Supplementary Material

**Modeling approaches to nitrogen management**

**for food production in closed, life-support systems**

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# Supplementary Data

**Supplementary Table 1.** Results from Hach Kit analyses on *Rhodopseudomonas palustris* nifA\* biomass demonstrates a nitrogen mass fraction of dry biomass between 12.0 and 20.5%. A fraction of 17% was subsequently assumed for Table S2 calculations

|  |  |  |
| --- | --- | --- |
| **Sample:** | **% N of Wet:** | **% N of Dry:** |
| Acetate Standard 1 | 1.20% | 12.0% |
| Acetate Standard 2 | 1.44% | 14.4% |
| Acetate Standard 3 | 2.05% | 20.5% |
| Wastewater 1 | 1.87% | 18.7% |
| Wastewater 2 | 1.87% | 18.7% |
| Wastewater 3 | 1.68% | 16.8% |
| **Average % N of Dry:** |  |
| Acetate: | 15.7% |
| Wastewater: | 18.1% |

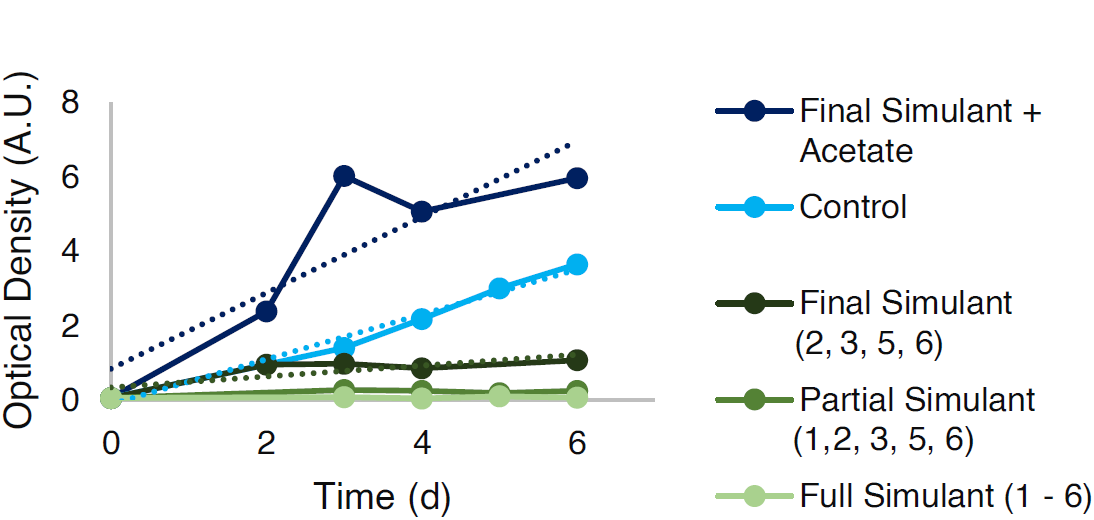
**Supplementary Table 2.** Results from reactor harvests in which a rate of N fixation was calculated, averaging between 13-14 g N / L day in the systems provided. A conservative estimate of 13 mg N / L day was assumed in the model.



# Supplementary Figures



**Supplemental Figure 1.** 3L anaerobic reactors utilized for *Rhodopseudomonas palustris* growth studies



**Supplementary Figure 2.** Results of tests in which *Rhodopseudomonas palustris* was grown using a Johnson center wastewater recipe and compared to controls using 60 mM acetate with or without wastewater components. Comparing the slopes of the simulant + acetate curve with that of the control curve yields a value of approximately 1.6.

Graphical user interface, text, application

Description automatically generated

**Supplementary Figure 3.** Results of different N management simulations demonstrating an increasing performance from the combined NFR regiment with increasing reactor volume