ADVANCED CENTRE FOR BIOCHEMICAL ENGINEERING	APPENDIX 9 RAIGM14
PROJECT RISK ASSESSMENT FORM FOR EXPERIMENTAL PROCEDURES	UCL

Department:	Biochemial Engineering	Risk Assessment Form

RISK RATING (H= HIGH, M= MEDIUM, L= LOW): **LOW**

TITLE OF EXPERIMENT/PROCEDURE:

Incubation and assay of recombinant *E. coli* and four different azo-compounds with supervised participation of iGEM students

(see document 'SOPIGM14 180814.docx')

Supervisors

UCL Staff: Dr. Darren Nesbeth

UCL PDRA: Stephanie Braun

UCL Postgraduate Students: Desmond Schofield, Alex Templar, Maria Jose Henriques Morales

iGEM Team members

UCL Postgraduate Students:

Tanel Ozdemir, Division of Biosciences, PhD Synthetic Biology (Year 1).

Adam Denyer, Department of Biochemical Engineering, MRes Synthetic Biology (Year 1).

David Jackson, Department of Biochemical Engineering, PhD Biochemical Engineering (Year 1).

Shahin Heshmatifar, Department of Biochemical Engineering, PhD Biochemical Engineering (Year 1).

UCL Undergraduate Students:

Soheila Jalali, Division of Biosciences, BSc Biotechnology (Year 3; graduated).

Yan-Kay Ho, Division of Biosciences, MSci Natural Sciences (Year 4; graduated).

Behzad Karkaria, Division of Biosciences, BSc Biomedical Sciences (Year 2).

Daniel de la Torre, Division of Biosciences, BSc Biotechnology (Year 1).

Edoardo Gianni, Division of Biosciences, BSc Biotechnology (Year 1).

Pamela Niem, Division of Biosciences, BSc Biomedical Sciences (Year 2).

Ning Lu, Department of Biochemical Engineering, MEng Biochemical Engineering (Year 2).

Joy Faucher, Department of Biochemical Engineering, MEng Biochemical Engineering (Year 2).

Sanjay Joshi, Department of Biochemical Engineering, BEng Biochemical Engineering (Year 2).

Maurice Bertrand, Department of Biochemical Engineering, BEng Biochemical Engineering (Year 2).

	Substances (including quantities): All azo-compounds listed are available as dry powders from Sigma. Stock solutions of each azo-compound will be made up by dissolving no more than 1g azo-compound in 50 mL of water (in a 50mL Falcon tube) for a final stock concentration of 20 mg/mL. For azo-compounds soluble in ethanol, 100mg azo-compound will be dissolved in 5 mL of ethanol (in a 15mL Falcon tube) for a final stock concentration of 20 mg/mL (see document 'SOPIGM14 180814.docx'). a) Reactive Black 5 (from Sigma-Aldrich; Product no. 306452; £44.70 / 100g) b) Methyl Red (from Sigma-Aldrich; Product no. 250198; £20.70 / 25g) c) Acid Orange 7 (from Sigma-Aldrich; Product no. 195235; £13.20 / 25g) d) Direct Blue 1 (from Sigma-Aldrich; Product no. C8679; £31.60 / 25g) e) Various ACDP Containment Level 1 Gram Negative Bacteria (max. ≈ 200mL culture) f) 100% v/v ethanol	2/5
	HAZARD IDENTIFICATION (state the hazards involved in the work): The principle azo compound hazard is during the set-up of azo dye stock solutions from dissolving azo compounds in appropriate solvents (see document 'SOPIGM14 180814.docx'). Researchers may be at greater risk if they suffer from a disease or from the effects of medication or pregnancy. a) RB5: Harmful (Xn)*; may cause allergic skin reaction, respiratory system problems (asthma symptoms or breathing difficulties, if inhaled). b) MR: Not hazardous. c) AO7: Irritant (Xi)*; causes skin irritation, serious eye irritation, may cause respiratory irritation. d) DB1: Harmful (Xn)*; harmful if swallowed, harmful in contact with skin, harmful if inhaled. e) Low hazard level: only working with *E. coli* strains that are of lab standard, i.e. containment level 1. f) Ignition risk. *according to EU Directives 67/548/EEC or 1999/45/EC.	
	Information sources (i.e. MSDS etc): a) Sigma-Aldrich MSDS: RB5 (see Appendix A1, p.5-11 in 'RAIGM14 App.pdf') b) Sigma-Aldrich MSDS: MR (see Appendix A2, p.12-17 in 'RAIGM14 App.pdf') c) Sigma-Aldrich MSDS: AO7 (see Appendix A3, p.18-24 in 'RAIGM14 App.pdf') d) Sigma-Aldrich MSDS: DB1 (see Appendix A4, p.25-31 in 'RAIGM14 App.pdf') e) 2007 Scientific Advisory Committee on Genetic Modification (SACGM) Compendium of guidance, Part 2: Risk assessment of genetically modified microorganisms, HSE. f) Local safety rules.	

	CONTROL MEASURES (state the control measures that are in place to protect staff and others from the above risks. Put in place adequate control measures for any risks that have been identified as uncontrolled.) a) RB5: Gloves, gowns, dust masks, and safety glasses must be worn as PPE. Rinse and dilute vessels containing substance. b) MR: No particular hazard, but typical PPE (i.e. gloves, gowns, dust masks, and safety glasses are strongly recommended to be worn). Rinse and dilute vessels containing substance. c) AO7: Gloves, gowns, dust masks, and safety glasses must be worn as PPE. Rinse and dilute vessels containing substance. d) DB1: Gloves, gowns, dust masks, and safety glasses must be worn as PPE. Rinse and dilute vessels containing substance. e) In the event of spillage of liquid containing ACDP Containment Level 1 bacteria in any area 5% Virkon is to be applied over the spilt area and used as general decontaminant. f) Local rules and personal protective equipment (PPE) guidelines regarding handling of flammable solvents are clearly displayed in all laboratories and will be followed.	3/5
	Is this procedure authorised by DSO to be carried out outside normal working hours? **No**	
	Is this procedure authorised to be left unattended: Normal hours: **Yes, incubation only (see document 'SOPIGM14 140814.docx')** Out-of-hours: **iGEM work strictly prohibited without prior written consent of Dr. Brian O'Sullivan**	
	Disposal procedures during and at end of experiment: a) RB5: Dedicated bins b) MR: Dedicated bins c) AO7: Dedicated bins d) DB1: Dedicated bins e-f) Place all plasticware that comes in contact with biological material in a flask containing 5% Virkon for 15 minutes then drain Virkon liquid down sink (with tap running) and transfer plasticware to a Red (Contaminated Waste) Bin for incineration. Pour all liquids containing biological material into a vessel containing 5% Virkon for 15 minutes then dispose of as above.	
	I the assessor confirm that I have read and am conversant with Departmental Safety Regulations as described in the Safety Handbook for Researchers 2012/13. Name Signed Date .	

	Emergency Procedures If any of the substances or procedures identified overleaf are likely to pose a special hazard in an emergency, then identify below the action to be taken:	4/5
	Assessor: Signed: Date Project Supervisor : Signed: Date Departmental Safety Officer: Signed: Date	

Refer to the Department Safety Handbook.

RISK ASSESSMENT FORM FOR EXPERIMENTAL PROCEDURES
Guidelines for filling in the Risk Assessment form:

Risk rating: an overall assessment of the risk involved (to be filled when the overall assessment has been completed).

- HIGH – serious risk of injury to personnel. Experiment not to be carried out by untrained personnel. It may be necessary to have extra personnel standing by in case of accidents.
- MEDIUM – some risk to personnel, which can be minimised by having proper precautions in place (these precautions MUST be outlined on the form, and MUST be in place each time the experiment is performed)
- LOW – little or no risk to personnel. (note: even if the risk is low, the assessment must still be carried out)

Substances involved: a complete list of the chemical and biological materials used in the experiment.

Hazards identified: The following list should be considered in the assessment: Chemical (Toxic by inhalation? Toxic by contact? Harmful? Irritant? Volatile? Lachrymator?), Biological, Dust, Electrical, Explosive, Compressed Gas, Fire, Laser/UV/Radiation, Manual Handling. Remember that the SCALE of the experiment will also affect the level of risk involved (something safe on a microlitre scale may be hazardous on a multi-litre scale)

Information Source: the MSDS supplied with most materials will outline any associated hazards (and should be attached to the RA form)

Control measures: Example, a fumehood (with sufficient airflow!) for the handling of volatile chemicals. Temperature controls for exothermic processes. Include any required protective clothing (gloves/lab coats/safety glasses) in this section.

Required checks on Control Measures: how often do you need to check the temperature? Airflow? etc.

Running Experiments Unattended: for low-risk procedures only. It may be useful to leave some contact details near the experimental set-up

Disposal procedure: MUST comply with legislation, and must not cause further hazards or nuisance to others.

Emergency procedures: a plan must be in place to deal with accidental exposure to hazardous materials, spillage, fire etc.