EXERCISES

Zinc

Standards

Zinc Concentration/mg L^{-1}	Absorbance
0.000	-0.0003
0.250	0.1272
0.500	0.2074
0.750	0.2849
1.000	0.3755

Sample: 10.066 g of maple syrup in water to make 100.0 mL of solution

Absorbance
0.3058
0.3118
0.3125
0.3147

1. Determine the equation for the standards (*A* vs *C*)

2. Determine the concentration of zinc (in mg/L) in each of the four samples and the average zinc concentration.

3. How much zinc is in one daily serving (1/4 cup; 60 mL; 79.8 g)?

4. If the Daily Value of zinc is 15 mg, what is the Percent Daily Value in one serving?

EXERCISES

Calcium

Standards

Calcium Concentration/mg L^{-1}	Absorbance
0.00	-0.0003
5.00	0.1671
10.00	0.2898
15.00	0.4003
20.00	0.5082

Sample: 0.947 g of maple syrup in water to make 100.0 mL of solution

Absorbance
0.3063
0.3098
0.2667
0.3102
0.3108

1. Determine the equation for the standards (*A* vs *C*)

2. Determine the concentration of calcium (in mg/L) in each of the five samples and the average calcium concentration.

3. How much calcium is in one daily serving (1/4 cup; 60 mL; 79.8 g)?

4. If the Daily Value of calcium is 1000 mg, what is the Percent Daily Value in one serving?

5. Extra Question. Should the third value be discarded?

EXERCISES

Copper

Standards

Copper Concentration/mg L^{-1}	Absorbance
0.000	-0.0008
0.250	0.0284
0.500	0.0521
0.750	0.0766
1.000	0.996

Sample: 10.066 g of maple syrup in water to make 100.0 mL of solution

Absorbance
0.0057
0.0054
0.0053
0.0057

1. Determine the equation for the standards (*A* vs *C*)

2. Determine the concentration of copper (in mg/L) in each of the four samples and the average copper concentration.

3. How much copper is in one daily serving (1/4 cup; 60 mL; 79.8 g)?

4. If the Daily Value of copper is 2 mg, what is the Percent Daily Value in one serving?

EXERCISES

Potassium

Standards

Potassium Concentration/mg L^{-1}	Absorbance
0.00	-0.0003
1.50	0.1272
3.00	0.2074
4.50	0.2849

Sample: 0.212 g of maple syrup in water to make 100.0 mL of solution

Absorbance
0.9645
0.9500
0.9614
0.9785
0.9890

1. Determine the equation for the standards (*A* vs *C*)

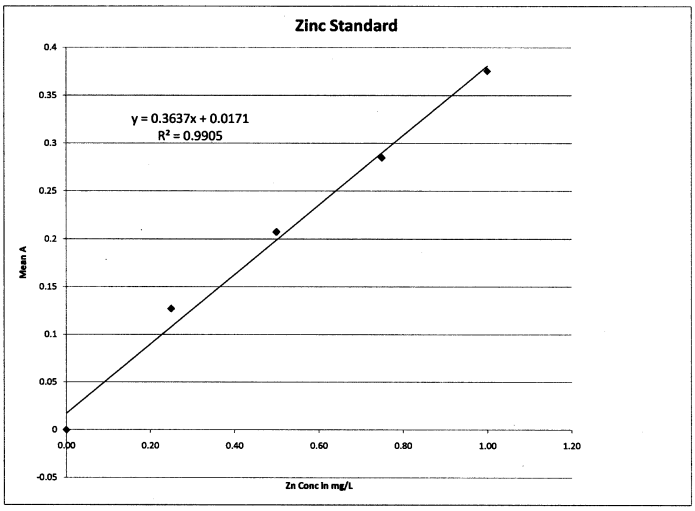
2. Determine the concentration of potassium (in mg/L) in each of the five samples and the average potassium concentration.

3. How much potassium is in one daily serving (1/4 cup; 60 mL; 79.8 g)?

4. If the Daily Value of potassium is 3500 mg, what is the Percent Daily Value in one serving?

EXERCISES – ANSWERS

Zinc



1. $A = 0.3637\ C + 0.0171$
   $C = 2.750\ A - 0.0470$
2.

A	Calculated C/mg L^{-1}
0.3058	0.7940
0.3118	0.8104
0.3125	0.8124
0.3147	0.8184

Mean concentration = 0.8088 mg/L
Mass of Zn in 100 mL = 0.08088 mg

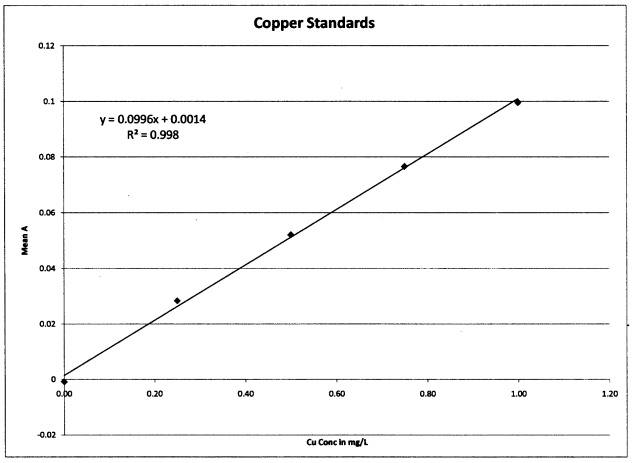
3. (0.08088 mg Zn/10.066 x 10^3 mg syrup) x 1 x 10^6
   = 8.035 mg Zn per 1 million mg syrup

   (8.035 mg Zn/1 x 10^6 mg syrup) x 79.8 x 10^3 mg syrup
   = 0.640 mg Zn in 79.8 g syrup

4. (0.640/15) x 100 = 4.3%

EXERCISES – ANSWERS

Copper



1. $A = 0.0996\ C + 0.0014$
   $C = 10.040\ A - 0.0141$
2.

A	Calculated C/mg L^{-1}
0.0057	0.0431
0.0054	0.0401
0.0053	0.0391
0.0057	0.0431

Mean concentration = 0.0414 mg/L
Mass of Cu in 100 mL = 0.00414 mg

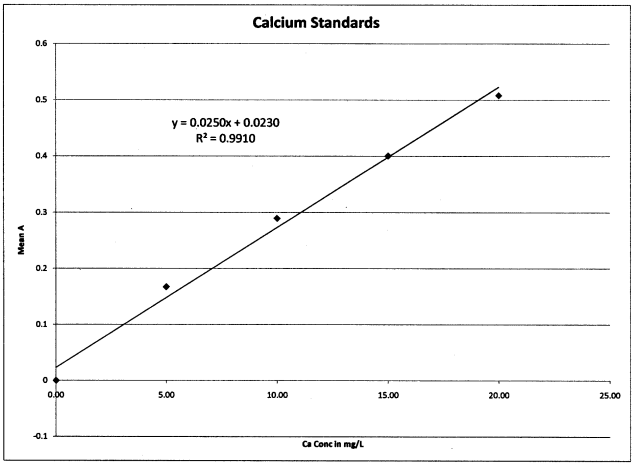
3. (0.00414 mg Cu/10.066 x 10^3 mg syrup) x 1 x 10^6
   = 0.4113 mg Cu per 1 million mg syrup

   (0.4113 mg Cu/1 x 10^6 mg syrup) x 79.8 x 10^3 mg syrup
   = 0.0328 mg Cu in 79.8 g syrup

4. (0.0328/2) x 100 = 1.6%

EXERCISES – ANSWERS

Calcium



1. $A = 0.0250\ C + 0.0230$
   $C = 40.0\ A - 0.920$
2.

A	Calculated C/mg L^{-1}
0.3063	11.33
0.3098	11.47
0.2667	9.75
0.3102	11.49
0.3108	11.51

Mean concentration = 11.11 mg/L
Mass of Ca in 100 mL = 1.111 mg

3. (1.111 mg Ca/0.947 x 10^3 mg syrup) x 1 x 10^6
   = 1173 mg Ca per 1 million mg syrup

   (1.173 mg Ca/1 x 10^6 mg syrup) x 79.8 x 10^3 mg syrup
   = 93.6 mg Ca in 79.8 g syrup

4. (93.6/1000) x 100 = 9.4%

5. A fairly simple test to answer this question is the 4*d* Test. The quantity *d* is the average deviation from the mean; absolute values of deviations must be used else the mean will be zero. If the deviation from the mean for the suspected value is more than 4*d*, the value should be discarded.

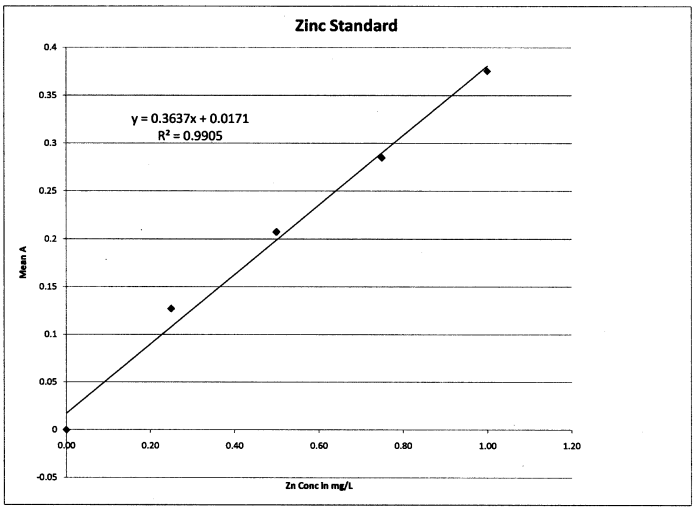
Calculated *C*/mg L^{-1}	*d*/mg L^{-1}
11.33	0.22
11.47	0.36
9.75	1.36
11.49	0.38
11.51	0.40
Mean = 11.11	Mean = 0.54

4*d* = 4 x 0.54 = 2.16

The deviation of the suspected point is not greater than 2.16 so the value should be retained.

EXERCISES – ANSWERS

Potassium



1. $A = 0.2399\ C + 0.008$
   $C = 4.168\ A - 0.0033$
2.

A	Calculated C/mg L^{-1}
0.9645	4.016
0.9500	3.956
0.9614	4.004
0.9785	4.075
0.9890	4.119

Mean concentration = 4.050 mg/L
Mass of K per 100 mL – 0.4050 mg

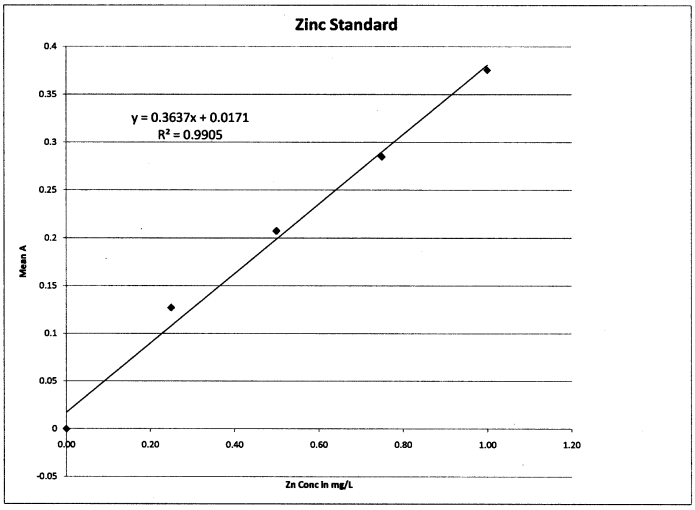
3. (0.4050 mg K/0.212 x 10^3 mg syrup) x 1 x 10^6
   = 1910 mg K per 1 million mg syrup

   (1.910 mg K/1 x 10^6 mg syrup) x 79.8 x 10^3 mg syrup
   = 152.4 mg K in 79.8 g syrup

4. (152.4/3500) x 100 = 4.4%

EXERCISES – ANSWERS

Zinc



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EXERCISES – ANSWERS

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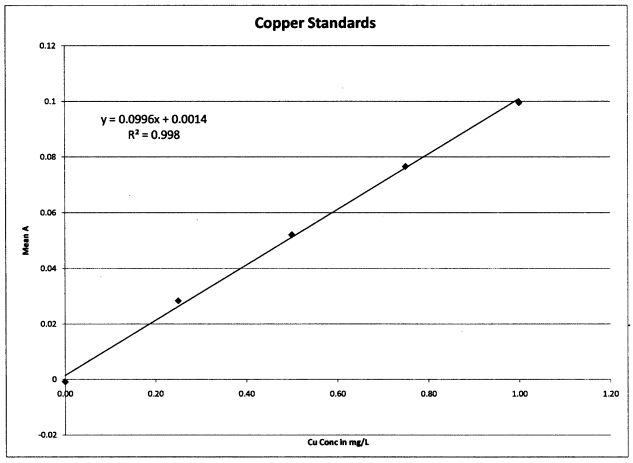

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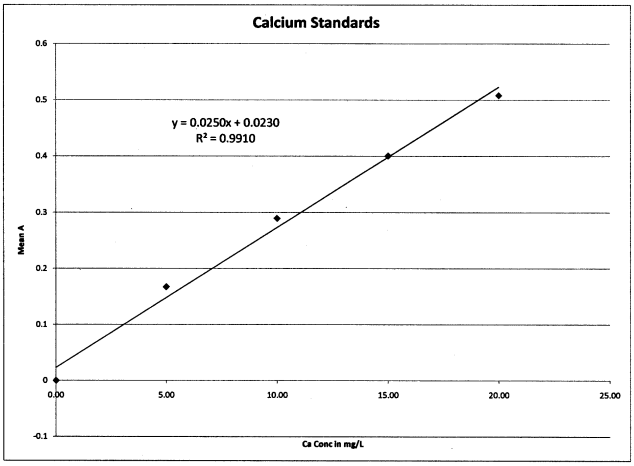

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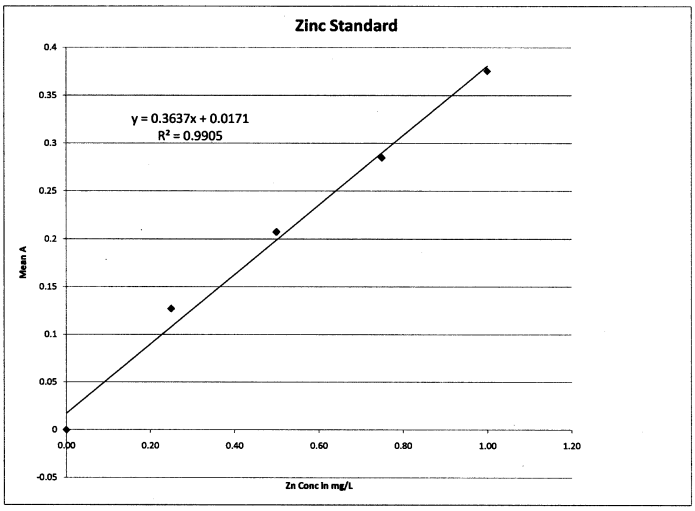

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