

Risk Assessment for 2 Dimensional Electrophoresis (Using Immobiline Gradient Strips)

Date: 15/9/05	School / Dept: Bioanalytical Mass Spectrometry Facility	Assessment completed by: Jeremy Kong	Contact No.:
What is the task: Separation of proteins via IEF and followed by SDS PAGE		Location where task is being conducted: BMSF, Rm M312	
Briefly explain the procedure for this task: This task involves separation of proteins in 2 different dimensions. The 1 st dimension involves the separation of protein according to their pI via Iso-Electric Focusing (IEF), while the 2 nd dimension involves the separation of protein according to their molecular mass via SDS Polyacrlamide Gel Electrophoresis (SDS-PAGE). Refer to SOP for 2 Dimensional Electrophoresis.			

Step in Process	Hazards in carrying out this step eg.	Risk (Harm)	EXISTING CONTROLS	Risk Rating with existing controls? <i>See next page</i>			ADDITIONAL CONTROLS REQUIRED	Risk Rating with additional controls?		
				consequences	Likelihood	rating		consequences	likelihood	rating
Preparation of protein samples prior to IEF	<ul style="list-style-type: none"> Biological exposure to protein samples and chemical exposure to CHAPS, DTT and bromophenol blue during preparation of IEF rehydration buffer. 	<ul style="list-style-type: none"> Causes irritation to respiratory system, eyes and skin upon inhalation and contact. 	<ul style="list-style-type: none"> Don standard PPE which include latoratory coat, latex gloves and safety glasses when handling biological sample and chemicals. 	2	D	L	<ul style="list-style-type: none"> Don face mask. Read MSDS prior to usage of chemicals. Spill kits. Hazardous substance training. 	2	D	L
Setting up and loading sample onto the IPGphor™ Isoelectric focussing system	<ul style="list-style-type: none"> Electrical hazard 	<ul style="list-style-type: none"> Electrical Shock 	<ul style="list-style-type: none"> Equipment manufactured to Australian standard. Ensure system is not running during loading of samples in IPGphor™ ceramic strip holder. 	3	E	M	<ul style="list-style-type: none"> Equipment is tested and tagged periodically. Read and understand SOP prior usage of the electrophoresis system. Conduct visual check on equipment prior to use. 	3	E	M

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				2	D	M		2	E	L
Equilibration of IPG strips	<ul style="list-style-type: none"> Chemical exposure to polymerised acrylamide, SDS and DTT, iodoacetamide during equilibration buffer preparation. 	<ul style="list-style-type: none"> DTT, SDS, iodoacetamide causes irritation to respiratory system, eyes and skin upon inhalation and skin contact. 	<ul style="list-style-type: none"> Don standard PPE which include laboratory coat, latex gloves and safety glasses when handling chemicals. In addition, don respiratory half mask when handling SDS in powder form. 	2	D	M	<ul style="list-style-type: none"> Read MSDS prior to usage of chemicals. Spill kits. Hazardous substance training. 	2	E	L
Preparation of polyacrylamide gel	<ul style="list-style-type: none"> Chemical exposure to acrylamide, SDS, TEMED and ammonium persulfate. 	<ul style="list-style-type: none"> Acrylamide affects central and peripheral nervous system and reproductive system when swallowed, inhaled or absorbed through skin. TEMED, SDS and ammonium persulfate causes irritation to respiratory system, eyes and skin upon inhalation and contact. 	<ul style="list-style-type: none"> Don standard PPE which include laboratory coat, latex gloves and safety glasses when handling chemicals. In addition, don respiratory half mask when handling TEMED and SDS in powder form. 	2	D	M	<ul style="list-style-type: none"> Don face mask. Read MSDS prior to usage of chemicals. Spill kits. Hazardous substance training. 	2	E	L

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Preparation of agarose sealing solution	<ul style="list-style-type: none"> Formation of super heated solution during heating with microwave. Burns 	<ul style="list-style-type: none"> Super heated solution might expel out of the bottle and cause scalding of user. 	<ul style="list-style-type: none"> Loosen cap of bottle when heating solution. Do not heat for more than 30sec at a time. don standard PPE which include latoratory coat, latex gloves and safety glasses. 	2	C	M	<ul style="list-style-type: none"> Heating up agarose solution in intervals using microwave with occasional swirling to mix the solution will help ensure agarose is melted more quickly without the formation super heated solution. Fill solution only 1/3 of bottle volume 	1	D	L
Setting up and running of electrophoresis system.	<ul style="list-style-type: none"> Electrical hazard Chemical exposure to electrophoresis buffer. 	<ul style="list-style-type: none"> Electrical shock. SDS electrophoresis buffer may cause irritation to eyes and skin upon contact. 	<ul style="list-style-type: none"> Equipment manufactured to Australian standard. Ensure power supply pack is turned off when connecting cables. Ensure SDS electrophoresis buffer is not filled beyond the max fill line. Don standard PPE which include laboratory coat, latex gloves and safety glasses when handling chemicals and loading the gel cassettes onto the electrophoresis system. 	2	D	L	<ul style="list-style-type: none"> Read and understand SOP prior usage of the electrophoresis system. Place electrophoresis power supply on a elevated position and separated from electrophoresis tank. Conduct visual check on equipment prior to use. Equipment is tested and tagged periodically. 	2	E	L

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Please complete if any of the items below are applicable.

Is there a requirement for safe storage?

All organic solvents to be kept in the flammable solvent cabinets in room M305.

How is access prevented except to authorised persons?

Lab is well supervised, users are monitored with lab books. Access after hours is by key card. Lab is otherwise locked from main entry. Video camera monitors BMSF entry after hours.

In the event of an emergency you will

- Inform supervisor and first aid officer/fire warden.
- For major emergencies dial x56666.
- Nearest first aid kit in room M310.
- Nearest safety shower in room M307.
- Nearest Hose reel and CO₂ fire extinguisher just outside M305.
- Nearest fire extinguishers: CO₂ fire extinguisher in rooms M305 and M307; Dry chemical extinguisher beside store room.
- Evacuate as per evacuation plan and gather in front of Chancellor Building.

OTHER ACTION REQUIRED TO ENSURE THE SAFETY OF PERSONS INVOLVED, EQUIPMENT, ENVIRONMENT, MEMBERS OF THE PUBLIC

The task should not proceed if the risk rating after the controls are implemented is still either **HIGH** or **EXTREME**.

Supervisor or designated officer Sign off: _____ Date: _____

Name: _____ Contact No. _____

UNSW RISK RATING ADAPTED FROM AS4360:1999 APPENDIX E

Note: In estimating the level of risk, initially estimate the risk with existing controls and then review risk controls if risk level arising from the risks is not minimal

TABLE 1 - CONSEQUENCE

Level	Descriptor	Examples of Description
1	Insignificant	No injuries. Minor delays. Little financial loss. \$0 - \$4,999*
2	Minor	First aid required. Small spill/gas release easily contained within work area. Nil environmental impact. Financial loss \$5,000 - \$49,999*
3	Moderate	Medical treatment required. Large spill/gas release contained on campus with help of emergency services. Nil environmental impact. Financial loss \$50,000 - \$99,999*
4	Major	Extensive or multiple injuries. Hospitalisation required. Permanent severe health effects. Spill/gas release spreads outside campus area. Minimal environmental impact. Financial loss \$100,000 - \$250,000*
5	Catastrophic	Death of one or more people. Toxic substance or toxic gas release spreads outside campus area. Release of genetically modified organism (s) (GMO). Major environmental impact. Financial loss greater than \$250,000*

* Financial loss includes direct costs eg workers compensation and property damage and indirect costs, eg impact of loss of research data and accident investigation time.

TABLE 2 - PROBABILITY

Level	Descriptor	Examples of Description
A	Almost certain	The event is expected to occur in most circumstances. Common or repetitive occurrence at UNSW. Constant exposure to hazard. Very high probability of damage.
B	Likely	The event will probably occur in most circumstances. Known history of occurrence at UNSW. Frequent exposure to hazard. High probability of damage.
C	Possible	The event could occur at some time. History of single occurrence at UNSW. Regular or occasional exposure to hazard. Moderate probability of damage.
D	Unlikely	The event is not likely to occur. Known occurrence in industry. Infrequent exposure to hazard. Low probability of damage.
E	Rare	The event may occur only in exceptional circumstances. No reported occurrence globally. Rare exposure to hazard. Very low probability of damage. Requires multiple system failures.

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UNSW RISK RATING ADAPTED FROM AS4360:1999 APPENDIX E

TABLE 3 – RISK RATING

Probability	Consequence				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (Almost certain)	M	H	E	E	E
B (Likely)	M	H	H	E	E
C (Possible)	L	M	H	E	E
D (Unlikely)	L	L	M	H	E
E (Rare)	L	L	M	H	H

Recommended Action Guide:

Abbrev	Action Level	Descriptor
E	Extreme	The proposed task or process activity MUST NOT proceed until the supervisor has reviewed the task or process design and risk controls. They must take steps to firstly eliminate the risk and if this is not possible to introduce measures to control the risk by reducing the level of risk to the lowest level achievable. In the case of an existing hazard that is identified, controls must be put in place immediately.
H	High	Urgent action is required to eliminate or reduce the foreseeable risk arising from the task or process. The supervisor must be made aware of the hazard. However, the supervisor may give special permission for staff to undertake some high risk activities provided that system of work is clearly documented, specific training has been given in the required procedure and an adequate review of the task and risk controls has been undertaken. This includes providing risk controls identified in Legislation, Australian Standards, Codes of Practice etc.* A detailed Standard Operating Procedure is required. * and monitoring of its implementation must occur to check the risk level
M	Moderate	Action to eliminate or reduce the risk is required within a specified period. The supervisor should approve all moderate risk task or process activities. A Standard Operating Procedure or Safe Work Method statement is required
L	Low	Manage by routine procedures.

*Note: These regulatory documents identify specific requirements/controls that must be implemented to reduce the risk of an individual undertaking the task to a level that the regulatory body identifies as being acceptable.

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