

Safety Documentation

Please select the forms you require by selecting the check boxes below.
You can select more than one.

Method Statement

Risk Assessment

Chemicals COSHH

Once you have made your selections, scroll down and complete the forms.

Buttons: [+] will add a row to a list [-X] will delete a row from a list

You may save this file to a local drive at any time.

When you have finished, save the file to a local drive and email it to your supervisor for authorisation.

Supervisors - There is a sign-off section at the end of the document set that must be completed.

Staff may "self authorise", (as a supervisor), but the forms must still be submitted to the DSO for approval.

IMPORTANT:

YOU **MUST NOT** START ANY PRACTICAL WORK UNTIL THESE FORMS HAVE BEEN RETURNED TO YOU
WITH **BOTH** YOUR SUPERVISOR's AND DSO's APPROVAL SIGNATURES ATTACHED.

Please complete these fields

School or Service	Wolfson School of Mechanical, Electrical and Manufacturing Engineering
Department	Mechanical Engineering
Originator name	Muhammad Ali Tariq
email address	m.a.tariq@lboro.ac.uk
Location	CBE Lab H34 and DAV 1.027 LAB
Project / Activity / Task	Real-time online sensing of proteins and small molecules using piezoelectric resonators
Supervisor Name	Dr Sourav Ghosh

Safety Method Statement

Reference SAF/MEME/8153

Location CBE Lab H34 and DAV 1.027 LAB

Originator Muhammad Ali Tariq

Project / Activity / Task Real-time online sensing of proteins and small molecules using piezoelectric resonators

What equipment will be used in this activity?

	+
Network Analyzer	X
SensAND instrument	X
UV Torch	X
LED Diode (blue)	X
Fume cupboard	X

What training must be completed to do this activity?

	+
General Laboratory training deemed to be sufficient - understanding the use of aqueous solutions and competent to utilize equipment required including fume cabinet.	X

What chemicals are being used? (These must be included in the COSHH Form)

	+
Streptavidin, Biotin thiol, Hydroxyl thiol and ampicillin (antibiotic) and carboxyl coated microsphere/beads.	X

Spill and accident procedures.

	+
All work will be carried out using aseptic technique. In the event of a small spill, the spill area and adjacent area will be cleaned by covering with paper towels soaked with 1% Virkon solution. In the event of a large spill, SOP038 will be followed and a spill kit will be used.	X

Procedure in the event of an emergency. (How to leave the process in a safe condition in such an event)

	+
Switch electricity mains off and inform supervisor/lab manager If fire alarm sounds continuously make equipment safe then evacuate the building by the nearest safest route to assembly point 30 (30 is DAV only)- only return when informed that it is safe to do so	X

References.

	+
	X

Detailed sequential description of the process

Process step	Precautionary measures and comments	
The aim of the project is to perform quantitative and qualitative detection of protein and small molecules such as antibiotic, using an aptamer-based acoustic method. The acoustic method used is quartz crystal microbalance, which is commonly used for the detection of biological molecules.	Wear lab PPE (lab coat, safety glasses, gloves as minimum). Disposable latex powder free gloves will be worn at all times when inside the laboratory. Use fume cabinet when needed.	X
1. The quartz crystal will be prepared by washing with acetone and isopropanol.	Try to avoid spillage and use a fresh sample of acetone and isopropanol each time. (for spillages use absorbent materials and spill pads. Dispose of waste by bagging and sending to the Wolfson hazardous waste store for disposal)	X
2. The quartz crystal will be dried in a stream of nitrogen gas.		X

Safety Method Statement (Continued)

Process step	Precautionary measures and comments	+
3. The quartz crystal will be cleaned using a plasma cleaner.		X
4. The crystal will be placed inside a microfluidic cell connected to a network analyser.	The microfluidic cell must be decontaminated before housing QCR and sample flow.	X
5. The quartz crystal resonator (QCR) will be cleaned using a plasma cleaner and functionalised overnight with a mixed biotin and hydroxyl thiol.	Appropriate time and flow rate shall be provided for functionalization.	X
6. Streptavidin (protein) and BSA will be passed through the microfluidic cell using a syringe pump and the signal will analysed using network analyser to detect binding of the protein to the biotin thiol.		X
7. A biotinylated aptamer designed for small molecule (antibiotic) detection will then be passed through the cell and captured on streptavidin functionalised QCR.		X
8. The small molecule (antibiotic) suspension will be passed over the quartz crystal and then analysed using the network analyzer to detect binding of specific antibiotic to the aptamer.		X
9. SensAND instrument would be used to acquire data from the sensor and analysed subsequently.	SensAND instrument consists of a network analyser, amplifier circuit and filter box. All of these are in separate boxes and need to handled with care and caution. The boxes are heavy and need appropriate care whilst placement. Electrical safety precautions need to be taken care of as per routine system checks.	X
10. UV light will be shone using the torch on the sensor surface to ascertain any stimulus and observable unbinding of molecules.	Never look directly into the light source, or shine in other peoples eyes. Always wear appropriate PPE	X
	In the event of a small spill, the spill area and adjacent area will be cleaned by covering with paper towels soaked with 1% Virkon solution. In the event of a large spill, SOP038 will be followed and a spill kit will be used. Equipment must be decontaminated at the end of experimentation	X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X

Safety Method Statement (Continued)

		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X
		X

Risk Assessment

Reference

Location

Originator

Project / Activity / Task

Is this process risk assessment for a : Laboratory / Workshop General use Event

Category 1: Machinery & work equipment:				
Design and Construction	Mechanical hazards	Electrical hazards	Radiation hazards	
In-house constructed	N/A	Electrical test lables current	Ultra Violet	+
Category 2: Workplace				
Confined work area (striking objects)				+
Storage and Stacking				X
Category 3: Hazardous and/or Harmful substances				
Biological substancees (Infection)				X
Category 4: Work activity				
Use of hand tools				X
Category 5: Work organisation				
N/A				X

Explain the risks associated with these hazards				
People / Groups at risk	<input type="text" value="Operator only"/>			X
Enter risk details here:-	Impact	Probability	Risk Score	
<input type="text" value="Spilling solutions, infectious droplets, aerosols"/>	<input type="text" value="Slightly Harmful"/>	<input type="text" value="Unlikely"/>	Low	
What are the control measures?	Lowers Impact	Lowers Probability	+	
<input type="text" value="Wear PPE
Use fume cabinet for ventilated space whilst transferring liquids or making solutions to avoid aerosols.
When not in use the liquids should be kept in sealed containers and at required temperature (-20C)."/>	<input type="text" value="Significantly"/>	<input type="text" value="None"/>	X	
			Residual Risk	
			<input type="text" value="Low"/>	
People / Groups at risk	<input type="text" value="Operator only"/>			X

Process Risk Assessment Form (Continued)

Enter risk details here:- Electrical Hazard from Network analyzer	Impact Slightly Harmful	Probability Highly Unlikely	Risk Score Low
What are the control measures?	Lowers Impact	Lowers Probability	+
Equipment shall be within current PAT test inspection date. Visual check of cables and connectors for wear or looseness prior to use. Fume cabinet should be within current inspection date - see green label to right hand side	Significantly	None	x
			Residual Risk Low
People / Groups at risk	Operator and people in proximity		x
Enter risk details here:- Slips trips and falls on the level	Impact Slightly Harmful	Probability Unlikely	Risk Score Low
What are the control measures?	Lowers Impact	Lowers Probability	+
Ensure that the work area is kept tidy. Remove potential trip hazards from the floor Make sure that any chemicals/spillages are cleared away using chemical spill kits and absorbent materials	Slightly	Slightly	x
			Residual Risk Low
People / Groups at risk	Operator only		x
Enter risk details here:- Appropriate stacking of sensAND instrument required	Impact Slightly Harmful	Probability Highly Unlikely	Risk Score Low
What are the control measures?	Lowers Impact	Lowers Probability	+
Workspace need to be managed properly with appropriate electrical safety checks for the instrument and cables must be tied and concealed behind the equipment.	Significantly	Significantly	x
			Residual Risk Low
People / Groups at risk	Operator and people in proximity		x
Enter risk details here:- UV torch light is dangerous and can damage eyes.	Impact Slightly Harmful	Probability Unlikely	Risk Score Low
What are the control measures?	Lowers Impact	Lowers Probability	+
Never look directly into the light source, or shine in other peoples eyes. Always wear appropriate PPE (include lab coat, sleeves rolled down).	Significantly	Significantly	x
			Residual Risk Low

+ Add another Risk

Who may be at risk as a result of this activity?

Process Risk Assessment Form (Continued)

Personnel Group	Maximum (Task setup/ Re-configuration)	High (Performing the task)	Medium (Observing the task)	Low (Present, but not involved)	Lone Working (Out of hours)	No Exposure Permitted	Total
Academic Staff	1	0	0	0	0	0	1
Technical Staff	1	0	0	0	0	0	1
Research Staff (PDRA)	0	0	0	0	0	0	0
Research Students (PhD)	1	0	0	0	0	0	1
Students (Undergraduate / MSc)	3	0	0	0	0	0	3
Visitors	0	0	0	0	0	0	0
Others - Over-type as needed	0	0	0	0	0	0	0
Total	6	0	0	0	0	0	6

With these controls in place, the risk is:

The activity is LOW RISK - and is effectively controlled

COSHH Form

Reference SAF/MEME/2509 - 2512

Location CBE Lab H34 and DAV 1.027 LAB

Originator Muhammad Ali Tariq

Project / Activity / Task Real-time online sensing of proteins and small molecules using piezoelectric resonators

CHEMICAL NAME				Hazard Rating		Low		OVERALL RISK: Low				
Streptavidin												
CAS No.	9013-20-1	Amount used	0.01 ml	Period of use (hrs)	1	The process is:	Semi Closed	Physical State	Non-Volatile Liquid	<input type="checkbox"/> Eyes <input type="checkbox"/> Skin <input type="checkbox"/> Inhaled <input type="checkbox"/> Ingested	Exposure Potential	Low
W.E.L. (Itel / stel)												

Hazard Statement and Description	Precaution Statement and Description	
No Hazard Statements applicable	No Precaution statements applicable	+
How will the precautions listed above be implemented?		
Safety glasses and PPE will be worn at all times. Work in a well ventilated area.		
Special Storage and Containment Measures	Disposal Method	
Tightly closed and dry. Recommended storage temperature -20 °C Storage class (TRGS 510): 13: Non Combustible Solids	Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.	+
How will spillages be dealt with?	<i>Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.</i> Click here to see spill procedures	
Cover drains, collect, bind and pump off spills. Observe possible material restrictions and take up dry. Dispose off properly by cleaning the affected area. Try to avoid generation of dusts.		

CHEMICAL NAME				Hazard Rating		Low		OVERALL RISK: Low				
Hydroxyl Thiol												
CAS No.	25322-68-3	Amount used	0.01 ml	Period of use (hrs)	1	The process is:	Semi Closed	Physical State	Non-Volatile Liquid	<input type="checkbox"/> Eyes <input type="checkbox"/> Skin <input type="checkbox"/> Inhaled <input type="checkbox"/> Ingested	Exposure Potential	Low
W.E.L. (Itel / stel)												

Hazard Statement and Description	Precaution Statement and Description	
No Hazard Statements applicable	No Precaution statements applicable	+
How will the precautions listed above be implemented?		
Safety glasses and PPE will be worn at all times. Work in a well ventilated area.		
Special Storage and Containment Measures	Disposal Method	
Keep container tightly closed in a dry and well ventilated place. Store at -20 C. Containers which are opened must be carefully resealed and kept upright to prevent leakage.	Keep in suitable closed containers for disposal. Place the soaked paper towels (and other virkon soaked items) into a yellow biohazard disposal bag.	+
How will spillages be dealt with?	<i>Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material.</i> Click here to see spill procedures	
Place the soaked paper towels (and other virkon soaked items) into a yellow biohazard disposal bag		

COSHH Form (Continued)

CHEMICAL NAME Biotin Thiol						Hazard Rating Low		OVERALL RISK: Low	
CAS No.	25322-68-3	Amount used	0.01	ml	Period of use (hrs)	1	The process is:		Semi Closed
W.E.L. (Itel / stel)							Physical State		Non-Volatile Liquid
						<input type="checkbox"/> Eyes <input type="checkbox"/> Skin <input type="checkbox"/> Inhaled <input type="checkbox"/> Ingested		Exposure Potential Low	

Hazard Statement and Description	Precaution Statement and Description	+
No Hazard Statements applicable	No Precaution statements applicable	x

How will the precautions listed above be implemented?
 Safety glasses and PPE will be worn at all times. Work in a well ventilated area.

Special Storage and Containment Measures	Disposal Method	+
Keep container tightly closed in a dry and well-ventilated place. Store at -20 C. Containers which are opened must be carefully resealed and kept upright to prevent leakage.	Keep in suitable closed containers for disposal. Place the soaked paper towels (and other virkon soaked items) into a yellow biohazard disposal bag.	x
How will spillages be dealt with?	<i>Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material. Click here to see spill procedures</i>	

Absorb solutions with finely-powdered liquid-binding material (universal binders). Decontaminate surfaces and equipment by scrubbing with alcohol.

CHEMICAL NAME Ampicillin						Hazard Rating High		OVERALL RISK: Low	
CAS No.	69-52-3	Amount used	0.001	mg	Period of use (hrs)	1	The process is:		Semi Closed
W.E.L. (Itel / stel)							Physical State		Non-Volatile Liquid
						<input type="checkbox"/> Eyes <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Inhaled <input type="checkbox"/> Ingested		Exposure Potential Low	

This chemical has a high health risk associated with it.

Hazard Statement and Description	Precaution Statement and Description	+
H317 May cause an allergic skin reaction.	P261 Avoid breathing dust/fume/gas/mist/vapours/spray.	x
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.	P272 Contaminated work clothing should not be allowed out of the workplace.	x
	P280 Wear protective gloves/protective clothing/eye protection/face protection.	x
	P284 Wear respiratory protection.	x
	P302 + P352 IF ON SKIN: Wash with plenty of soap and water.	x
	P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.	x

Justify the use of this chemical:
 This chemical is being used in very small concentrations (

How will the precautions listed above be implemented?
 Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures and consult an expert.

Special Storage and Containment Measures	Disposal Method	+
		+

COSHH Form (Continued)

Tightly closed and dry. Keep locked up or in an area accessible only to qualified or authorized persons. Recommended storage temperature 2 - 8 °C	Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.	x
How will spillages be dealt with?	<i>Please note: any material used to clean up a spill of hazardous material must also be disposed of as hazardous material. Click here to see spill procedures</i>	
Cover drains, collect, bind, and pump off spills. Observe possible material restrictions. Dispose off properly. Clean up affected area. Avoid generation of dusts.		

+ Add another chemical

Statement of work (Process to be undertaken)

1. The quartz crystal will be prepared by washing with acetone and isopropanol.
2. The quartz crystal will be dried in a stream of nitrogen gas.
3. The quartz crystal will be cleaned using a plasma cleaner.
4. The crystal will be placed inside a microfluidic cell connected to a network analyser.
5. The quartz crystal resonator (QCR) will be cleaned using a plasma cleaner and functionalised overnight with a mixed biotin and hydroxyl thiol.
6. Streptavidin (protein) and BSA will be passed through the microfluidic cell using a syringe pump and the signal will analysed using network analyser (SensAND) to detect binding of the protein to the biotin thiol.
8. A biotinylated aptamer designed for small molecule (antibiotic) detection will then be passed through the cell and captured on streptavidin functionalised QCR.
9. The small molecule (antibiotic) suspension will be passed over the quartz crystal and then analysed using the network analyzer to detect binding of specific antibiotic to the aptamer.
10. SensAND instrument would be used to acquire data and analyse it. Instrument must be appropriately stacked on the workspace and all electrical safety checks made prior to its use.

Show Image

Personal protection requirements not covered in the precaution statements above.

None

Sources of information and references

MSDS

Reference to **existing approved** Risk Assessment

With the current controls, the risk of using these chemicals is: **Low**

Supervisor to check that the process involving the safe use of these chemicals has been satisfactorily evaluated

Supervisor and Departmental Safety Office (DSO) Sign-off.

Supervisors

Please check the documents above and if you want to approve them:

- 1) Electronically sign this document
- 2) Save it to a local drive (You will be prompted to do this)
- 3) eMail the signed document to the DSO.

DSO

Please review the documents above and if you want to approve them:

- 1) Enter the reference numbers as appropriate
- 2) Electronically sign this document
- 3) Save it to a local drive (You will be prompted to do this)
- 3) eMail the signed document to the originator

IF YOU DO NOT WANT TO AUTHORISE THE FORMS,

Please do not sign the form, but click the "Not Approved" check-box and return it to the originator by email stating why and what you expect them to do to put it right in the comments box below.

Not Approved

Supervisors Signature

Form Reference Numbers

Risk Assessment

SAF/MEME/8153

Method Statement

SAF/MEME/8153

COSHH Assessment

SAF/MEME/2509 - 2512

DSO Signature

This document set must be reviewed and re-approved at the following times:

- 1) After the first occurrence of the activity described above (Review only)
- 2) After any change to the procedure or reagents used
- 3) After any incident resulting from this activity
- 4) At least annually from the date of approval

Next Review:

5 Sep 2025

Review comments