Algae Growth Studies

Objectives: To determine the growth characteristics of a select algae species

Algae Species: *Chlorella vulgaris*

Algae Media for Growth:

Nitrogen-Greenway Biotech Inc Urea 46-0-0
Phosphate-Hi-Yield Triple Super Phosphate 0-45-0

Equipment:

2- 125mL Flask
Mortar and Pedestal
Pipette with Tip
Nitrogen (0.1 g)
Phosphate (0.075 g)
Weighing Dish
100 mL beaker
30 mL Beaker
Tin Foil

Supplies

Spectrophotometer
Thermometer
pH Kits
Aquarium Pump with Tubing and Air Stone
Light Meter
Kimwipes
23 Watt Compact Fluorescent Bulbs
Scale

Safety: Gloves are to be worn during the sample handling process

Method:

1. **Weigh 0.075 g Crushed Phosphate**
2. **Weigh 0.1 g Nitrogen**

} **Will be provided in solution titled Nutrient Media**

3. Add nutrients to 125mL flask
4. Add 30mL algae
5. Swirl algae for 30 seconds
6. Pour 90 mL nutrient media water in flask and stir for 1 minute
7. Take initial Absorbance reading (Optical density OD)-set to 625nm
8. Add air diffuser to sparge air into sample
9. Cover top of flask with tin foil
10. Plug in aerator
11. Label Beakers and place on stir place
12. Take readings for optical density every day preferably at the same time (All groups need to maintain this schedule)
13. Convert optical density to algae dry weight using relation provided below
    Algae dry weight (grams) = 0.0318*optical density
14. Use excel to plot algae dry weight as a function of time in days
15. Calculate growth rate μ (1/days)

Raw Data Worksheet

Date	Time	OD Daily	Comment

EXCEL DATA SAMPLE

Time days	OD	Algae Mass grams
0		
1		
2		
3		
4		
5		
6		
7		

Algae growth rate can be calculated using the following relationship

$$ln\frac{X}{Xo} = \mu t$$

where X is algae mass at time t and Xo is algae mass at time 0
μ is growth rate in 1/time
t = time in days

Plot natural log of algae mass on y axis and plot time on x axis
The data has to be picked from the exponential phase (do not plat all data)

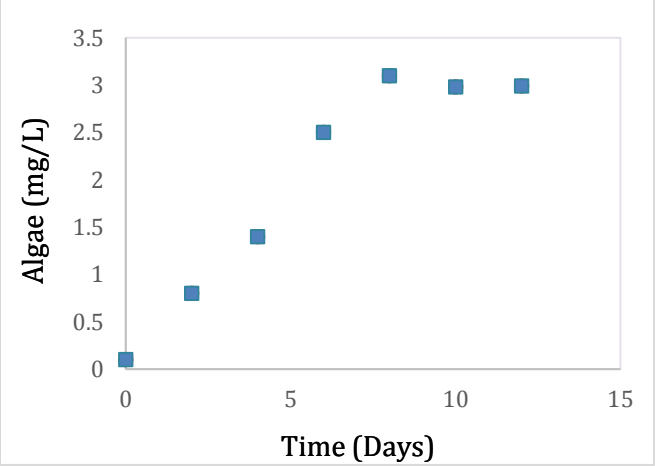
Slope of the line is the growth rate

See sample data next page

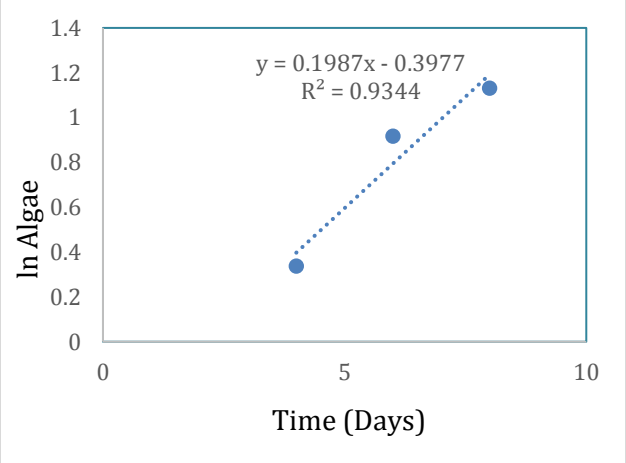
Sample data

Time (days)	Algae(g)	ln(algae)
0	0.1	
2	0.8	
4	1.4	0.336472
6	2.5	0.916291
8	3.1	1.131402
10	2.98	1.091923
12	2.99	1.095273

Raw data plot for Algae Biomass with Time



Natural log of Algae Biomass with Time during exponential phase



Growth rate from slope = 0.1987 1/days