



Overview

The concentration of ascorbic acid (vitamin C) in cranberry juice was determined on the Orion 960 Autochemistry System by using the first derivative titration technique with an Orion Combination Redox Electrode and iodine as the titrant. The Orion 960 determines the endpoint and calculates the concentration of ascorbic acid.

Market	Food and Beverage	Species Measured	Ascorbic acid
Sample	Cranberry Juice	Sample Size	20 mL
		Typical Concentration	>= 250 mg/L
Technique #	6 First Derivative	Electrode	Combination Redox 9678BN
Solutions	0.01M iodine titrant (dissolved in 0.01M KI); 0.1M sodium thiosulfate; Orion 900001 redox electrode filling solution		
Solutions preparation:	To prepare 0.01 M iodine, dissolve 1.27 g of iodine and 0.83 g potassium iodide in 500 mL water or buy standardized solution. Store iodine in a brown-glass bottle.		
Titrant standardization	Titrate 0.30 mL of 0.1 N sodium thiosulfate standard solution diluted to 50 mL with DI. Use technique 11, set the reaction ratio of 2, and change the default settings as follows: "Increments by" 0.2 mL and "Max total titrant" to 10mL.		
Sample Prep	Accurately pipette 20 mL of sample into titration beaker. Add 30 mL of the deionized water into the beaker.		
Statistics			
# of Trials	3	Mean	349.97 mg/L
		%CV	0.82 %
		Analysis Time	7.9 minute(s)
Comments	Rinse the electrodes, stirrer, and dispenser probe thoroughly between measurements with deionized water.		

Method Parameters

Sample Volume/Weight	20 mL	Timed or Stability Readings	6.0 second(s) timed
Constant Increment	0.100 mL	Number of Endpoints	1
Max Titrant Volume	4 mL	Desired Units	mg/L
Molecular weight	176.12	Predose	1 mL
Prestir	1 second	Additional Parameters	
Reaction Ratio	1		



Thermo SCIENTIFIC

Potentiometric Titration Application Notes

Applications Log # 706

Results

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METHOD 6 SUMMARY
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SAMPLE ID NUMBER: 3
TEST: Cranberry Juice
SITE: ANALYST:
  
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1728 11-22-06 ELECTRODE:
1.REDOX
TECHNIQUE 6 FIRST DERIVATIVE
SAMPLE VOLUME 20.000 mL
TITRANT 01091 M of Iodine
PRE-DOSE VOLUME 1.000 mL
CONST INCREMENT 0.100 mL
MAX TITRANT VOL 4.000 mL
TIMED READINGS 6.0 sec
PRESTIR 10 sec
CONTINUOUS STIRRING
REACTION RATIO 10000
MOLECULAR WEIGHT 176.12
NO. OF ENDPPOINTS 1
CAL CONSTANT 100000
  
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electrode check: +/- 2.4 mV

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0.µ = 1.000 mL E= 156.3 mV
1.µ = 1.100 mL E= 144.3 mV
2.µ = 1.200 mL E= 133.0 mV
3.µ = 1.300 mL E= 123.4 mV
4.µ = 1.400 mL E= 115.5 mV
5.µ = 1.500 mL E= 108.7 mV
6.µ = 1.600 mL E= 103.5 mV
7.µ = 1.700 mL E= 98.9 mV
8.µ = 1.800 mL E= 95.2 mV
9.µ = 1.900 mL E= 92.1 mV
10.µ = 2.000 mL E= 89.4 mV
11.µ = 2.100 mL E= 86.9 mV
12.µ = 2.200 mL E= 85.1 mV
13.µ = 2.300 mL E= 83.3 mV
14.µ = 2.400 mL E= 81.6 mV
15.µ = 2.500 mL E= 80.6 mV
16.µ = 2.600 mL E= 78.9 mV
17.µ = 2.700 mL E= 77.1 mV
18.µ = 2.800 mL E= 76.1 mV
19.µ = 2.900 mL E= 75.0 mV
  
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20.µ = 3.000 mL E= 73.7 mV
21.µ = 3.100 mL E= 72.8 mV
22.µ = 3.200 mL E= 72.8 mV
23.µ = 3.300 mL E= 72.4 mV
24.µ = 3.400 mL E= 71.1 mV
25.µ = 3.500 mL E= 73.3 mV
26.µ = 3.600 mL E= 196.9 mV
27.µ = 3.700 mL E= 376.9 mV
28.µ = 3.800 mL E= 385.8 mV
29.µ = 3.900 mL E= 389.5 mV
7.9 min
  
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FIRST DERIVATIVE ANALYSIS

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0 dE/dv = -120.0 d2E/dv2 = 35.0
1 dE/dv = -116.5 d2E/dv2 = 77.5
2 dE/dv = -104.5 d2E/dv2 = 145.0
3 dE/dv = -87.5 d2E/dv2 = 155.0
4 dE/dv = -75.5 d2E/dv2 = 137.5
5 dE/dv = -60.0 d2E/dv2 = 122.5
6 dE/dv = -49.0 d2E/dv2 = 92.5
7 dE/dv = -41.5 d2E/dv2 = 75.0
8 dE/dv = -34.0 d2E/dv2 = 62.5
9 dE/dv = -29.0 d2E/dv2 = 40.0
10 dE/dv = -26.0 d2E/dv2 = 37.5
11 dE/dv = -21.5 d2E/dv2 = 40.0
12 dE/dv = -18.0 d2E/dv2 = 20.0
13 dE/dv = -17.5 d2E/dv2 = 22.5
14 dE/dv = -13.5 d2E/dv2 = 20.0
15 dE/dv = -13.5 d2E/dv2 = -20.0
16 dE/dv = -17.5 d2E/dv2 = -2.5
17 dE/dv = -14.0 d2E/dv2 = 35.0
18 dE/dv = -10.5 d2E/dv2 = 10.0
19 dE/dv = -12.0 d2E/dv2 = -2.5
20 dE/dv = -11.0 d2E/dv2 = 37.5
21 dE/dv = -4.5 d2E/dv2 = 45.0
22 dE/dv = -2.0 d2E/dv2 = -20.0
23 dE/dv = -8.5 d2E/dv2 = 32.5
24 dE/dv = 4.5 d2E/dv2 = 3187.5
25 dE/dv = 629.0 d2E/dv2 = 7567.5
26 dE/dv = 1538.0 d2E/dv2 = 1577.5
27 dE/dv = 944.5 d2E/dv2 = -7275.0
28 dE/dv = 63.0 d2E/dv2 = -4537.5
29 dE/dv = 37.0 d2E/dv2 = -260.0
  
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SAMPLE = 346.77 mg/L
END POINT VOL= 3.611 mL (240.3 mV)
Excess Titre= 0.289 mL
  
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Signal/Noise= 14

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Relative Scale
vol
=====
1.000| + *
1.094| + *
1.187| + *
1.281| + *
1.374| + *
1.468| + *
1.561| + *
1.655| + *
1.748| + *
1.842| + *
1.935| + *
2.029| + *
2.123| + *
2.216| + *
2.310| + *
2.403| + *
2.497| + *
2.590| + *
2.684| + *
2.777| *
2.871| +
2.965| *
3.058| *
3.152| *
3.245| *
3.339| *
3.432| + *
3.526| *
3.619| + *
3.713| + *
3.806| +
3.900| + *
mL
=====
Symbols: * = mV, + = first derivative
  
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