

Risk Assessment Form (3)

Must be completed before experimentation.

Student's Name(s) Blake Lippman and Tyler Bissoondial

Title of Project Investigating the Use of Ceratopteris richardii as a Model Plant for the Phytoremediation of Cadmium

To be completed by the Student Researcher(s) in collaboration with Designated Supervisor/Qualified Scientist: (All questions must be answered; additional page(s) may be attached.)

1. List all hazardous chemicals, activities, or devices that will be used; identify microorganisms exempt from pre-approval (see Potentially Hazardous Biological Agent rules).

Cadmium Chloride, DCFH-DA Trypan Blue, 2, 7-Dichloro-dihydro-fluorescein diacetate, Butylated hydroxytoluene, Acetone, Invitrogen RNAqueous-4PCR Total RNA Isolation kit, Invitrogen SuperScript III Platinum One Setp RT-PCR Kit, Ethanol, Agarose Gel, MDA Lysis/Binding Buffer, Wash Solution #1 & #2/3, Elution buffer.

2. Identify and assess the risks involved in this project.

The aforementioned hazards have the ability to cause cancer, genetic defect, reproductive damages, irritation, damage to the eyes and respiratory tract, and dizziness / drowsiness. Please see attachment for more details

3. Describe the safety precautions and procedures that will be used to reduce the risks.

We will wear gloves, goggles, lab coats, and use the fume hood when necessary. Face masks will be used when handling chemicals that are hazardous with inhalation. Mentor handles safety precaution training, hazardous chemicals, and will assist with use of potentially harmful equipment.

4. Describe the disposal procedures that will be used (when applicable).

Hazardous and organic chemicals will be stored in hazardous and organic chemical waste containers to be properly disposed by the Chemical Safety Officer at GW Hewlett High School. Most other chemicals are safe to dispose of down the drain diluted with water according to manufacturer's instruction.

5. List the source(s) of safety information.

Applicable MSDS (SDS) sheets from Bio-Rad, Qiagen, Sigma Aldrich, Invitrogen, Ambion, and Flinn Scientific

To be completed and signed by the Designated Supervisor (or Qualified Scientist, when applicable):

I agree with the risk assessment and safety precautions and procedures described above. I certify that I have reviewed the Research Plan/Project Summary and will provide direct supervision.

Dr. Terrence Bissoondial

Designated Supervisor's Printed Name


Signature

05/26/2019

Date of Review (mm/dd/yy)

Science Research Coordinator: Hewlett HS

Position & Institution

516-425-9991

Phone or email contact information

Ph. D in Molecular Biology

Experience/Training as relates to the student's area of research

Risk Assessment:

Risk and Safety:

Material Safety Data Sheets from US Research Nanomaterials, Cayman Chemicals, Sigma Aldrich, ThermoFisher Scientific, and Carolina were used for the chemicals.

Cadmium Chloride: May cause cancer, respiratory inflammation, genitive defects, and may damage fertility of the unborn child due to prolonged or repeated exposure. Gloves, goggles, and lab coats will be worn while handling for adequate protection. Will be disposed of according to official regulations by the chemical safety officer of G.W. Hewlett High School.

<https://www.fishersci.com/store/msds?partNumber=C10100&productDescription=CADMIUM+CHLORIDE+ACS+100GM&vendorId=VN00033897&countryCode=US&language=en>

DCFH-DA: Flammable liquid and vapor that is harmful if swallowed. Possible skin irritation and serious eye irritation may occur from direct contact. May cause drowsiness and dizziness. Goggles, gloves, and a lab coat will be worn for adequate protection when handling this compound. Will be disposed according to official regulations by the chemical safety officer of G.W. Hewlett High School. <https://www.caymanchem.com/msdss/85155m.pdf>

Trypan Blue - may cause cancer with prolonged exposure. Gloves, goggles, lab coats will be worn when handling. Will be disposed according to official regulations by the chemical safety officer of G.W. Hewlett High School.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=T0887&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigma%2Ft0887%3Flang%3Den>

2,7-Dichloro-dihydro-fluorescein diacetate - causes skin irritation, eye irritation, and target organ systemic toxicity (single exposure). Material may be irritating to the mucous membranes and upper respiratory tract. It may be harmful by inhalation, ingestion, or skin absorption, and may cause respiratory system irritation. Gloves, goggles, lab coats will be worn when handling. Will be disposed according to official regulations by the chemical safety officer of G.W. Hewlett High School.

<https://www.caymanchem.com/msdss/85155m.pdf>

Butylated hydroxytoluene (BHT) - a flammable liquid and vapour, is harmful if swallowed, causes skin irritation, causes serious eye irritation, and may cause respiratory irritation.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=167215&brand=ALDRICH&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Faldrich%2F167215%3Flang%3Den>

Acetone- highly flammable liquid and vapor; more than minimal risk may cause serious eye irritation; toxic to aquatic life; potentially harmful if inhaled or absorbed through skin; potentially harmful if swallowed. Gloves, goggles, lab coats will be worn when handling. Will be disposed according to official regulations by the chemical safety officer of G.W. Hewlett

High School.

<https://www.fishersci.com/shop/msdsproxy?productName=AC177170010&productDescription=ACETONE>

Invitrogen RNAqueous®-4PCR Total RNA Isolation Kit- more than minimal risk can potentially harmful if inhaled, absorbed through skin, or when in contact with eyes, causing irritation; potentially harmful if swallowed. Gloves, goggles, labs coats will be worn when handling. Will be disposed according to manufacturer's instruction and according to official regulations by the chemical safety officer of G.W. Hewlett High School.

https://assets.fishersci.com/TFS-Assets/LSG/manuals/cms_059300.pdf

Invitrogen SuperScript® III Platinum® One-Step RT-PCR Kit- more than minimal risk can potentially harmful if inhaled, absorbed through skin, or when in contact with eyes, causing irritation; potentially harmful if swallowed. Gloves, goggles, labs coats will be worn when handling. Will be disposed according to manufacturer's instruction and according to official regulations by the chemical safety officer of G.W. Hewlett High School.

https://www.thermofisher.com/document-connect/document-connect.html?url=https://assets.thermofisher.com/TFS-Assets/LSG/manuals/superscript_onestep_qrtPCR_man.pdf&title=Product%20Info%20Sheet:%20SuperScript%20III%20Platinum%20One-Step%20qRT-PCR%20Kit

SYBR Safe® DNA Stain- nonhazardous; nonetheless, gloves, goggles, labs coats will be worn when handling.

<https://www.thermofisher.com/content/dam/LifeTech/Documents/PDFs/PG1290-PJ8342-CO128458-SYBRsafe-Green-Fact-Sheets-Corp-FHR.pdf>

1xTBE has no health effects and is not flammable. Gloves, goggles, labs coats will be worn when handling.

<https://www.fishersci.com/shop/msdsproxy?productName=BP24304&productDescription=1X+TRIS-BORATE-EDTA>

Ethanol - more than minimal risk of eye, skin, gastrointestinal, and respiratory irritation, ignition, reaction with oxidizers, and formation of carbon monoxide and carbon dioxide via decomposition. Will be disposed according to official regulations by the chemical safety officer of G.W. Hewlett High School.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=E7023&brand=SIGALD&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigald%2Fe7023%3Flang%3Den>

Agarose gel - more than minimal risk of skin, eye, respiratory, and gastric irritation. Gloves, goggles, labs coats will be worn when handling.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=P5472&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigma%2Fp5472%3Flang%3Den>

MDA Lysis/Binding Buffer - more than minimal risk of damage to eyes and respiratory tract, neuro- and nephrotoxic effects. Will be handled and disposed by mentor.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en>

<https://www.sigmaaldrich.com/catalog/product/sigma/mak085?lang=en&productNumber=MAK085&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigma%2Fmak085%3Flang%3Den>

Wash Solution #1 - more than minimal risk of skin, eye, respiratory, and gastrointestinal irritation, instability caused by excess heat and moisture, and reaction with oxidizing agents. Gloves, goggles, lab coats will be worn when handling. Will be disposed according to manufacturer's instruction.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=W0263&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigma%2Fw0263%3Flang%3Den>

Wash Solution #2/3 - more than minimal risk of eye and gastric irritation. Gloves, goggles, lab coats will be worn when handling. Will be disposed according to manufacturer's instruction.

<https://www.sigmaaldrich.com/MSDS/MSDS/PleaseWaitMSDSPage.do?language=en&country=US&brand=SIGMA&productNumber=W4639&PageToGoToURL=https://www.sigmaaldrich.com/catalog/product/sigma/w4639?lang=en®ion=US>

Elution Buffer- more than minimal risk of eye and gastric irritation. Gloves, goggles, lab coats will be worn when handling.

<https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=C0241&brand=SIGMA&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fsigma%2Fc0241%3Flang%3Den>