Abstract

Abstract Vitamin C, also known as ascorbic acid, is a water soluble vitamin that is regarded as one of the safest and most effective nutrients. Vitamin C can be found in most fruits and vegetables. The goal of the experiment is to find out the concentration of vitamin C in three citrus fruits, orange, lemon and lime, and to compare them and find out which fruit contains the highest concentration of Vitamin C. By using the juice from each fruit to make a solution to combine with 10cm³ of DCPIP until the DCPIP turned colourless and recording the amount of Vitamin C needed to make the DCPIP colourless, the molarity of Vitamin C in each fruit could be calculated and it was found that lemon has the most amount of Vitamin C followed by lime and orange. Research Question/Hypothesis/Introduction The research question brought out was about the concentration of Vitamin C in three different citrus fruits-lemon, lime and orange. The research question was chosen as people eat citrus fruits every day and it is important that we know which ones have to most Vitamin C. The results show that lemon has the highest molarity of Vitamin C. It is significant as consumers will know what fruit contains the most Vitamin C which is essential to health. We are trying to find out what citrus fruit has the highest amount of Vitamin C and made a hypothesis that lemon has the highest molarity of Vitamin C. Vitamins are molecules required by the body in order to maintain healthy. It is the daily requirements of our body. If we do not have enough of Vitamin C, we will result in a disease call scurvy which leads to the formation of brown spots on the skin, spongy gums, and bleeding from all mucous membranes. Research Methods and Materials The apparatus and materials used were Orange, Lemon, Lime, 0. 1g/1000cm³ of indophenol(DCPIP), 2mol/dmâ»³ of ethanoic acid, 50cm³ burette, pipette, clip, 250cm³ conical flasks, 100cm³

volumetric flasks, 250cm³ beakers, filter funnel, retort stand and white tile. The method used was titration. Here are the steps taken. 1. Add 10cm³ of fruit juice into a measuring cylinder then transfer the juice into a 100cm³ volumetric flask. 2. Add 25cm³ of ethanoic acid into the measuring cylinder and transfer it to the same 100cm³ volumetric flask. 3. Fill the volumetric flask with distilled water to make it up to 100. 0cm³ then mix the solution well by shaking it 5 times. 4. Transfer 10cm³ of indophenol(DCPIP) using a pipette into a conical flask. 5. Pour the Vitamin C solution into the burette and run the diluted solution slowly from the burette into the conical flask in which until the colour of the indophenol turns colourless. 6. Record the volume of the diluted solution added and repeat the experiment 3 more times with the same Vitamin C for consistent results. Data Summary/Results Fruit Juice | Volume of Juice needed to neutralize DCPIP (cm³) | Total Average | | | 1st Recording | 2nd Recording | 3rd Recording | 4th Recording | Average Recording | | Orange | 1st set | 18. 5 | 24. 5 | 26. 4 | 27. 4 | 24. 2 | 20. 6375 = 0. 0206375dm³ | | 2nd set | 16. 3 | 16. 7 | 17. 3 | 18 | 17. 075 | | Lemon | 1st set | 17. 8 | 20. 4 | 23 | 24. 5 | 21. 425 | 19. 0125 = 0. 0190125dm³ | | 2nd set | 16 | 17. 8 | 15. 9 | 16. 7 | 16. 6 | | Lime | 1st set | 19 | 21 | 24 | 24. 3 | 22. 075 | 19. 525 = 0. 019525dm³ | | 2nd set | 16. 9 | 17 | 16. 8 | 17. 2 | 16. 975 | | Table 1: Recording of results from experiment Analysis The mathematical equation to find the concentration of vitamin C is molarity = mole/volume. It can also be represented as, mole = molarity x volume, which molarity is represented by the symbol M and volume V. Therefore, Mâ,�Vâ,� = Mâ,, Vâ,, when Mâ,� is the molarity of Vitamin C in the juice, Vâ,� is the volume of juice used, Mâ,, is the molarity of indophenol and Vâ,, is the volume of indophenol used. The molarity of the indophenol is 0.

1g/dm³ and the volume of indophenol used is 10cm³. Fruit Juice | Concentration of Vitamin C (mg/dm³) | Orange | Mâ,$\square$ = 0. 001 0. 0206375 = 0. 0484 g/dm³ = 48. 5 | Lemon | Mâ,$\square$ = 0. 001 0. 0190125 = 0. 0526 g/dm³ = 52. 6 | Lime | Mâ,$\square$ = 0. 001 0. 019525 = 0. 0512g/dm³ = 51. 2 | Conclusion The experiment showed that lemon had the highest molarity of Vitamin C. The results showed that it needs the least amount of lemon juice to cause the indophenol to change into a colourless colour. Therefore, it has the highest amount of Vitamin C as it is the most concentrated. The hypothesis of the experiment was that lemon juice contains the most amount of Vitamin C. The hypothesis was proven to be right as the experiment went by. Discussion The strength of the experiment was that the citrus fruits were easy to buy for it is available at most of the supermarkets. Also, the juices were sealed tightly right after being squeezed out of the fruit and sieved. The weakness of the experiment was that we did not get the same brand of citrus fruits and it was kept at different places. The experiment could be improved if we get the same brand of fruits and that we did a few more sets to get more accurate answers. Bibliography/References

http://en. wikipedia. org/wiki/Vitamin_C http://www. umm. edu/altmed/articles/vitamin-c-000339. htm http://www. webmd. com/diet/features/the-benefits-of-vitamin-c http://en. wikipedia. org/wiki/Mole_(unit)