# ENHANCING POULTRY BIODEGRADATION FOR SUSTAINABLE NUTRIENT CYCLING

**SEMINAR PRESENTATION UNDERTAKEN IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MSc DEGREE IN ENVIRONMENTAL MICROBIOLOGY.**

**DEPARTMENT OF BIOLOGICAL SCIENCE.**

**FACULTY OF NATURAL AND ENVIRONMENTAL STUDIES.**

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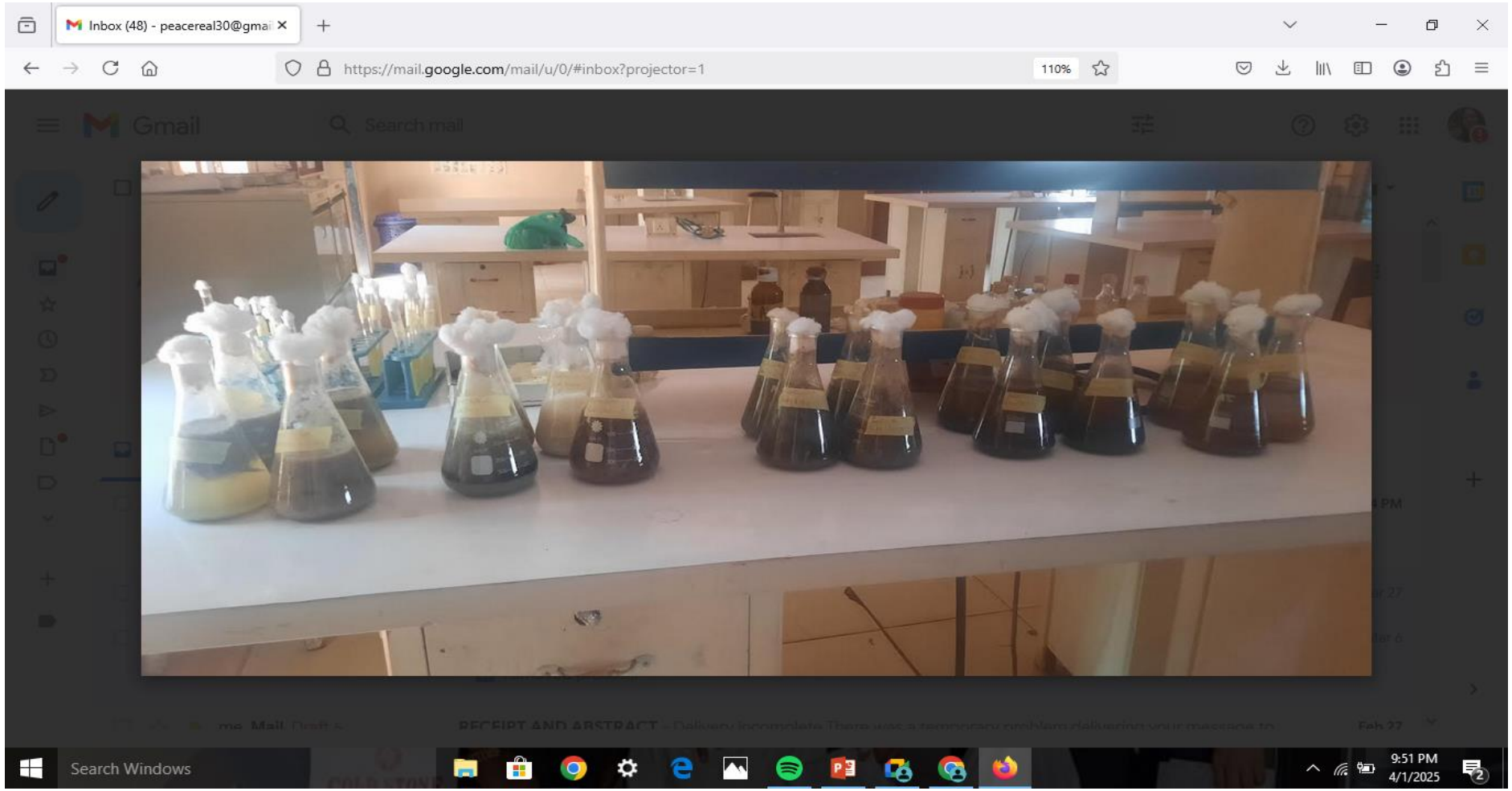
# BIODEGRADATION PROCESS



# INTRODUCTION

- **Environmental pollution**
- **Sustainable development goal**
- **Conventional methods of disposing poultry wastes**
- **Ecofriendly methods of poultry waste management**

# STATEMENT OF THE PROBLEM

- **Global poultry waste management.**
- **Soil ameliorant**
- **Increased crop productivity/food security**
- **Environmental sustainability**

# AIM

- This study aims to evaluate the potential of poultry litter in enhancing the biodegradation of poultry feathers and to determine the potency of the resulting hydrolysate as a soil ameliorant.

# OBJECTIVES

1. To ascertain the optimal ratio of poultry litter to poultry feathers for optimal degradation of feathers.

- 2. To determine the effects of biodegradation on the physical & chemical characteristics of feathers.
- 3. To investigate the plant-growth-promoting potential of the feather hydrolysate from biodegraded poultry feathers and litters.
- 4. To evaluate the effect of biodegradation on the microbial community dynamics of the hydrolysate(microbial community dynamics of sample with the most phenotypic degradation rate).

# METHODOLOGY

- This study will employ:
- Biological degradation methods
- Microbiological analysis of the hydrolysate before and after biodegradation.
- Chemical characterization for minerals like N,P,K.
- Using the hydrolysate to grow plants to show the ideal mixing ratio with the highest yield.
- Molecular identification of isolated bacteria.

# For objectives 1 and 2, we use the table below.

**Treatments (in triplicates) 1% w/v of feathers = 1g of feathers in 99 ml of water (triplicate analysis)**

| TREATMENTS | | Water |
|---|---|---|
| poultry feathers % (w/v) | poultry litters % (w5/v) | |
| 0.25 (1.25g) | 1 (5g) | 500ml of water |
| 1 (5g) | 0.25 ( 1.25g) | 500ml of water |
| 1 (5g) | 1 (5g) | 500ml of water |
| 1 (5g) | 0 | 500ml of water |
| 0 | 1 (5g) | 500ml of water |

# EXPECTED OUTCOMES

- This study aims to  contribute to the development of sustainable poultry waste management practices by:
- Identifying optimal biodegradation ratio of the hydrolysate
- Identification of microbial and fungal organisms before and after biodegradation
- Determination of the essential minerals in the hydrolysate before and after degradation
- Identification of the potted plant with the highest growth rate.
- Gene sequencing of the isolated organisms.

# CONCLUSION

- The potential of the hydrolysate as a soil ameliorant lies in its ability to enrich soil with essential nutrients, improve soil structure and water retention, enhance microbial activity, and promote plant growth. Additionally, the organic compounds present in the hydrolysate can stimulate soil microbial communities, leading to better nutrient cycling and overall soil health.

# REFERENCES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# THANK YOU