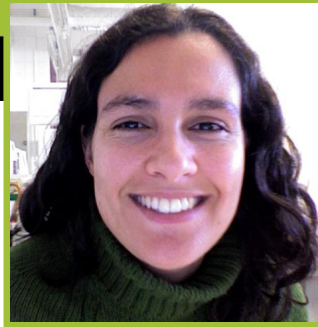


Chemistry Department

PHA production in mixed photosynthetic cultures

Biochemical and Process Engineering Group



Joana Fradinho

PhD Student

- Photosynthetic mixed cultures
- Arsenic and Mercury removal from drinking water
- Degree in Biological Engineering (5 years)
- Total articles = 5

Objectives

Wastewater treatment and Industrial wastes valorization through PHA production using mixed photosynthetic cultures:

- influence of operational system in culture selection
- evaluation of PHA accumulation capacity of different enriched mixed photosynthetic cultures
- assessment of the impact factor of different carbon sources, light intensity and illumination patterns in cultures' PHA accumulation capacity
- analysis of culture dynamics in response to operational adjustments

Methodology

- Photosynthetic bioreactors are utilized for the enrichment of photosynthetic mixed cultures in PHA accumulating organisms (Fig. 1)
- Feast and Famine strategies allow the enrichment of PHA accumulating photosynthetic mixed cultures (Fig. 2)
- Microbial techniques allow the observation of PHA inclusions (Nile Blue, Fig. 3) and identification of microorganisms by Fluorescence *in situ* hybridization (FISH, Fig. 4)

Expected Results

New photosynthetic PHA production systems:

- achievement of PHA accumulation levels similar to the ones exhibited by current mixed aerobic cultures
- production of PHA with similar characteristics to commercial plastics
- optimized illumination supply for decreased production costs

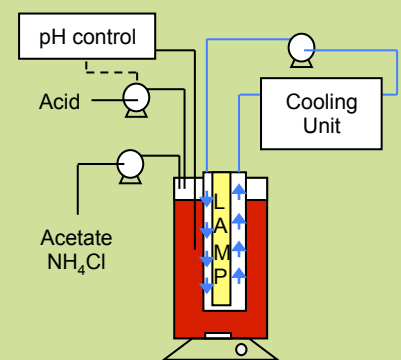


Fig. 1 – Schematic of photosynthetic bioreactor

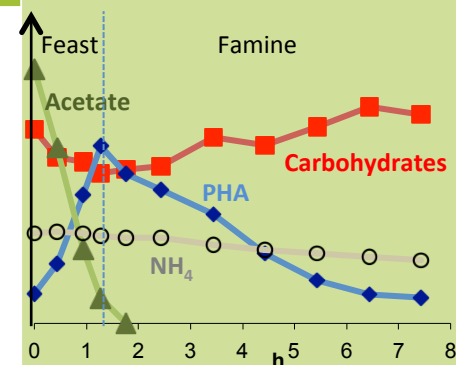


Fig. 2 – Feast and Famine profile

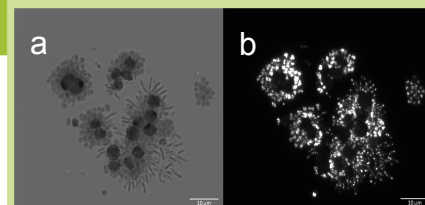


Fig. 3 – Microscopic image: a) Bright field, b) Nile Blue

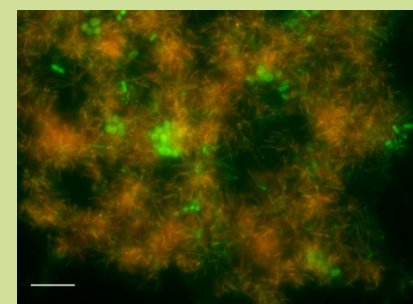


Fig. 4 – Fluorescence *in situ* hybridization