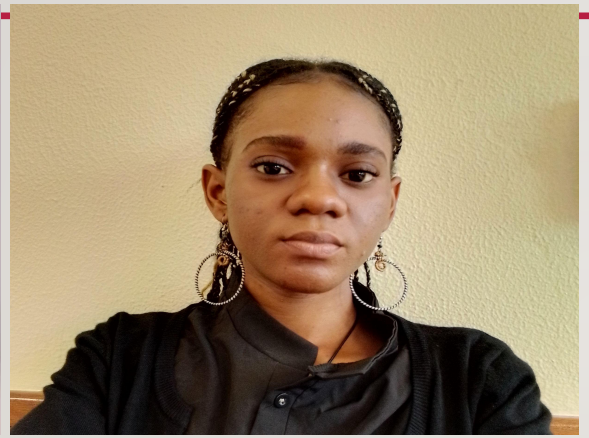
WATER WARRIORS

Saving water from microplastic

CHALLENGE 1 (UNIVERSITY)

TEAM PRESENTATION

NAOMI NAOER
BANGLADESH
GOVT. M.M.
COLLEGE,
JASHORE



RAÏSSA BOFANGA
DRC KINSHASA,
ENSIGN COLLEGE.

FESTO GILALA,
TANZANIA
SOKOINE
UNIVERSITY OF
AGRICULTURE

DIB NADJETT
ALGERIA
NATIONAL
HIGHER SCHOOL
OF AGRONOMY

THE ISSUE

We are surrounded by plastics. In our soil, rivers and oceans.

THE ISSUE

According to a 2023 study, the ocean's surface may contain between 82 and 358 trillion micro-plastic particles, which would weigh around 2.3 million tones. This is only in the top foot of seawater. Estimates suggest that 92% of the 5.25 trillion plastic particles on the ocean's surface are microplastics, which are small plastic particles that are less than 5 millimeters in size.

THE ISSUE

Even our food chain has been contaminated by this nuisance

OUR PLAN

1) Remove micro-plastics from water and eliminate them from the environment

2) Convert those micro-plastics into bio fertilizer and oxygen gas through decomposition.

OUR SOLUTION

Our project will solves the problem of micro-plastics in oceans by:

First step:
Use a SMART FERROFLUID BOX made with the help of nanotechnology to capture micro-plastic from water bodies.

Second step:
Use the Pestalotiopsis microspora fungi to transform the micro-plastic into organic matter (bio fertilizers and oxygen)

OUR SOLUTION

What is the Ferrofluid ?

Ferrofluids are colloidal liquids that become magnetic when exposed to a magnetic field.
It is scientifically proven that we can use the ferrofluid to remove the micro-plastic from water.

OUR SOLUTION

What is the pestialopiosis microspora ?

The pestialopiosis microspora is a species of endophytic fungus capable of breaking down and digesting polyurethane (main plastic composant) It starts breaking down the plastic after two weeks only

HOW TO GROW THE PESTIALOPIOSIS MICROSPORA ?

DESIGN: SMART FERROFLUID BOX

- 1. The SMART FERROFLUID BOX is made of stainless steel which are completely floatable. The boxes will have 4 holes on each side covered with hydrophilic membranes. The membranes will help the water pass through the box and contain the ferrofluid.
- 2. The boxes will have a waterproof GPS system and CENSORING system in order to navigate the box and get updates remotely.
- 3. The box design is a primary prototype and can be updated but the basic design remains same. The measurements will be depending on the area we use the boxes. If we use the boxes in a wider scale like the ocean the measurement will be bigger. And if the boxes are being used in a smaller scale like the municipality tanks or household areas then the measurements will be smaller.

DESIGN:THE RECTAGULAR GLASS CONTAINER

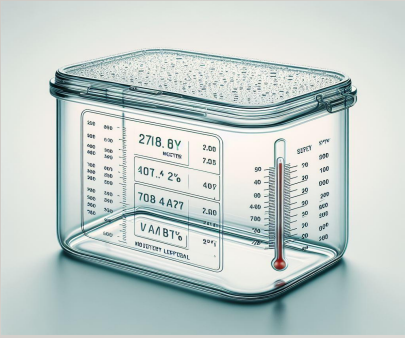
The pestialopiosis microspora can grow in small areas and closed spaces, therefore we have designed a rectangular glasse bottle.

The container will have a thermometer and an hygrometer to automatically mesure the temperature and level of moisture for the pestialopiosis microspora

HOW DOES IT WORKS ???

STEP 1: SMART FERROFLUID BOX

- The box containing the nanoparticles of ferromagnetic materials suspended in carrier fluid will be introduced into contaminated water, The microplastics will be attracted to ferrofluid due to their hydrophobic surface properties. The ferrofluid has 87% success rate to remove micro-plastics and with the help of nanotechnology it can be up-to 99%.
- Once the ferrofluid captures the micro-plastic, we collect the boxes from the water bodies and use a magnet to separate the micro-plastic from ferrofluid. The ferrofluid can be used up-to 5 times to capture the micro-plastic. The captured micro-plastic will be contained and be taken to the next step where the decomposition happens.



HOW DOES IT WORKS ???

STEP 2: PESTIALOPIOSIS MICROSPORA FUNGI

- The collected micro-plastics, will be introduced to the bottle of Pestialopiosis microspora to be decomposed
- The fungi contain petase enzymes responsible for breaking down the polymer chain of plastics and produces Biofertilizers and oxygen gas.
- We're going to use a rectangular glass container that will contain a various field of plastic eating fungus so that no matter the quantity of the microsplastic collected the pestialopiosis microspora can decompose it.

THE PROJECT IMPACT

MARKET POTENTIAL

a) The companies involved in waste water treatment and environmental remediation will optimize on this technology by offering the smart ferrofluid box to municipalities, and industries to make sure the micro-plastic level decreases. It will be much more encouraged to use the SMART FERROFLUID BOX to capture micro-plastic effortlessly.

b) The converted bio fertilizers and oxygen gas will creates new market for sustainable waste managements and the companies specialized with bio fertilizer will explore for partnership and venture to commercialize this idea.

THE PROJECT IMPACT

SOCIAL IMPACT

a) It will reduce the environmental impact of micro-plastics pollution on aquatic eco-systems and human health

b) It will help to safeguard water quality, protect biodiversity and mitigates the risks associated with plastic contamination in food chain,

c) It will contribute to sustainable agriculture practices, promoting soil health and reducing reliance on chemical fertilizers,

d) It will improve the availability of quality oxygen in communities.

BUDGET FOR APPLICATION IN HOUSEHOLD AND INDUSTRY

1. Materials for Ferrofluid Box:

- Stainless steel box: $500 - $100, - Ferrofluids and oil: $100 - $200, - Magnets: $50 - $100, - Membrane: $50 - $100
- Total: $700 - $140

2. Implementation of Pestialopiosis Microspora Fungi:

- Large rectangular glass container: $200 - $500
- Pestialopiosis microspora fungus: $50 - $100 -Installation and setup: $100 - $200
- Total: $350 - $800

BUDGET FOR APPLICATION IN HOUSEHOLD AND INDUSTRY

3. Transportation:

- - Varies based on distance and transportation method, but estimate $100 - $300 for transportation costs for people bringing microplastics for decomposition.

- So, the estimated budget for building the ferrofluid box and implementing the pestialopiosis microspora fungi, including transportation, would be approximately $1150 - **$2500.**

CONCLUSION

- The problem of micro-plastics, must be solved by preventing the major sources of plastics producers for instances ; industries and municipality as before they reach sources of water like ocean, rivers, streams, sea and dams,
- We believe that nothing is lost in nature everything is recycled into new products
- The project offers practical and scalable solution for wastewater treatment in industries and municipalities.

WE REALLY APPRECIATE THAT OPPORTUNITY WHO COMES FROM SOLVING THE EXISTING PROBLEM

Thank you For your Time

And Attention