. DO NOT wash into the sewer.



9. Cotton blue stain

Do not empty into drains. Label the containers containing waste and contaminated materials and remove them from the area as soon as possible. Collect and place in suitable waste disposal containers and seal securely. Dispose of contents/container in accordance with national regulations.

10. Methylene blue

Absorb in vermiculite, dry sand or earth and place into containers. Place waste in labelled, sealed containers. Dispose of contents/container in accordance with national regulations.

11. Safranin

Absorb in vermiculite, dry sand or earth and place into containers. Place waste in labelled, sealed containers. Dispose of contents/container in accordance with national regulations.

12. Leishmans Stain

Absorb in vermiculite, dry sand or earth and place into containers. Place waste in labelled, sealed containers. Dispose of contents/container in accordance with national regulations.

13. Zinc sulphate

Soak up with inert absorbent material and dispose of it as hazardous waste. Keep in suitable, closed containers for disposal.

14. Bromothymol blue

Absorb with suitable material. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

15. Ferrous sulphate

Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal. DO NOT wash into the sewer. Ferrous Sulfate is harmful to aquatic life in very low concentrations.

16. Ammonium ferrous sulphate

Dispose of contents and container to an approved waste disposal plant.

17. Glycerol

Soak up with inert absorbent material and dispose of it as hazardous waste. Keep in suitable, closed containers for disposal

18. lactic acid

Soak up with inert absorbent material and dispose of as hazardous waste

19. Methanol

Pour the methanol into a shallow glass or Pyrex dish. Don't pour it into a plastic dish since methanol can dissolve some plastics. Set the shallow dish in a fume hood and allow the methanol to evaporate. The fume hood will evaporate the methanol and dissipate the fumes quickly to a safe level. Wipe the shallow dish with a wet, disposable paper towel, and discard the paper towel in the regular trash. Wash the shallow dish as you would normally wash laboratory glassware.

20. Potassium iodate solution

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

21. Magnesium sulfate

Contain spill and absorb with inert material such as soil, sand or absorbent granules and place in a sealable waste container. Dispose of waste safely in an approved landfill.

22. Sodium citrate

Dilute with water and flush to the sewer.

23. Sodium thiosulfate

Dilute with water and flush to the sewer. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.

Chemical Irritants

Hydrochloric acid, Sulfuric acid, Nitric Acid, Sodium hydroxide, Potassium hydroxide



Flammable Chemicals

Gasoline, acetone, toluene, diethyl ether, alcohols, Cyclohexane

Corrosive chemicals

Strong acids, Alkaline degreasers

Toxic Chemicals

Arsenic, Barium, Benzene, Carbon Tetrachloride, Chlorobenzene, Chloroform, Cresol, Lead, Mercury, Silver, Tetrachloroethylene, Vinyl Chloride



Reactive Chemicals

Sodium metal, reactive sulfides, potassium cyanide and picric acid

References

1. <https://ohioline.osu.edu/factsheet/aex-892207>
2. <https://blog.storemasta.com.au/examples-of-highly-flammable-chemicals-used-in-the-lab>
3. EHRS Environmental Health & Radiation Safety guidelines
4. Hazardous Substance Fact Sheet. <http://www.nj.gov/health/eoh/rtkweb>
5. MSDS (Material safety data sheet).
6. Laboratory and scientific section. Guidelines for the safe handling and disposal of chemicals used in the laboratory.