CHO cell engineering for modulating N-glycosylation in recombinant proteins

CSIR-National Chemical Laboratory

Environmental and Health Risk Management Plan

1. Institutional Arrangements

Requirements	Current Status	Mitigation Steps
Institutional Bio-Safety Committee (IBSC)	Institutional Bio-Safety Committee (IBSC) is active at NCL. It is currently headed by a Principal Scientist at NCL.	- IBSC meets periodically for approvals and monitoring.
EHS Team	NCL has a standing committee on safety which looks after lab safety related issues. This is currently chaired by a Principal Scientist at NCL.	- Training is given to employees for EHS by consultant
Documentation and Record Keeping in reference to the risks mentioned below and quantifiable records of generated waste and compliance measures.	Record of any hazardous waste generated will be maintained	Record of any hazardous waste generated will be maintained
SOPs related to Environment Compliance e.g Chemical spillage handling, waste segregation etc.	Waste segregation is done. Sharps are separately collected.	- Monitoring is done periodically through internal safety committees.
General Safety and Storage	Fire safety cabinets and solvent storage cans are available. NCL level safety committee and division level safety committees are in place which monitor safety related issues on a regular basis.	- NCL level safety committee and division level safety committees are in place which monitor safety related issues on a regular basis.

2. Environmental Impact and risk mitigation

Risks	Project Specific Risk	Potential Impact	Mitigation Steps

Air Pollution	Cultures are handled in biosafety cabinets with HEPA filters for protection.	Risk is minimal since no pathogenic organisms handled	- Cultures are handled in biosafety cabinets with HEPA filters for protection
Water Pollution and Waste water treatment	Minimal risk since most chemicals are non-hazardous in nature	Minimal risk	Any chemical waste of hazardous nature is disposed as per NCL procedure
Chemical waste	Most chemical waste is benign of aqueous nature. Risk is minimal.	Minimal risk	Any chemical waste of hazardous nature is disposed as per NCL procedure
Biological Waste	No pathogenic organism used	Minimal risk	Biological waste is autoclaved/treated with bleach before disposal
Heavy metals	Minimal Risk	Project implementation will not create any adverse heavy metal waste.	Project implementation will not create any adverse heavy metal waste.-
Radiation Waste	Minimal Risk	Project implementation will not create any adverse radiation waste.	Project implementation will not create any adverse radiation waste
Electronic Waste	minimal risk	Project implementation will not create any adverse Electronic Waste -	Project implementation will not create any adverse Electronic Waste -
Hazardous and C&D Waste	- Minimal Risk	Project implementation will not create any adverse Hazardous and C&D Waste -	Project implementation will not create any adverse Hazardous and C&D Waste -
Destruction/alteration	There is no	Project	Project

of surrounding ecosystem	new construction in this project. Therefore Minimal Risk	implementation will not create any adverse Destruction/alteration of surrounding ecosystem -	implementation will not create any adverse Destruction/alteration of surrounding ecosystem --

3. Occupational Health and Safety and **risk mitigation**

Risks	Project Specific Risk	Potential Impact	Mitigation Steps
Heat Hazards	. Heat discharge from autoclave into surrounding is minimal.	Burns from touching hot autoclaved glassware	First aid is in place
Chemical hazards, including fire and explosions	From routine organic solvents like ethanol there is minimal risk	Fire	Safety protocols are in place.Small volumes are stored, fire extinguishers available
Pathogenic and biological hazards	No pathogenic organisms used therefore minimal risk	- No pathogenic organisms used therefore minimal risk	- No pathogenic organisms used therefore minimal risk
Radiological hazards	Minimal Risk	- Project implementation does not create any adverse radiological hazards	- Project implementation does not create any adverse radiological hazards
Electronic Waste	Minimal Risk	- Project implementation does not create any adverse Electronic Waste	- Project implementation does not create any adverse Electronic Waste
Hazardous and C&D Waste	Moderate risk	Ethidium bromide may occasionally be required for some DNA gels. As far as possible, we will use safer DNA dyes	Use of gloves and lab coat for personnel protection. Any Ethidium bromide containing gels, if used, will be decontaminated appropriately.

Noise	Minimal Risk	Project implementation does not create any adverse Noise pollution-	Project implementation doesnot create any adverse Noise pollution--
Process safety	No large scale process will be used therefore minimal risk	No large scale process will be used therefore minimal risk. Volumes of organic solvents and cultures handled are small so there is minimal risk.	Solvent storage cans are used to store and transport ethanol used for disinfection.

4. Community Health and Safety and risk mitigation

Risks	Project Specific Risk	Potential Impact	Mitigation Steps
Safety Transportation Management System (for transport of hazardous material)	Organic solvents like ethanol are used as disinfectants and required in small volumes of not more than few liters per week	Minimal risk	--safety protocol will be strictly adhered.
Emergency preparedness and participation of local authorities and potentially affected communities	Do not expect any risk involving community level effect. Volumes of organic solvent used for this project are low so fire risk is low.	Minimal risk	Minimal risk
In case your organization already has **EHS guideline**, please summarise the same. Also, share details of the **EHS Officer/ Contact Person** of the organization. If not, please describe the impact because of hazardous material, release of chemicals, biologicals, management of catastrophic events like fire/explosion**.**			