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The Effects of Light Intensity and Cell Structure on the Cultivation of Arthrospira platensis

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THE EFFECTS OF LIGHT INTENSITY AND CELL STRUCTURE ON THE CULTIVATION OF *ARTHROSPIRA PLATENSIS*

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PURPOSE

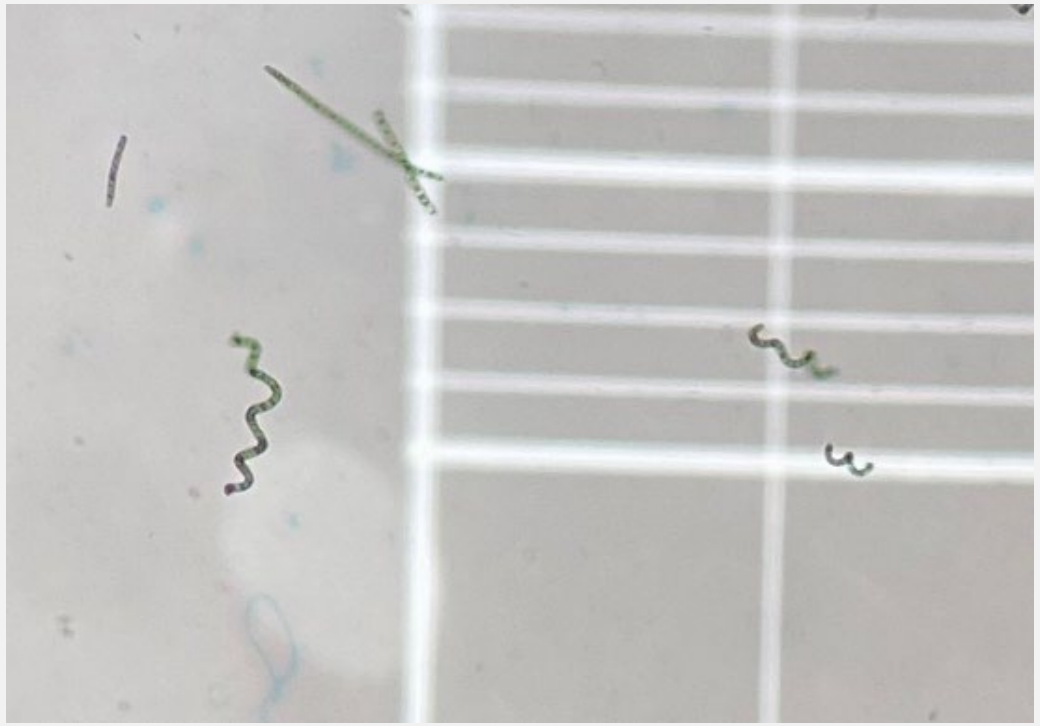
WHY SPIRULINA?

- Spirulina is a superfood
- 50-70% protein content
- Carbon dioxide → oxygen
- Algae > livestock

CELL STRUCTURE

COILED

STRAIGHT



PAST RESEARCH

Studying the difference of light intensities on cultivation

OUR GOAL

Studying the difference of *cell structure* in different light intensities on oxygen production and cultivation

EXPERIMENTS

MATERIALS

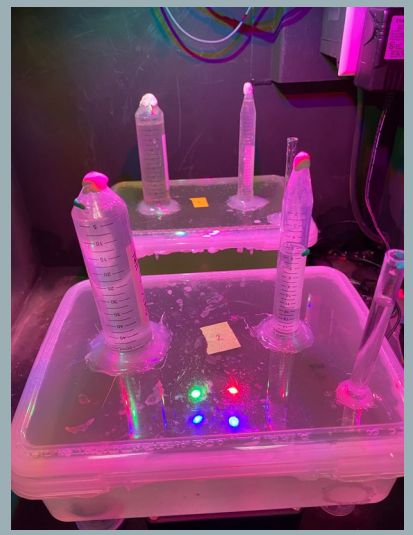
- 6 oxygen-monitoring containers:
  - 50 mL & 15 mL collection tubes & a clear plastic straw
- Two differently structured spirulina cultures:
  - The Mix original culture contained coiled and straight spirulina at a roughly 50/50 ratio. The Coiled original culture consisted purely of coiled spirulina.
- Zarrouk nutrient media
- 3 different light intensities:
  - 51µmol/m^2/s ; 25µmol/m^2/s ; 12µmol/m^2/s

METHODS

51µmol/m²/s

25µmol/m²/s

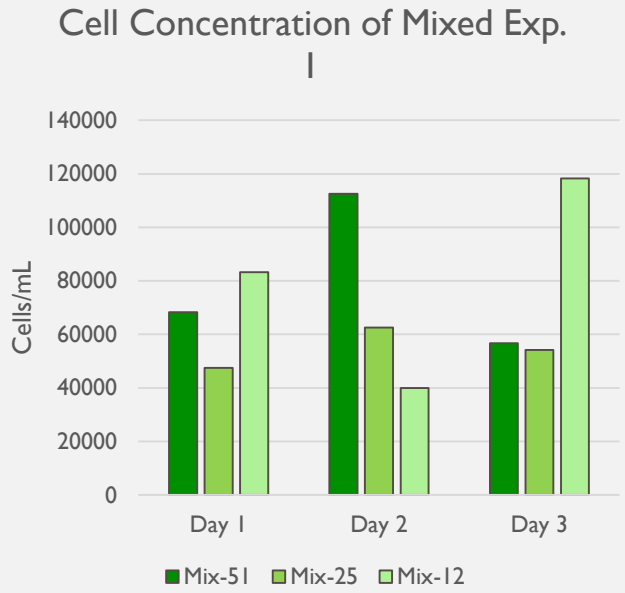
12µmol/m²/s

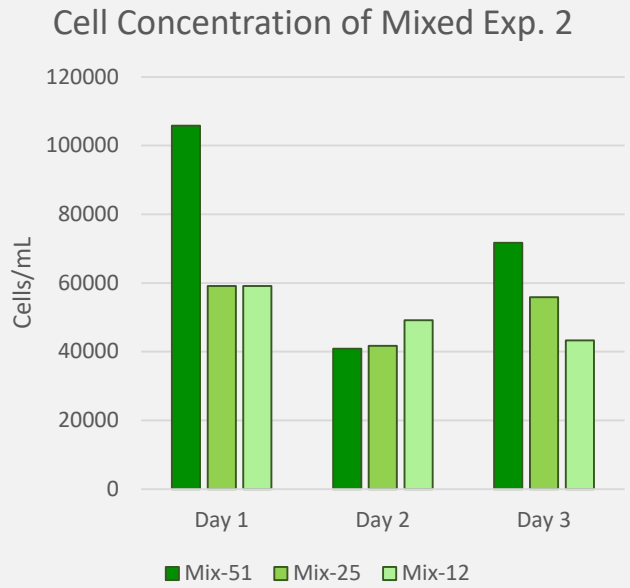


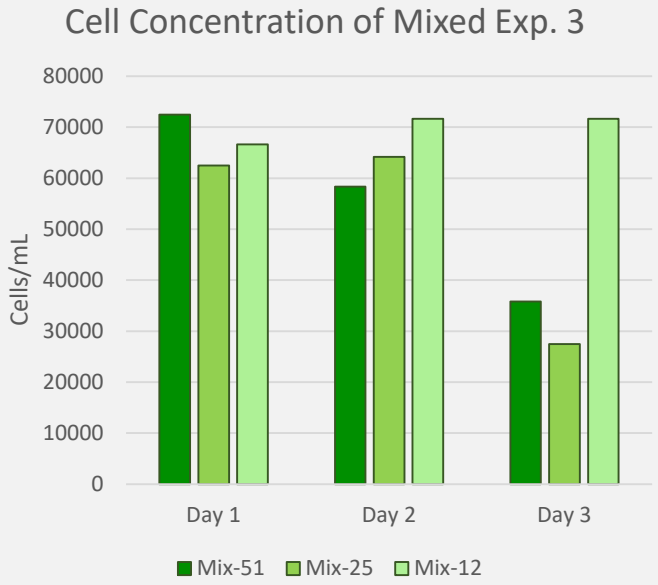
- Original cultures were maintained at a pH of 10 at 30°C and given 50 mL of nutrient media daily.
- 6 experiment containers: 3 of each culture type.
- Given 3 mL of nutrient media daily and placed under the different light intensities.
- Data was collected at the 24, 48, & 72 hour marks

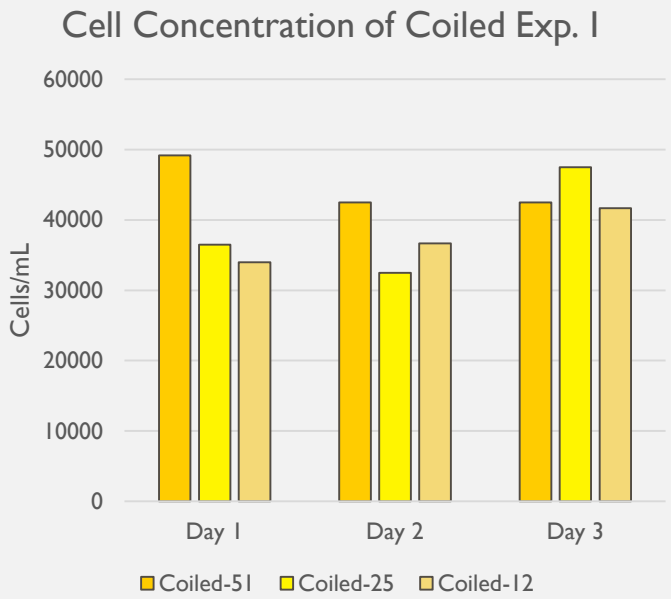
RESULTS

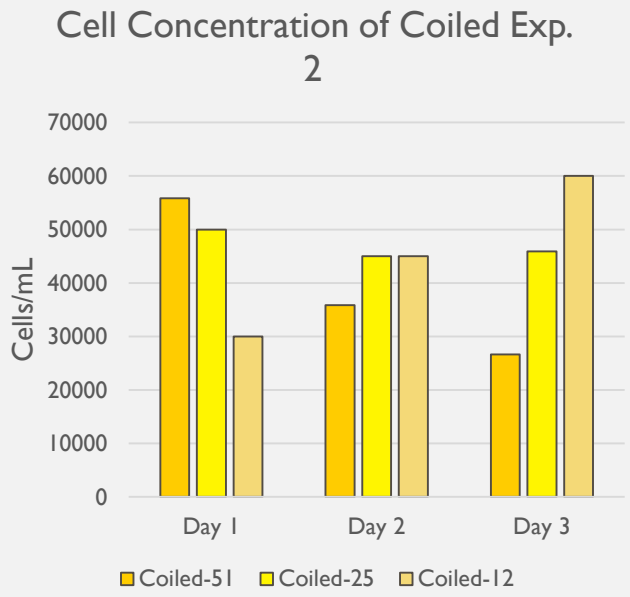
Cell Concentration

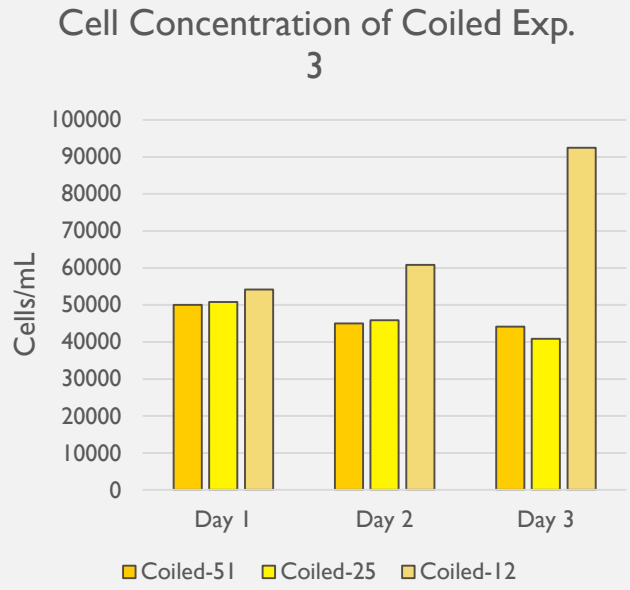




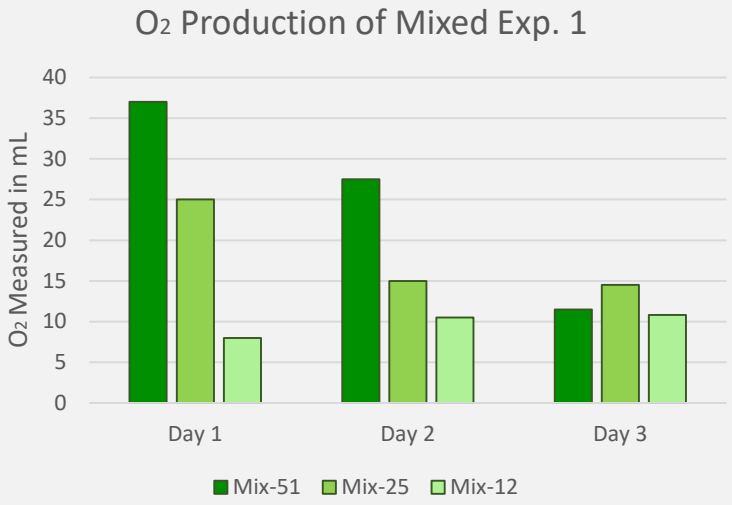


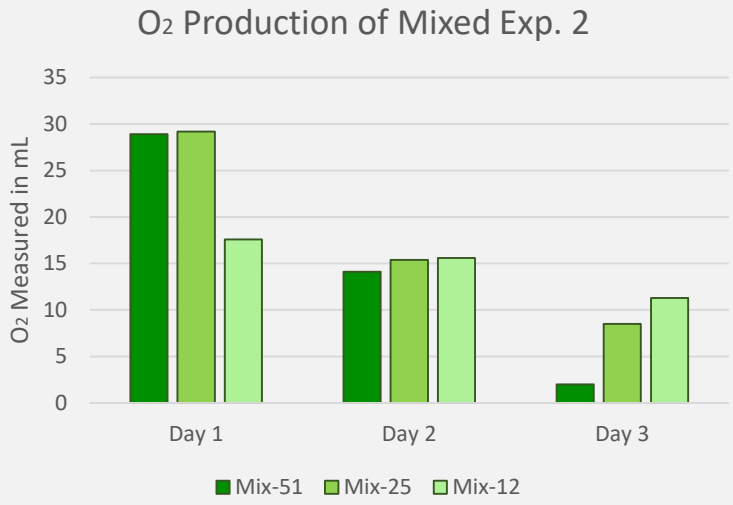


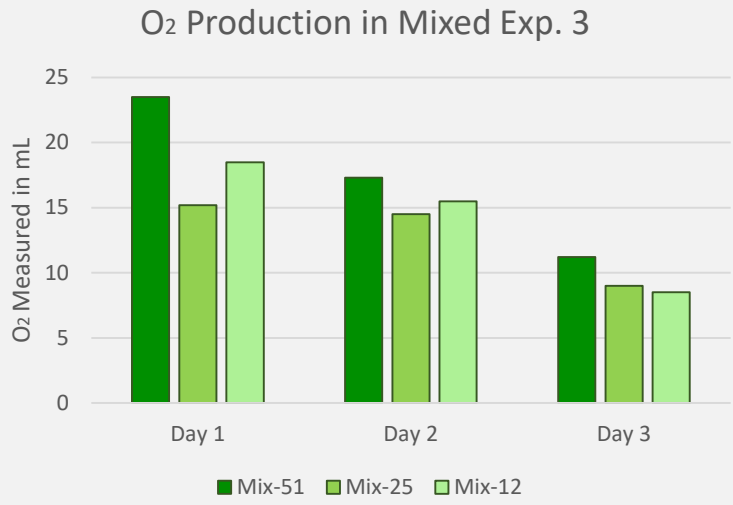


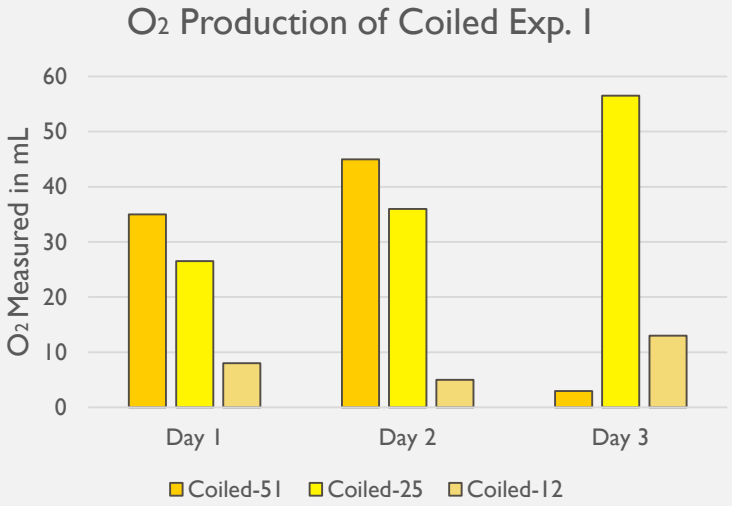


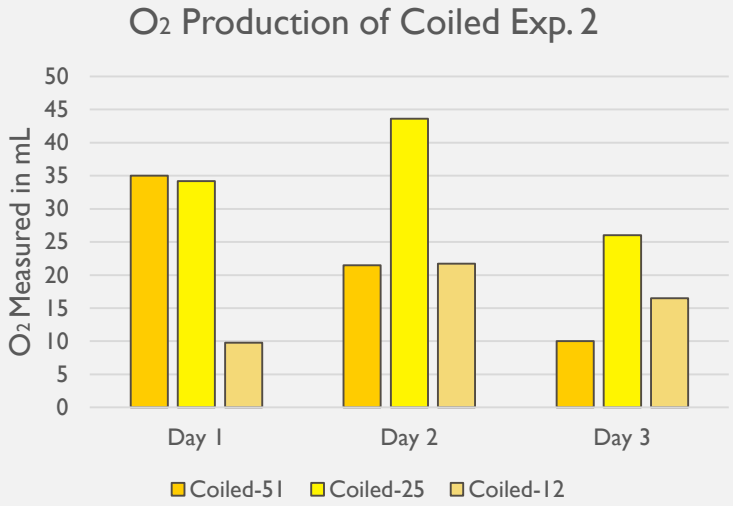
Oxygen Production

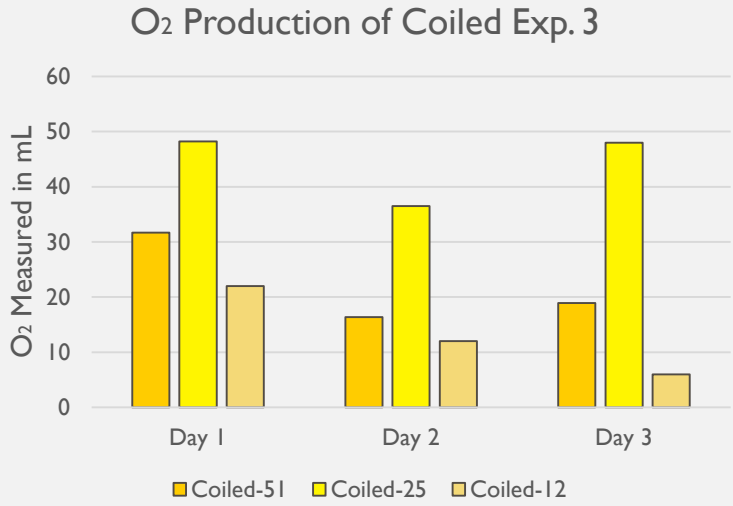












Oxygen Production

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Cell Concentration

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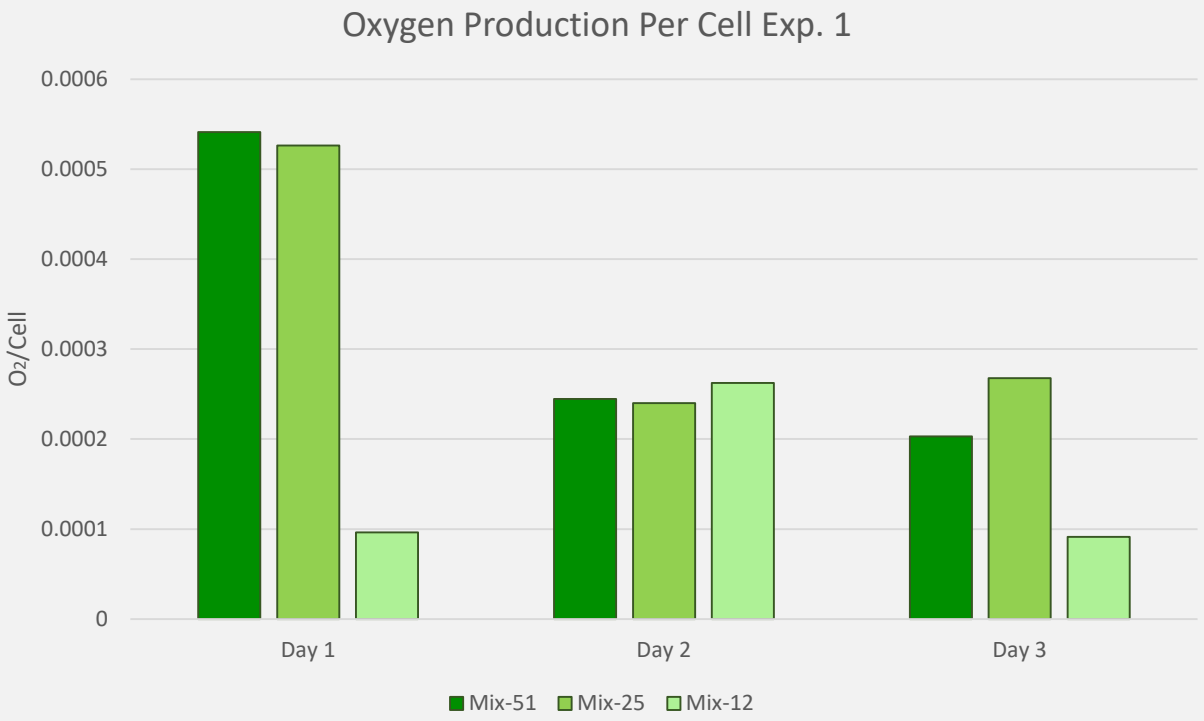
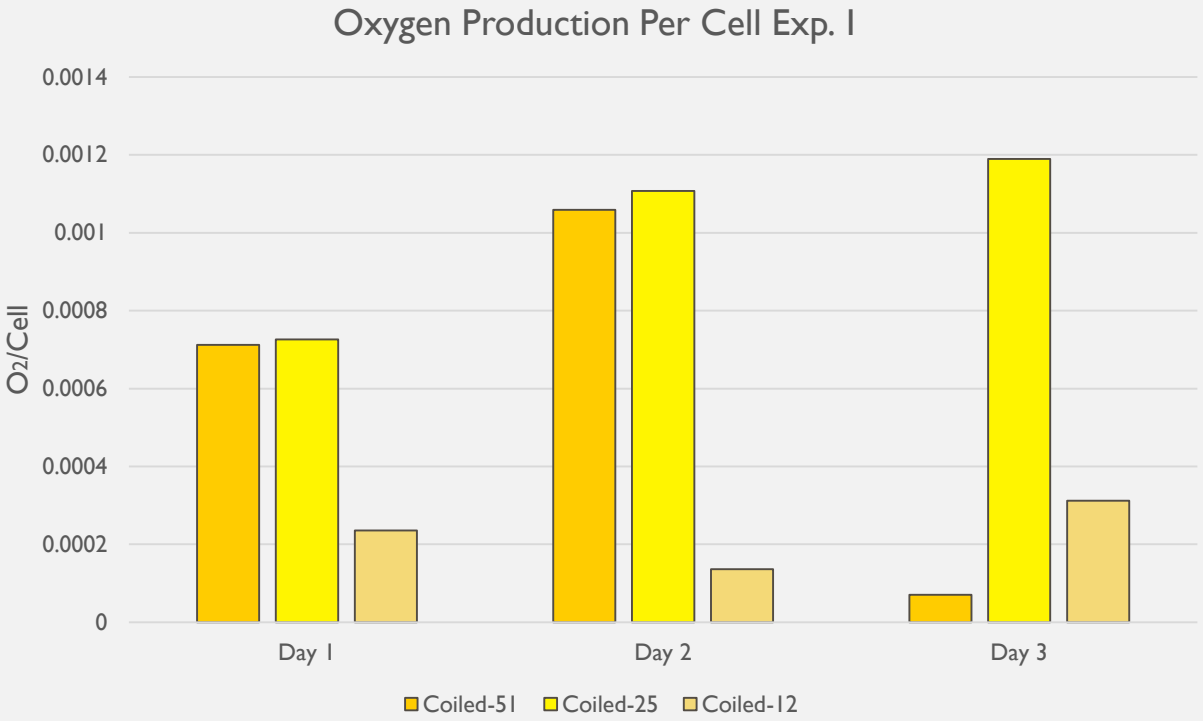
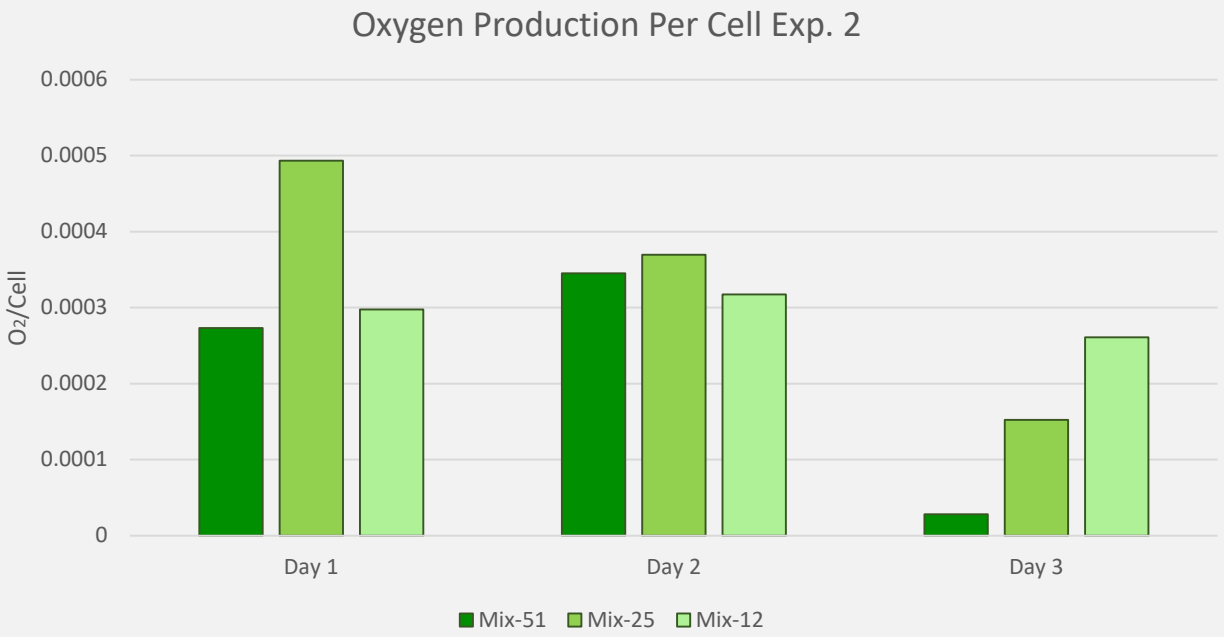
Oxygen Produced per Cell

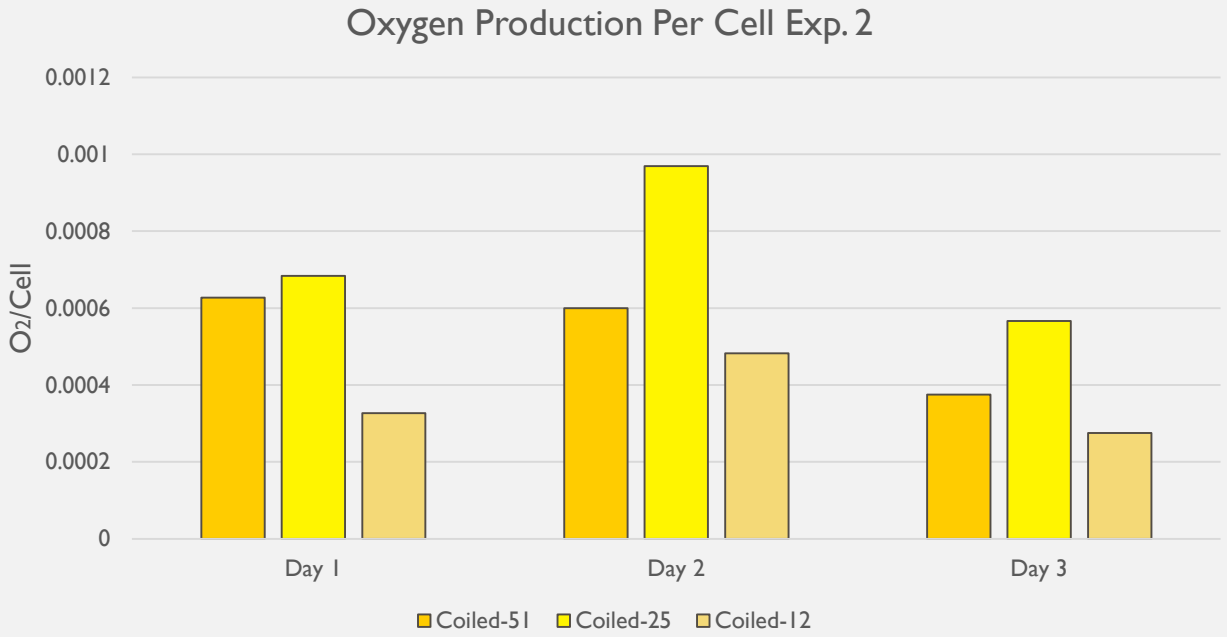
Exp 1 – Oxygen Produced Per Cell



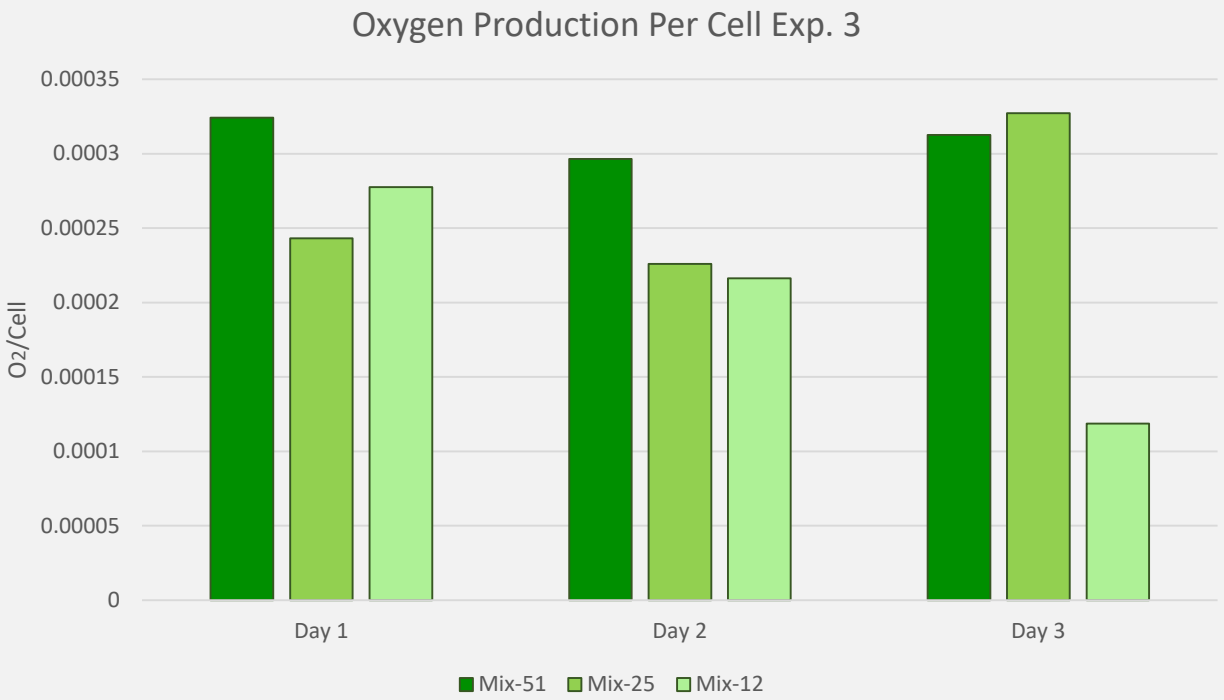


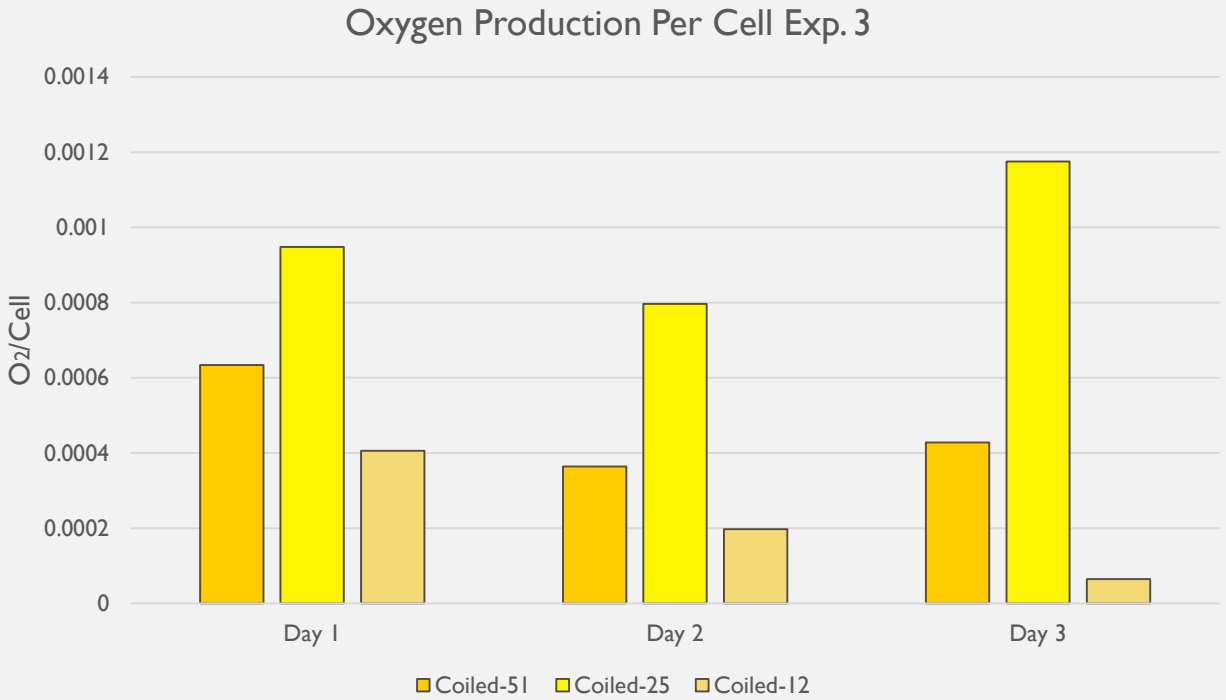
Exp 2 – Oxygen Produced Per Cell





Exp 3 – Oxygen Produced Per Cell





CONCLUSIONS

- There is a difference.
- But why?
  - Protein content difference
  - Structure difference

NEXT STEPS

- Red light → a more cost-effective alternative
- Longer experimental duration
- More testing on the different cell structures

Acknowledgements

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QUESTIONS?