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Document name: Procedures for the disposal of liquid chemical residues and aqueous solutions		
Issued by: Jenny Lilliehöök, Environmental Coordinator		
Approved by: Cynthia de Wit, Chair of the Environmental Council		

Procedures for the disposal of liquid chemical residues and aqueous solutions

Purpose

These guidelines specify which chemical residues from laboratory activities may be poured down the drain and which ones must be disposed of as hazardous waste.

Scope

The guidelines cover laboratory research and teaching conducted within the University area that stretches from Sveaplan in the south to the Bergius Botanic Garden in the north and is connected to Stockholm Vatten's wastewater treatment plant in Henriksdal through the sewage system.

These guidelines constitute an exception to the rule that no hazardous substances may be poured down the drain, and have been approved by the City of Stockholm's Environment and Health Administration and Stockholm Vatten AB.

The guidelines are based on the departments' (or equivalent) lists of chemical residues that are difficult to dispose of in any way other than pouring down the drain – for example, highly diluted aqueous solutions or readily biodegradable substances that the treatment plants will remove. The departments (or equivalent) have specified the approximate quantities and concentrations, as well as how often they wish to pour the chemical residues down the drain.

Please note that radioactive substances and solutions are subject to other waste regulations.

Responsibility

The head of department (or equivalent) is responsible for the handling and disposal of chemicals into the drain.

Implementation

These guidelines specify which liquid chemical residues can be poured down the drain and which ones should be disposed of as hazardous waste. Substances/products that are not covered by one of the exceptions to the procedures or approved on the list may not be poured down the drain without first contacting the environment officer at the Technical Support Office, which consults with Stockholm Vatten AB.

The following criteria must be met before a chemical is poured down the drain:

1. There should only be small quantities of, for example, experimental residues or solvents that are difficult to collect when washing up. It is not permitted to pour pure chemicals directly from a can or similar. Check carefully that the solution does not contain any harmful chemical by-products.

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2. Highly acidic or alkaline solutions may damage the pipes. Accordingly, the pH value should be adjusted to between 5 and 11.5.
3. The risk of ignition, explosion, or exposure should always be considered.
4. The chemical product must be labelled “May be poured down the drain” in the list on the following pages **or be one of the following**:
 - a) Sugars, urea, vitamins, electrolytes, amino acids, peptides, proteins, carbohydrates and lipids: These substances are not considered to have any significant environmental impact and may thus be poured down the drain in small quantities.
 - b) Inorganic chemicals: The following ions in aqueous solution may be poured down the drain in small quantities, i.e. no more than about a litre per day and laboratory.
 - i. Cations: Na⁺, Mg²⁺, K⁺, Ca²⁺, Ti(IV), Mn(IV) (NB! Not Mn(VII)), Fe²⁺, Fe³⁺, Al³⁺, Li⁺, Ni²⁺, Ba²⁺
 - ii. Anions: Cl⁻, Br⁻, I⁻, CO₃²⁻, HCO₃⁻, NO₃⁻, PO₄³⁻, SO₃²⁻, SO₄²⁻, H₂PO₄⁻, silicates, borates
 - c) Readily biodegradable antibiotics: Ampicillin, Carbenicillin, Chloramphenicol, Penicillin
 - d) The following antibiotics **after inactivation** by autoclaving: Amphotericin (Fungizone), Erythromycin, Geneticin (G418), Gentamicin, Neomycin, Puromycin, Streptomycin, Sulfadoxine, Tetracycline
 - e) Substances labelled with hazard statements H314, H315, H318, H319 or H335: These substances may be washed down the drain if they do not have any other harmful properties and are flushed down with copious amounts of water.
 - f) Chemical residues from specific uses, approved individually by Stockholm Vatten AB. The environment officer at the Technical Support Office is responsible for maintaining the list of these chemicals.

The hazard statements provide guidance for products that are not on the list.

Hazard statements	Properties	Disposal
H400, H410, H411, H412, H413	Harmful to aquatic life	Hazardous waste, may not be poured down the drain
H340, H341, H350, H351, H360, H361	Carcinogenic, Mutagenic, Reprotoxic	Hazardous waste, may not be poured down the drain
H314, H315, H318, H319, H335	Irritant Corrosive	The product may be poured down the drain if it does not have any other harmful properties and is flushed down with copious amounts of water.

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Chemical product	May be poured down the drain*	No more than 1 L per day and workplace may be poured down the drain*	Disposed of as hazardous waste	Comment
Acetaldehyde		x		
Acetone		x		Contaminated solvents should be disposed of as hazardous waste.
Acetonitrile		x		Contaminated solvents should be disposed of as hazardous waste.
Acrylamide (hydrolyzed)		x		
Acrylamide (monomer)			x	
Ammonia		x		
Ammonium heptamolybdate		x		Only low concentrations in water.
Ammonium hydroxide	x			
Ammonium chloride	x			
Ammonium sulfate	x			
Antrone (10H-anthracen-9-one)			x	
Barium chloride	x			
Benzaldehyde		x		
Bioclear (D-Limonene)			x	
Butanol	x			Contaminated solvents should be disposed of as hazardous waste.
Carbon Anode Solution			x	

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Carbon Cathode Solution			x	
Cell culture media with antibiotic			x	Disposal depends on the type of antibiotic; see the University/ waste management procedures.
Citric acid	x			
Control III Disinfectant/Germicide			x	These substances are not completely eliminated in the treatment plants.
Coomassie brilliant blue			x	No information about environmental impact.
Cyanoacetic acid			x	Minor residues in aqueous solution may be poured down the drain.
Dichloromethane			x	Water phases containing minor residues may be poured down the drain.
Dimethylaminopyridine			x	Water phases containing minor residues may be poured down the drain.
Dioxane			x	Water phases containing minor residues may be poured down the drain.
DMF			x	Water phases containing minor residues may be poured down the drain.
DMSO			x	Water phases containing minor residues may be poured down the drain.
Eosin Y solution			x	
Ethanol	x			Contaminated solvents should be disposed of as hazardous waste.
Ethidium bromide			x	
Ethyl acetate		x		Contaminated solvents should be disposed of as hazardous waste.
Formaldehyde		x		
Formamide		x		

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Genetically modified inactivated bacteria		x		
Genetically modified inactivated yeast		x		
Genetically modified live bacteria			x	
Genetically modified live yeast			x	
Glycerol		x		
Glycidamide (hydrolyzed)		x		
Glyoxal		x		
Guanidine thiocyanate [593-84-0]			x	
Hematoxylin			x	
Heptane			x	Water phases containing minor residues may be poured down the drain.
Hydroquinone in aqueous solution	x			Only low concentrations in aqueous solution.
Isopropanol	x			Contaminated solvents should be disposed of as hazardous waste.
Jodopax			x	
Potassium hydroxide		x		Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
Potassium permanganate		x		
Ketones		x		Contaminated solvents should be disposed of as hazardous waste.
Chlorine/hypochlorite			x	Minor residues in aqueous solution may be poured down the drain. If possible, substitute chlorine/ hypochlorite for hydrogen peroxide or Perform.
Chloroform/phenol mixture			x	Water phases containing minor residues may be poured down the drain.

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Copper sulfate			x	Copper is toxic to aquatic organisms.
Chrome alum (KCr(SO ₄) ₂)		x		Only in highly diluted aqueous solutions; otherwise disposed of as hazardous waste.
Mercury			x	Highly diluted aqueous solutions (as in natural waters) may be poured down the drain.
Lugol's solution			x	
Pharmaceutical drug residues			x	
Malonaldehyde		x		
Mercaptoethanol (beta-) (1% solution ~ 20ml/week)		x		Only small quantities of highly diluted solutions.
Methanol	x			Contaminated solvents should be disposed of as hazardous waste.
Methylglyoxal		x		
Methyl salicylate			x	
Methyl vinyl ketone		x		
Formic acid	x			
Sodium cyanoborohydride (hydrolyzed)		x		
Sodium hydroxide		x		Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
Sodium hydrogen carbonate	x			
Palladium hydroxide		x		Only in highly diluted aqueous solutions; otherwise disposed of as hazardous waste.
Paraformaldehyde		x		
Pentane			x	Water phases containing minor residues may be poured down the drain.

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Perform, 2% solution (active substance, 0.5% potassium peroxymonosulfate)	x			
Picric acid/formaldehyde/glacial acetic acid			x	
Propanol (1-)	x			Contaminated solvents should be disposed of as hazardous waste.
Propanol (2-)	x			Contaminated solvents should be disposed of as hazardous waste.
Pyridine			x	Only minor residues in water; otherwise disposed of as hazardous waste.
RBS 25	x			
Nitric acid			x	Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
Hydrochloric acid			x	Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
SDS (Sodium dodecyl sulfate)	x			
Sulfuric acid			x	Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
Di-tert-butyl dicarbonate				x
Tetrahydrofuran				x
Thiosulfate solutions			x	
Toluene				x
Toluidine blue				x
Triethylamine			x	Only minor residues in water; otherwise disposed of as hazardous waste.
Trifluoromethanesulfonic acid				x

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Trifluoroacetic acid			x	
Triton X (varying number)			x	
Heavy metals			x	
Virkon, 2% solution (active substance, 0.5% potassium peroxymonosulfate)	x			If possible, substitute for Perform, which does not contain linear alkylbenzene sulfonates (LAS).
Hydrogen peroxide, 30% solution	x			
Xylene			x	Water phases containing minor residues may be poured down the drain.
Acetic acid		x		Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.
Acetic anhydride		x		Small quantities of acids/alkalis may be poured down the drain with copious amounts of water.

* Only if the residual product is not contaminated with environmental toxins.