Risk Assessment Form (3)

Must be completed before experimentation.

Student's Name(s) Sanjna Kedia and Emily Ma

Title of Project Remediation of Wastewater Using a Microbial Fuel Cell with Optimized Electricity Generation and an Algae Bioreactor

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).

- Peptone- 16g dissolved in 1L water
- Calcium Chloride (CaCl2)- 0.4g dissolved in 1L water
- Vegetable Extract- 9g dissolved in 1L water
- Urea- 3g dissolved in 1L water
- Potassium Phosphate Dibasic(K2HPO4)- 2.8g dissolved in 1L water
- Sodium Chloride (NaCl)- 0.7g dissolved in 1L water
- Sodium Nitrate Solution- 100mg in 1L water
- Bleach(10%) - 500ml
- 70% Isopropyl alcohol- 100ml
- Magnesium sulfate heptahydrate- 0.2g dissolved in 1L water
- Anabaena- 100ml culture in 1L water
- E. Coli K-12
- Autoclave (sterilizing materials)

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

Peptone, Vegetable extract, urea, potassium phosphate dibasic, NaCl- There are no classified hazards with these products.
Magnesium Sulfate heptahydrate- This chemical may cause damage to organs with prolonged exposure, and can be toxic to aquatic life.
Sodium Nitrate- causes serious eye irritation
CaCl2- Causes serious eye irritation; category 2A; do not let the product enter the drains
Bleach- Corrosive to eyes; causes eye burns; harmful or fatal if swallowed
70% isopropyl alcohol- highly flammable liquid and vapor; causes serious eye irritation; may cause dizziness or drowsiness
E. Coli K-12- BSL 1; non-pathogenic
Anabaena- There are no classified hazards of this organism.
Autoclave- heat, steam, pressure, sharp hazards

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

- Peptone, Vegetable extract, urea, potassium phosphate dibasic, NaCl, magnesium sulfate heptahydrate- If any of these chemicals are inhaled, the person will be moved to fresh air. If skin contact is made, the person's skin will be washed with soap and water. If eye contact is made, the person will wash their eyes with water. Nitrile gloves with a thickness of 0.11mm will be worn while handling these chemicals.
- Calcium Chloride, sodium Nitrate- If this chemical is inhaled, the person will be moved to fresh air. If skin contact is made, the person's skin will be washed with soap and water. If eye contact is made, the person will wash their eyes with water. Nitrile gloves with a thickness of 0.11mm will be worn while handling this chemical. Additionally impervious clothing and safety glasses with shields will be worn while handling this chemical.
- bleach- Splash proof safety glasses, chemical resistant gloves, protective footwear and a lab apron will be worn and used while handling this chemical.
- 70% isopropyl alcohol- If this chemical is inhaled, the person will be moved to fresh air. If skin contact is made, the person's skin will be washed with soap and water. If eye contact is made, the person will wash their eyes with water. Nitrile gloves with a thickness of 0.11mm will be worn while handling this chemical. Additionally impervious clothing and safety glasses with shields will be worn while handling this chemical. This chemical will be locked in a flammables cabinet when it is not in use.
- E. Coli K-12 and Anabaena- Student researchers will be trained in sterile technique and how to properly work with microorganisms. Nitrile gloves, safety goggles, and a lab apron will be worn while handling this organism.
- Autoclave- Heat resistant gloves, safety glasses, a lab apron, sleeve protectors will be worn while using the autoclave. Items that are corrosives, solvents, volatiles, and radioactive will not be put in the autoclave.

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

Vegetable extract, urea, potassium phosphate dibasic, NaCl, magnesium sulfate heptahydrate, bleach- The surplus and non recyclable solutions of these chemicals will be sent to a licensed disposal company.
Peptone- This chemical will be kept in suitable closed containers for disposal and non recyclable and surplus solutions of this chemical will be sent to a licensed disposal company.
CaCl2- This product will not be let into the drains, and non recyclable and surplus solutions of this chemical will be sent to a licensed disposal company.
70% Isopropyl alcohol- This contents and container of this chemical will be disposed to an approved waste disposal plant.
Sodium Nitrate- This solution will be disposed of as an unused product and according to official regulations.
E.Coli K-12- This microorganism will be treated with 10% bleach solution, will be parafilmed, and thrown in the garbage.
Anabaena- This microorganism will be treated with 10% bleach for 24 hours and the resulting solution will be rinsed down the drain until the bleach odor can no longer be detected.
All surfaces will be wiped down with 10% bleach prior to and after use.

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

Sigma Aldrich, Carolina Biological, Fisher Scientific, Vernier

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.

Alison Huenger — Designated Supervisor's Printed Name

Alison Huenger — Signature

10/01/19 — Date of Review (mm/dd/yy)

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degrees in chemistry and biology - worked at Stony Brook University Biotechnology camp and past experience as a chemical engineer — Experience/Training as relates to the student's area of research