

PHYSICAL CHEMISTRY PROGRAM

PROJECT 18

MICROBIAL PRODUCTION OF POLYHYDROXYBUTYRATE (PHB) FROM METHANE

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Research Centre
for Gas Innovation

cleaner energy for a sustainable future

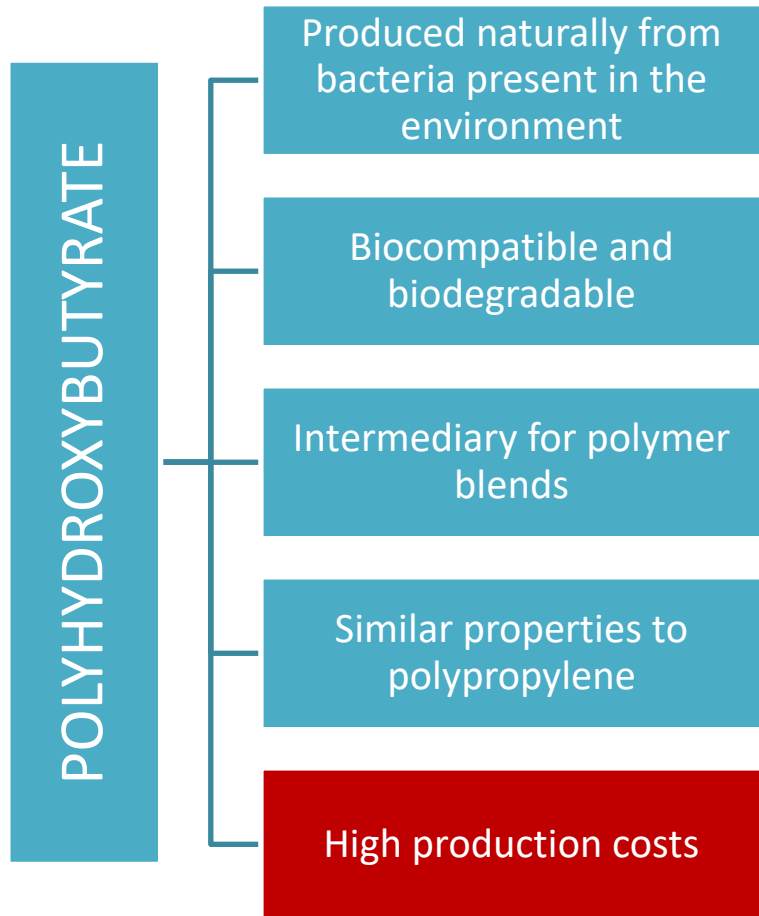
INTRODUCTION

BIOTECHNOLOGY



Technological use of **biological systems** or parts of them in the manufacture of or modification of an end product

INTRODUCTION



INTRODUCTION

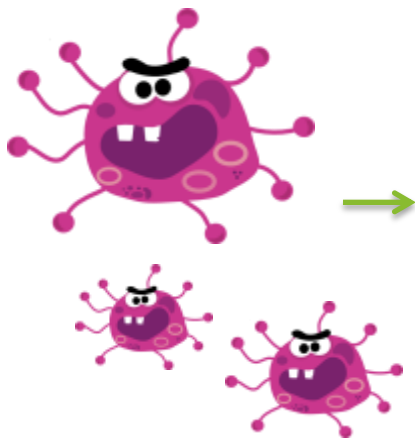
POLYHYDROXYBUTYRATE



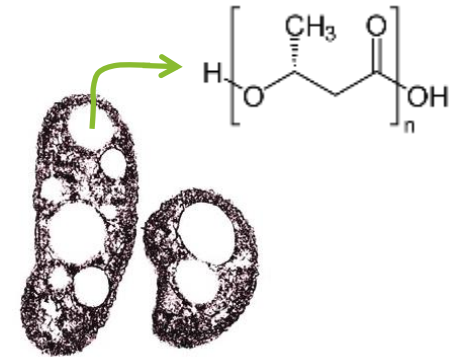
PROJECT 18

MAIN OBJECTIVE

BIOCONVERT METHANE INTO BIODEGRADABLE POLYMERS
PRODUCED BY BACTERIA SUCH AS POLYHYDROXYBUTYRATE (PHB)



C1 COMPOUNDS
METHANE OR METHANOL

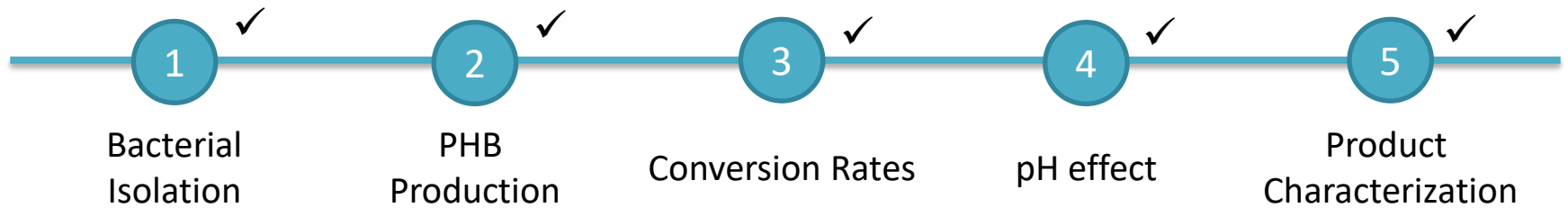


MICROBIAL SOURCE



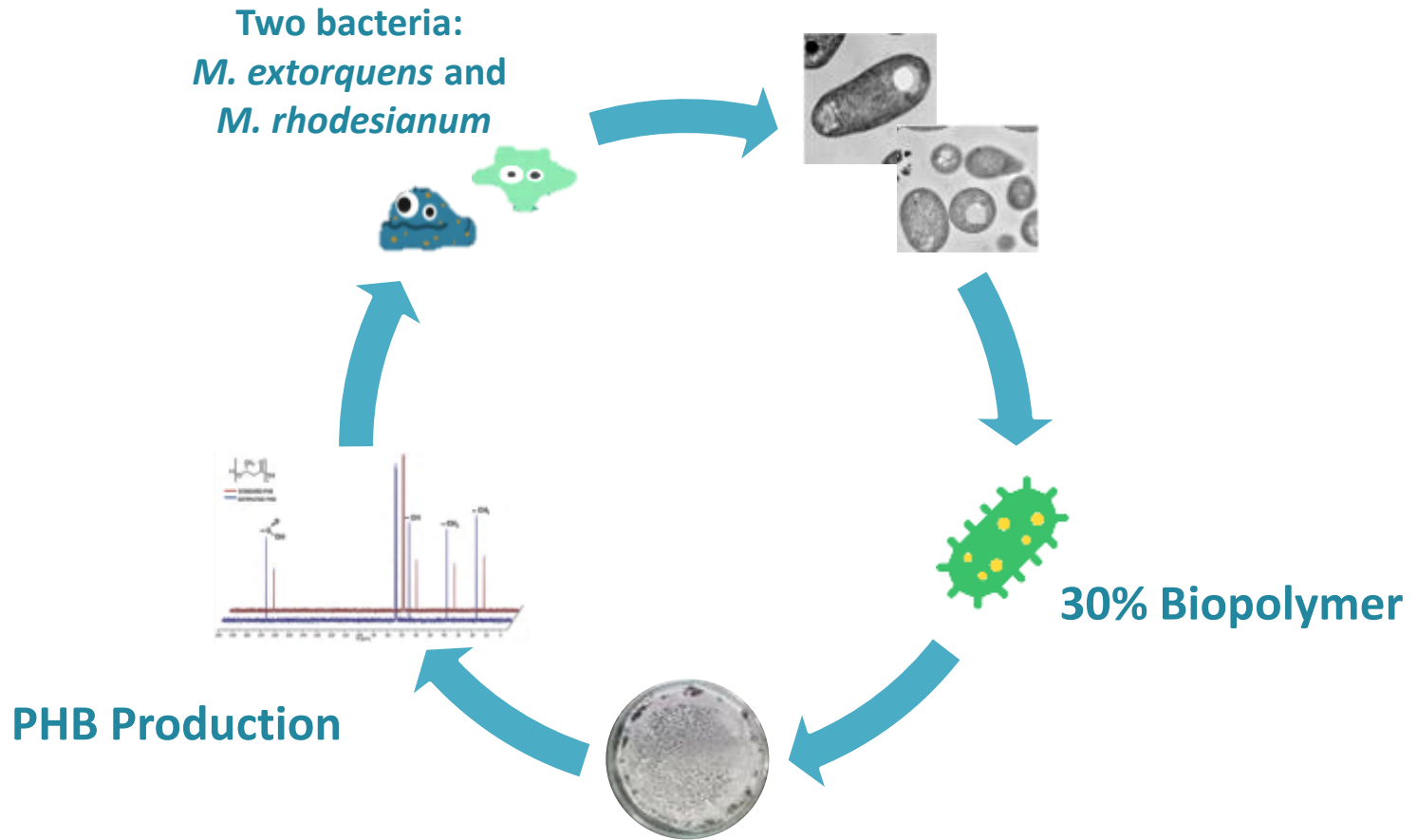
FINISHED ACTIVITIES

METHANOL



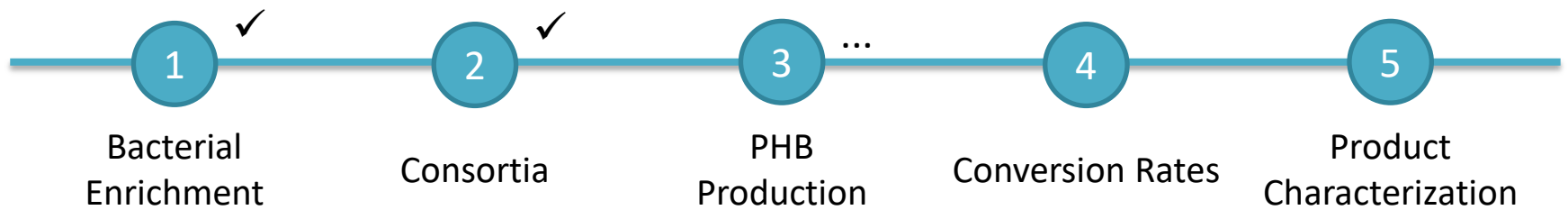
FINISHED ACTIVITIES

METHANOL



PLANNED ACTIVITIES

METHANE



MATERIAL AND METHODS

METHANOTROPHS BACTERIAS ENRICHMENT



Enrichment with methane for 40 days
10 to 70% CH₄: air atmosphere



Seven bacteria consortia

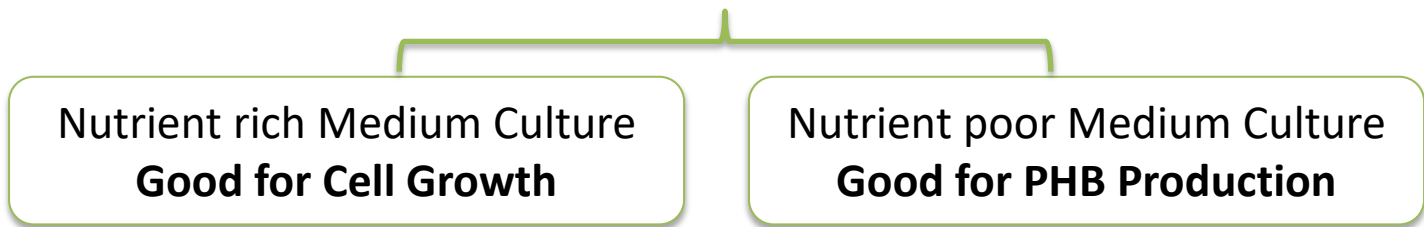


MATERIAL AND METHODS

PHB Production Experiments with CH₄

Large scale experiments with consortia
Different methane to air concentrations

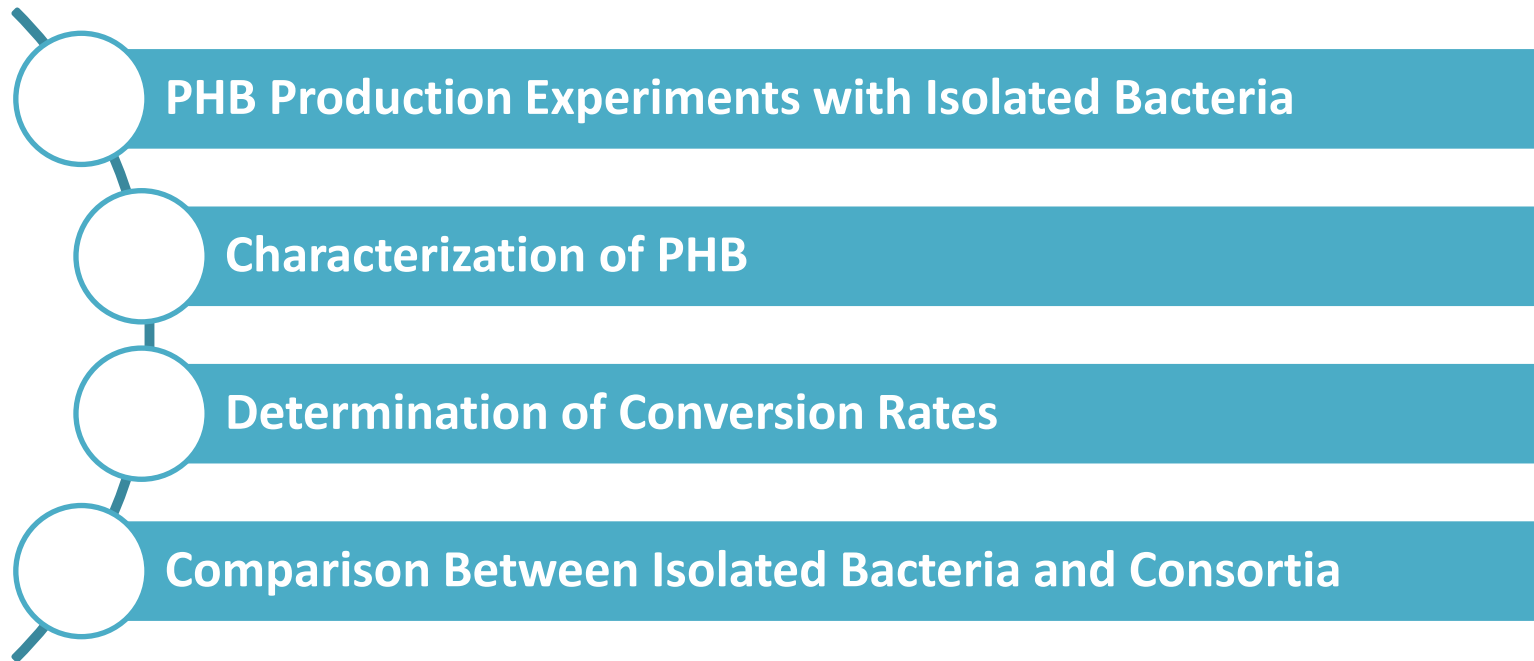
Two different approaches:



PHB production evaluation:

Lipophilic dyes Nile Red

NEXT STEPS



2018 Publications

- **pH Effect on the Production of PHB by *M. extorquens* isolated from Estuarine Environment.** CARDOSO, L. O. B.; KAROLSKI, B.; PERPETUO, E. A.; NASCIMENTO, C. A. O. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Methane Influence on Algae Growth.** GRACIOSO, L. H. ; CARDOSO, L. O. B.; BORREGO, B. B.; KAROLSKI, B.; PERPETUO, E. A. ; NASCIMENTO, C. A. O.; GIUDICI, R. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Isolation of Bacteria Tolerant to High Concentrations of CH₄.** BORREGO, B. B.; GRACIOSO, L. H.; KAROLSKI, B.; CARDOSO, L. O. B.; PERPETUO, E. A.; GIUDICI, R. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Isolation of Baixada Santista mangrove algae tolerant to high concentrations of CO₂.** PERPETUO, E. A.; BORREGO, B. B.; GRACIOSO, L. H. ; KAROLSKI, B.; CARDOSO, L. O. B.; NASCIMENTO, C. A. O. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Bioprospection of Mangrove Bacteria Producing PHB by MALDI-TOF Technique.** KAROLSKI, B.; CARDOSO, L. O. B.; GRACIOSO, L. H.; BORREGO, B. B.; PERPETUO, E. A.; NASCIMENTO, C. A. O.

2018 Awards

- **pH Effect on the Production of PHB by *M. extorquens* isolated from Estuarine Environment.** CARDOSO, L. O. B.; KAROLSKI, B.; PERPETUO, E. A.; NASCIMENTO, C. A. O. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018. **BEST POSTER**
- **Methane Influence on Algae Growth.** GRACIOSO, L. H. ; CARDOSO, L. O. B.; BORREGO, B. B.; KAROLSKI, B.; PERPETUO, E. A. ; NASCIMENTO, C. A. O.; GIUDICI, R. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Isolation of Bacteria Tolerant to High Concentrations of CH₄.** BORREGO, B. B.; GRACIOSO, L. H.; KAROLSKI, B.; CARDOSO, L. O. B.; PERPETUO, E. A.; GIUDICI, R. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018. **HONORS**
- **Isolation of Baixada Santista mangrove algae tolerant to high concentrations of CO₂.** PERPETUO, E. A.; BORREGO, B. B.; GRACIOSO, L. H. ; KAROLSKI, B.; CARDOSO, L. O. B.; NASCIMENTO, C. A. O. Symposium of Marine Biotechnology, Arraial do Cabo - RJ, 2018.
- **Bioprospection of Mangrove Bacteria Producing PHB by MALDI-TOF Technique.** KAROLSKI, B.; CARDOSO, L. O. B.; GRACIOSO, L. H.; BORREGO, B. B.; PERPETUO, E. A.; NASCIMENTO, C. A. O. **BEST ORAL PRESENTATION**



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THANK YOU



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