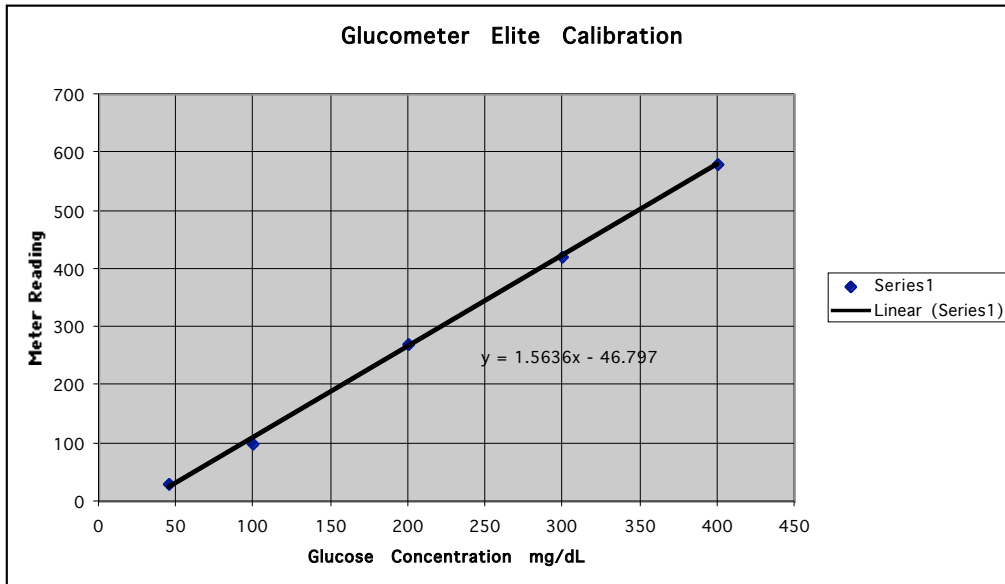


Names: _____
 Chem 227 / Dr. Rusay / Flatulence Lab Questions



Data Tables:

<i>Flatulence: Beano-Enzyme Kinetics Data</i>				
<i>Chem 227: Class Data-04 4/29</i>				
<i>Sugar Source</i>	<i>Concentration</i>	<i>Reading</i>	<i>Temperature</i>	
	[S] _o	Glucometer		
[S] _o = 100mL deionized H ₂ O Extracts of 50g of produce				
	time (min)	(mg/dL)	(oC)	
(lo = below detection limit)				
Split Green Peas	[S] _o			25
	5	110		
	15	402		
	25	526		
	35	582		
	45	574		
	[S] _o + 0.1M HCl			
	25	110		25
	0.25[S] _o			25
	10	68		
	20	131		
	30	151		
	40	149		

Red Kidney Beans	0.5[S]o			25
		3	32	
		14	41	
		17	53	
		40	52	
	0.5[S]o			35
		12	63	
		28	74	
		36	69	
		45	74	
	0.5[S]o			
		4	lo	100
Lentils	0.25[S]o			35
		9	42	
		18	48	
		27	45	
		37	48	
	0.5[S]o			35
		9	80	
		19	78	
		28	67	
		38	87	
Broccoli	[S]o			25
		27	lo	
	[S]o			35
		10	lo	
		20	lo	
		30	lo	

Lab Questions:

1. Draw a Haworth structure for sucrose.

2. Draw Fisher formulas for the un-cyclized forms of D-glucose and D-fructose.

3. Draw a Haworth structure for the α -anomer of D-glucose.

4. What are the respective molecular formulas of a) verbascose, b) stachyose, and c) raffinose?

verbascose:

stachyose:

raffinose:

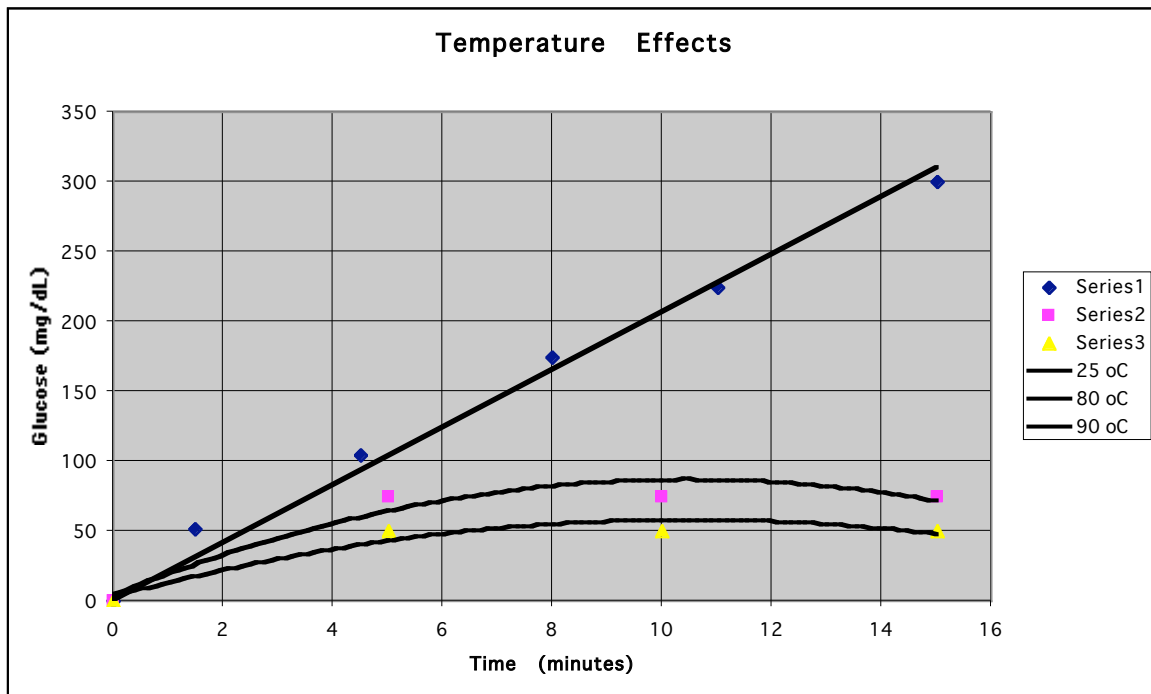
5. How many grams of galactose would be produced by complete hydrolysis of 5 mmol of a) verbascose, b) stachyose, and c) raffinose respectively? Show your calculations.

verbascose:

stachyose:

raffinose:

Part II:



6. Consider the above graph. Would *Beano* work as well if added to foods before cooking? Estimate the optimum temperature for *Beano* performance. Explain your answers.
7. Using Michaelis-Menton principles of enzyme kinetics, write the reaction steps that represent the mechanism using E to represent the enzyme and S for the saccharide substrate,

8. Interpreting the data and graphs, provide statements with specific reference to the data as to what are the effects on the rate of enzymatic activity caused by:
- Increased temperature:
- Increased solution concentrations:
9. Rank the foods in order of the increasing amounts of raffinose sugars.
10. What volume of gas could gastrointestinal bacteria theoretically produce from complete fermentation of 10 mmol of stachyose? Clearly state your assumptions and show your calculation.
11. An Englishman preferred green pea soup, a person from Mexico preferred refried beans, a person from India preferred Dahl made from lentils, and a health conscious American preferred steamed Broccoli. If they all ate the same relative amount of their preferred food at a large party, who would have the most difficult time being socially and politically correct?

GRAPHS

