

Activity Title: Urine investigation	Type of activity: Widening and Outreach Participation activity - > 16 years old.	Location of activity: Anywhere, where hand washing facilities available
Assessed by (+date): BoxED Team (04/09/19)	Endorsed by (+date): Andrew Carter Head of R&O	Assessment review date: Ongoing after delivery of activity, annual review date September 2020

Section 1 – Activity

Description of experimental procedure. (Give sufficient detail so that it is clear as to the procedure being undertaken, to include substances to be used and importantly created)

Practical to analyse fake urine samples for 'disease' diagnosis.

Four 'patient urine' samples 1-4 will be prepared for the pupils to investigate. The pupils will be testing for

1. **General observation**
2. **Sugar** using Benedict's reagent
3. **Protein** using the Bradford assay
4. **Observation of 'Red Blood Cells (RBCs)'** using microscopes with pre-prepared haemocytometers

Test for Glucose – Benedict's Reagent

The method for using **Benedict's reagent** is to add an equal volume of this reagent to an equal volume of the test solution (fake urine). Heating in a hotblock using screwcapped tubes for around 3 mins. Depending on glucose concentrations depends on colour of the precipitation of this solution.

Test for protein – Bradford Assay

Protein is determined by the **Bradford reagent** method. This involves adding an equal volume of Bradford reagent (0.5 mL) to an equal volume of the test solution (fake urine), incubating 5 minutes and reading absorbance on a spectrophotometer.

Observation of red blood cells (RBC) by light microscopy.

Prefabricated haemocytometers will be set up for the students to visualize under a lightmicroscope to provide an introduction to how haemocytometers function. RBC's provided through photos.

Comparison to Urine Dipstick

Fake urine samples will be tested with a **Combur⁷ Test dipstick**, following manufacturer's instructions, to compare to results to the above tests. The students will need to investigate why they have a discrepancy in results if any, advantages and disadvantages to the different tests.

Section 2 – Substances

Have you used the least hazardous substances possible in this procedure in order to eliminate or minimise the hazards to health? (✓)

Yes ☒ No ☐ (If No *please justify*)

If you are planning to work with radioactive material you need to complete the radioactivity specific COSHH form available on the [Risk Assessment page](#)

Substance details

Substance (chemical, and/or pressurised gases. Including those created by activity) Include the common chemical name from 1.1	Quantity and concentration (Amount in mL or g then concentration in Mg/ML, %w/w, w/v, Molarity. Also include maximum amounts).	Classification (corrosive, toxic, flammable,) From pictogram 2.2 - Please use words to describe the pictogram. See end of this form for description.	Hazard Statements to include exposure routes & potential health effects. From Label elements 2.2 – Hazard Statements (H-numerical and description only).	Exposure Time (duration / frequency of use)
Fake Urine samples 1-4 Contains; Ovalbumin (OVA), Glucose, flour, porcine haemoglobin 0.02µg/ml	30 mL bottles of each sample	Non-hazardous. Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008. This substance is not classified as dangerous according to Directive 67/548/EEC.	ALLERGY NOTE contains EGG and WHEAT protein. Contains Pig Products.	1 hour
Benedict's reagent (sigma)	4x 50 mL bottles 0.5 mL per reaction	Harmful /Irritant/ skin sensitiser Hazardous to the aquatic environment	H319 Causes serious eye irritation. H411 Toxic to aquatic life with long lasting effects.	1 hour
Bradford reagent (sigma)	4x 50 mL bottles 2 mL per reaction	Carcinogen/ germ cell mutagen/ reproductive toxicant Corrosive	H290 May be corrosive to metals. H315 Causes skin irritation. H319 Causes serious eye irritation. H371 May cause damage to organs.	1 hour
Combur ⁷ Test Dipsticks	~10	The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.	Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Ingestion May be harmful if swallowed. Skin May be harmful if absorbed through skin. May cause skin irritation. Eyes May cause eye irritation.	1 hour, once a year.

Biological Agents, provide details below:

Biological Agent (inc. strain or Ref no.) + Hazard Group
(e.g. microorganisms, bodily fluids, tissues/cells and/or other infectious/harmful materials)

<p>(Hazard Group 3 or 4 is not permitted) Genetically Modified Organisms (GMOs)</p> <p>Are you using Genetically Modified Organisms (GMOs)? If so what is the GM Risk Assessment number:</p> <p>No. _____</p> <p><i>Please note if your work involves Genetically Modified Organisms you must complete a specific GMO risk assessment and submit this to the GM Safety Committee for approval prior to commencing work.</i></p>	
<p>Quantity Used <i>(e.g. in ml – max culture volume)</i></p>	
<p>Exposure Route <i>(inhalation, ingestion, percutaneous, splash into eyes, other transmission routes / allergies caused)</i></p>	
<p>Hazard Description <i>(e.g. disease that may be caused, will the material have been screened before use? – provide details, is use of sharps planned?)</i></p>	

Section 3 – Control Measures

Identify those persons who will be undertaking the activity and in particular actions for those persons at increased risk of harm (disabled, pregnancy, immuno-compromised etc)

School pupils >16 years old, school staff, UWE students and staff.

Urine samples contain EGG and WHEAT proteins which are allergens. **Schools are advised in advance of this and asked to reply by email when booking if any pupils are allergic to these reagents.** It should also be highlighted at the beginning of a session also to the pupils themselves, providing an additional opportunity to raise any concerns. Urine also contains pig products which should be highlighted also.

Control measures for the activity – to minimise previously identified hazards *i.e.: Engineering controls e.g. use of fume cupboard, microbiological safety cabinet etc., Personal Protective Equipment / Respiratory Protective Equipment (PPE/RPE) (detail type), restricting quantity of substance used, containment level e.g. 1, 2 supervision or exposure monitoring, limiting persons in area, prohibiting lone working.*

- Laboratory coats, safety spectacles and chemical resistant nitrile gloves to be worn as directed within the session.

- Practical participants to wash their hands after practical work.

Precautionary statements

Benedict's Reagent

P273 Avoid release to the environment.

Bradford reagent P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Further relevant information is available on the HLS Health and Safety intranet site:

<https://intranet.uwe.ac.uk/sites/hlshas/>

Are there other Risk Assessments or Procedures (Safe Systems of Work - SSW) that are relevant to this COSHH assessment e.g. *Centrifugation, Incubation, Neutralisation etc.* If so please list below:

Identify the Monitoring and Maintenance of Control Measures e.g. Fume Cupboards, Microbiological Cabinets, Local Exhaust Ventilation (LEV)

n/a

Additional special measures of control - *Please consider all sections below:*

Manual handling: n/a

Assistance / Supervision: At least 1 member of UWE H&S trained staff, 1 UWE student and 1 teacher per class containing no more than 30 pupils.

Health surveillance / Immunisation: n/a

Other: n/a

Indicate any specialist information relating to any of the substances in use - *Please consider all sections below:*

Storage: n/a

Transportation: All kit will be contained in plastic storage boxes – those transporting chemicals will also be sealable and all contents checked that bottles closed.

Waste / Disposal:

- Tubes containing Benedicts reagent should be collected from students, confirmed that tubes closes and placed into the sealable container to be returned to UWE for disposal in the toxic waste.
- All other liquids including urine and Bradford's reagent to be disposed off down the sink with copious amounts of water.
- All other waste including student gloves can be disposed off in normal waste at the school or at UWE.

Bio security requirements: n/a

Outline any Emergency Measures for the activity - *Please consider all sections below:*

Spillages:

'Urine' spillages:

Mop up any spills with tissues and washed down area with soapy solution.

Chemical spillages:

Spillage of **Benedict's reagent and/or Bradford reagent** occurs mop up with tissue, rinse tissue with water thoroughly and dispose of tissue in the bin at school

First aid:

Bradford reagent/ Benedict's

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a First Aider if required.

Emergency equipment: n/a

Will additional personnel be involved or exposed to the risk and what are their actions: n/a

Details of specific Information, Instruction and Training required, including any specific competencies to be checked.










n/a

Section 4 – DSEAR

Are any of the substances that you are using flammable, oxidising, pressurised or explosive (name them)?

n/a

Have you included suitable control measures above? yes

	GHS01	Explosive		GHS04	Gases under pressure		GHS07	Harmful / Irritant / Skin sensitiser
	GHS02	Flammable		GHS05	Corrosive		GHS08	Carcinogen / Germ cell mutagen / Reproductive toxicant
	GHS03	Oxidising		GHS06	Acute toxic		GHS09	Hazardous to the aquatic environment

Section 5 - Risk Rating

Overall assessment of the risk posed by this activity e.g. *Low, Medium, High*

low

Additional Actions required to reduce the risk:

Action	By Who	By When	Action Completed

Overall residual risk posed by this activity e.g. *Low, Medium, High*

Low