Analysis of ribena using titration

Title: Analysis of Vitamin C in Ribena Using Titration Aim: The objectives of this experiment were to gain knowledge on how to titrate solution and determine amount of Vitamin C in Ribena. Results Table 1: Mass of Ascorbic Acid in Volumetric Flask Mass of empty bottle (g)21. 5922 Mass of empty bottle with ascorbic acid (g)21. 6954 Mass of empty bottle (g)21. 5924 Mass of ascorbic acid used (g)0. 1002 Number of moles: (mass of ascorbic acid used)/(molecular mass of ascorbic acid) = 0. 1002g/(176. 10gmol-1) = 5. 9 x10-4 moles M1: concentration of stock ascorbic acidV1: volume in volumetric flask with stock solution M2: concentration of diluted ascorbic acidV2: volume in volumetric flask with diluted solution (M1 x 100)/1000 = 5. 69 x10-4 molesM1: 5. 69 x10-3 mol/L M1V1 = M2V2 5. 69 x10-3 mol/L x (10/1000) = M2 x (100/1000)M2: 5. 69 x10-4 mol/L Table 2: Standardization of NBS Titration numberRough 123 Final burette reading (ml)16. 8027. 0037. 2047. 30±0. 10 Initial burette reading (ml)5. 4016. 8027. 2037. 20±0. 10 Titre (ml)11. 4010. 8010. 0010. 10 Number of OK titres, N Sum of OK titres 2. 00 Average (ml)10. 5 Calculation: (10. 00+10. 10)/2 = 10. 05 M1V1 = M2V2 M1: concentration of diluted ascorbic acidV1: volume of diluted solution in conical flask M2: concentration of NBS V2: volume needed for titration 5. 69 x10-4 mol/L x (10/1000) = M2 x (10. 05/1000)M2: 5. 66 x 10-4 mol/L Table 3: Quantity of Vitamin C in Ribena Titration numberRough12 Final burette reading (ml)12. 2018. 6025. 00±0. 00 Initial burette reading (ml)5. 7012. 2018. 60±0. 00 Titre (ml)6. 506. 406. 40 Number of OK titres, N Sum of OK titres2. 00 Average (ml)6. 40 Moles of NBS: MV 5. 66 x 10-4 mol/L x (6. 40/1000) = 3. 62 x 10-6 moles

M1V1 = M2V2 M1: concentration of NBS solution V1: volume of NBS needed for titration M2: concentration of Vitamin C in ribenaV2: volume of ribena added 5. 66 x 10-4 mol/L x (6. 40/1000) = M2 x (2/1000) M2: 1. 81 x 10-3 mol/L Moles of ascorbic acid: MV 1. 81 x 10-3 mol/L x (2/1000) = 3. 62 x 10-6 moles Moles of NBS: moles of Vitamin C = 3. 62 x 10-6: 3. 62 x 10-6 = 1: 1 Mass of ascorbic acid: molecular mass of ascorbic acid x number of moles of ascorbic acid = 176. 100 g/mol x 3. 620x 10-6 = 6. 370 x 10-4 g = 0. 637mg Concentration of ascorbic acid in ribena per 100ml: 2. 000ml > 0. 637 mg100ml > 31. 5mg There are 31. 850mg of ascorbic acid in 100ml of ribena Discussion: Volume needed to satisfy minimum requirement of 60mg vitamin C: (60. 000mg/0. 637mg) x 2. 000 ml = 188. 383ml The calculated value of ascorbic acid is much higher than the value stated by manufacture which is 12mg/100ml. This may be due to inaccuracy during titration. A better technique that is by using high turbulence layer chromatography will be able to determine the amount of ascorbic acid accurately. Reference: Douglas A Skoog, Donald M. West, F. James Holler. 1996. Fundamentals of Analytical Chemistry, 7th edition, US.