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Working with Phenol Risk assessment

Introduction

Phenol is used routinely in the laboratory, mainly for the preparation of nucleic acids. It is highly toxic and can be rapidly absorbed through the skin. If sufficient phenol is present or a large enough skin area is affected, then absorption may cause severe systemic effects. Additionally, small quantities on the skin can act as an anaesthetic at first, and may cause extensive damage before pain is felt.

Assessments

All phenol workers must be issued with a copy of the 'Phenol green Card' which is provided by Occupational Health. Copies can be obtained from the Departmental Safety Officer. Before commencing work with phenol for the first time you must be familiar with the CoSHH assessment for the particular type of work with phenol you are undertaking. If such an assessment has not been undertaken your supervisor should ensure that one is completed and that the control measures required are implemented. Basic safety information can be obtained from the Material Safety Data Sheet (MSDS) for phenol. N.B. The MSDS is not an assessment; users must extrapolate the information to the circumstances and volumes phenol is being used in.

Control measures

Management

The first level of control is elimination. Do you need to use phenol, or is there a less hazardous technique available? If there is you should use that. N.B. Many proprietary nucleic acid extraction systems use phenol under a trade name - consult the MSDS for the exact contents.

If phenol is required, only purchase the amount you need to complete your project and try to purchase it in a form you can readily use i.e. molecular biology grade pre-equilibrated with water or buffer at the appropriate pH for your needs - this reduces the amount of handling and exposure required.

Users must be competent and fully aware of the hazards involved with working with phenol. Students and staff of limited experience must be supervised when handling phenol-containing solutions and colleagues working nearby should be made aware that phenol is being used.

Engineering controls

The current workplace exposure limit (WEL) for phenol is 2 parts per million (the odour threshold is 0.05ppm). All work with phenol must be handled in a fume cupboard to ensure the WEL is not exceeded and user safety.

Phenol should be purchased in shatter-proof vessels (HDPE or polypropylene) wherever possible and large volumes (> 1 litre) should not be handled except with extreme caution and only where absolutely necessary. Secondary containment must be used for transportation outside the laboratory.

Personal protective equipment (PPE)

Ensure appropriate personal protective equipment is specified for the type of operation being undertaken. Because of the aggressive nature of phenol, lab coats, safety spectacles conforming to BS EN166 1F, and double nitrile gloves must always be worn as a minimum (if any user is allergic to nitrile gloves they must seek advice from the DSO). Additionally, covered footwear should be worn to prevent splashes to feet in the event of a spillage. All of these measures should be clearly specified in the CoSHH assessment. PPE is the last line of defence should other control measures fail, and an accident occur. Its importance cannot be over-emphasized for work with phenol.

Emergency procedures

First Aid – skin contact

Polyethylene glycol (PEG) 300 solution should always be readily available by the hand-wash basin for use in the event of a spill on skin (phenol partitions preferably into PEG 300 from the skin). A clean wash bottle must be available next to the phenol.

All contaminated clothing should be removed wearing nitrile gloves. Exposed skin must be drenched with fast flowing water for 15 minutes then washed with PEG 300 for at least 30 minutes (transfer PEG 300 from the stock to the wash bottle for this purpose).

Do not scrub the contaminated area as this will tend to both spread the contamination and enable phenol to more readily enter the body.

Both the victim and anybody assisting should avoid secondary contamination from the washing and contaminated clothing – nitrile gloves should be worn.

All phenol casualties should be sent to the John Radcliffe Hospital A&E for an assessment; taking a green phenol card with them, this must be shown to Ambulance staff (if called) and A&E staff assessing the subject.

First Aid - Eyes

In the event of eye contact there will be severe pain and redness.

Irrigate the affected eye with running water for at least 10 minutes.

Send the casualty immediately to the Oxford Eye Hospital; they should be telephoned in advance to warn of the casualty's arrival (telephone: **01865 741166** for the John Radcliffe Radcliffe Hospital switchboard and ask to be put through to eye hospital emergency).

Do NOT use PEG 300 on eyes.

Spillages

Keep everyone clear of the spillage area and wear PPE including safety glasses.

Spillages should be absorbed with spillage absorption granules and swept up into a polythene bag; this should then be placed in a UN type approved container or a phenol waste jar. Alternatively mop up the spill with a chemical absorbent sheet, place this in a polythene bag and place this in a UN type approved container or a phenol waste jar (see below for stockists).

Wash the affected area thoroughly with detergent and water.

Waste disposal

Contact with phenol waste must be minimised and no attempt should be made to empty phenol from test tubes etc. into larger containers. Instead, a suitable leak-proof container (i.e. one that is UN type approved for liquids) or a waste jar should be chosen into which the phenol solutions complete with contaminated glass or plastic-ware can be placed. These waste containers must be disposed of via the Safety Office. This is the only approved route for disposal of phenol waste.

Phenol waste must be segregated see SOP S10: Phenol Handling

Suitable containers for disposal of liquid:

Re-use empty Winchester bottles that have been thoroughly washed out.

Re-use empty TriReagent bottles

Fisher Scientific HDPE Winchester bottles (these are type approved for hazardous materials):

Cat No: 10111751 HDPE 2.5 litre

Cat No: 10203181 HDPE 5.0 litre

Sarstedt

Disposal Box Cat. No: 77.1515 - These are not UN approved and will need to be placed in the blue burn bins provided by the Safety Office.

Update History

Version	Date	Reason for update	Updated/reviewed by :	Date next review due
1.0	01/05/2006	New document	SMH	May 2008
1.0	01/08/2009	Reviewed – no changes	SMH	Aug 2011
1.0	01/12/2011	Reviewed – no changes	SMH	Dec 2013
1.1	Dec 2012	Academic Chair changed to Head of Safety	SMH	Dec 2014
1.2	22/06/2016	Header changed and slight change to wording to reflect that all phenol must be used in a fume hood.	SMH	June 2018