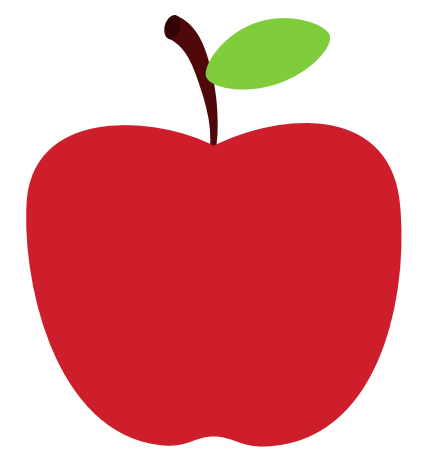


How does temperature affect the concentration of vitamin C in apples?



Introduction

Food waste and overconsumption is a growing problem in the society we live in today. In order to promote a more sustainable environment, we have to be aware of how our food waste related behaviours impact the planet. Whether it is consumption practices referring to leftovers, expired food, or our shopping practices, it is crucial to understand how keeping our food in appropriate conditions prevents them from rotting and losing their nutritional value. To learn more about this matter, we decided to conduct an experiment based on how temperature affects the amount of vitamin C in a fruit of our choice, being apples.

Method

Method for determining the vitamin C concentration in fruits using iodometric titration:

Sample preparation:

1. Weigh 100 g of the fruit sample and cut it into small pieces.
2. Grind the sample in a blender, put in a beaker, and cover it with parafilm. Place it in one of the four locations for 48 hours.
3. Finally, strain the ground fruit pulp through cheesecloth, collecting 30 ml of extract total.

Titration:

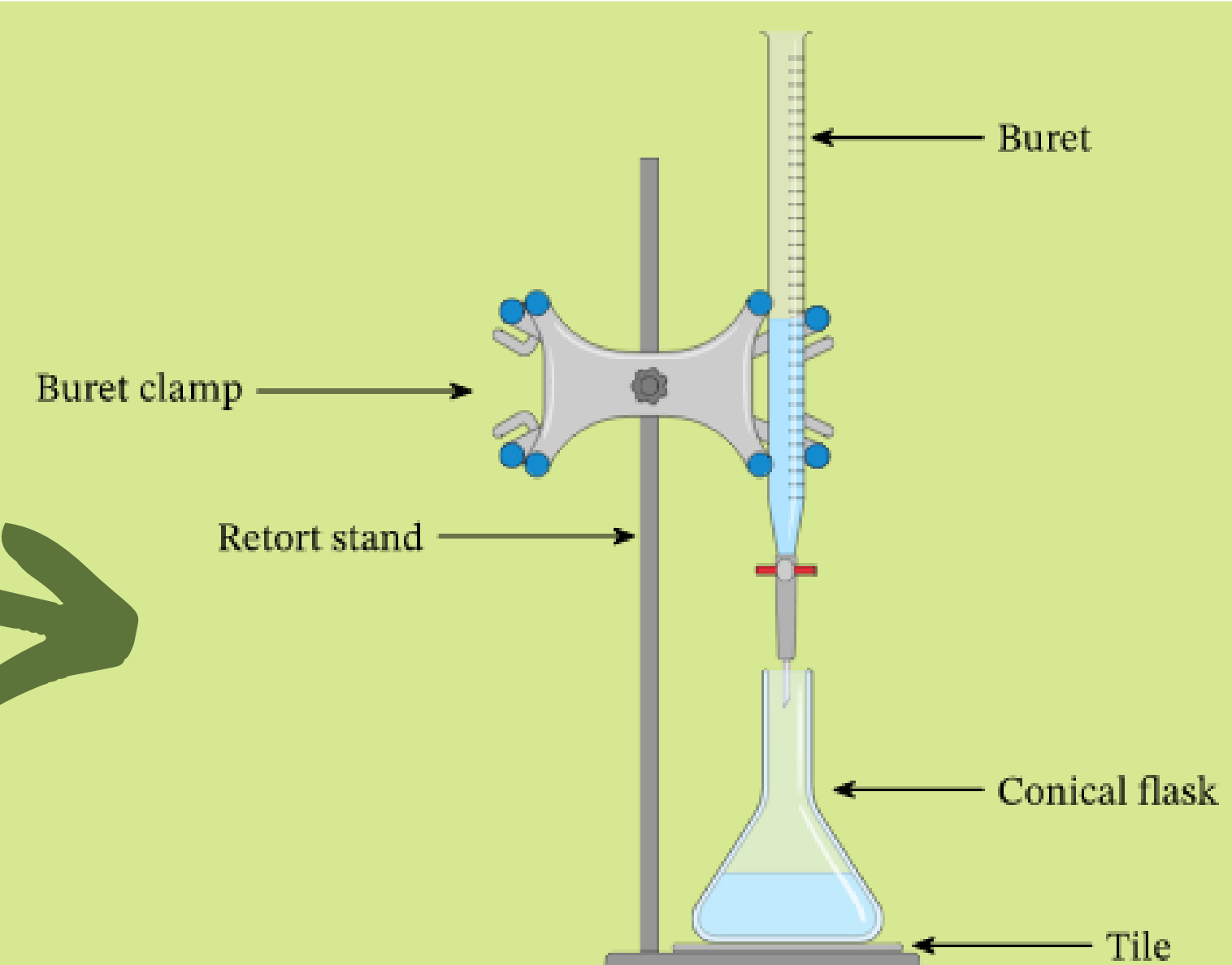
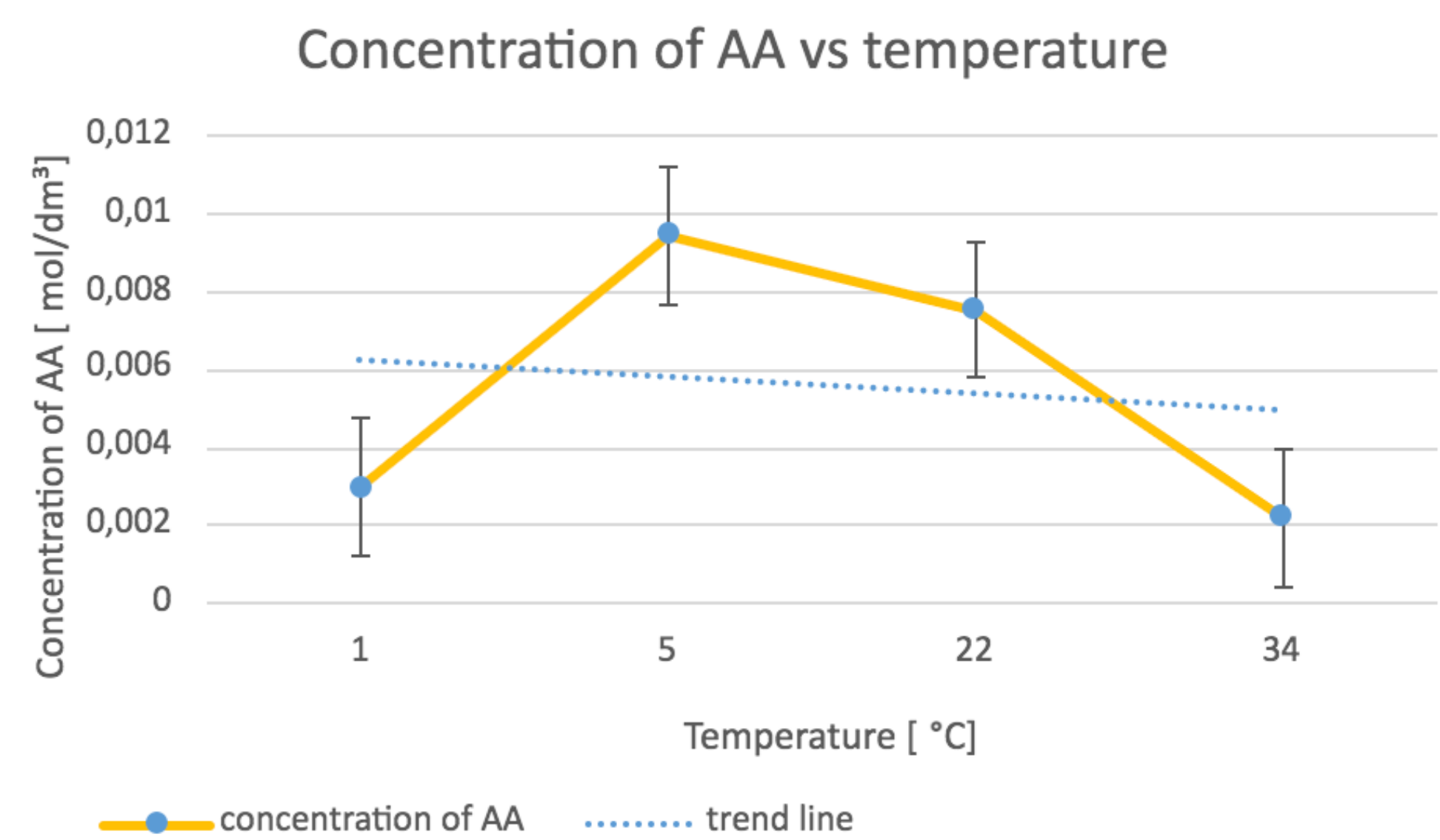
1. Pipette 10 ml of the fruit extract into a 100 mL volumetric flask.
2. Add 5 mL of 1% potassium iodide solution to the flask, stopper it, and swirl to mix.
3. Titrate the solution with 0.01 M iodate solution until the yellow color of iodine disappears and a clear, colorless solution is obtained.
4. Note down the volume of iodate solution used.

Calculation:

1. Calculate the average volume of iodate solution used for each sample.
2. Calculate the amount of moles of iodate present in each sample by multiplying the average volume of iodate solution by its concentration.
3. Calculate the amount of moles of ascorbic acid present in each sample by multiplying the amount of moles of iodate by 3.
4. Calculate the concentration of ascorbic acid in the fruit/vegetable extract by dividing the amount of moles of ascorbic acid by the volume of fruit/vegetable extract used in the titration.

Results

	Temperature (°C)	Concentration of AA (mol/dm ³)
Bottom fridge	1	0.003
Top fridge	5	0.00948
Room	22	0.00756
Incubator	34	0.00222



Conclusion

The data obtained from our project shows that the concentration of vitamin C in apples is influenced by temperature. Among the tested temperature conditions, the top fridge maintained at 5 degrees Celsius exhibited the highest concentration of vitamin C, with a value of 0.00948 mol/dm³. This finding aligns with the conclusions of a study conducted by Burdurlu et al. (Ankara University) on the degradation of vitamin C in citrus juice concentrates during storage. They observed that ascorbic acid levels decreased with increasing temperature, and orange juice concentrate exhibited the lowest ascorbic acid level at 28 degrees Celsius compared to other samples.

Our findings show that storing apples at a slightly cooler temperature, such as 5 degrees Celsius, can better retain vitamin C compared to room temperature (22 degrees Celsius) and higher temperatures like those found in an incubator. Further research is needed to investigate optimal temperature ranges and to explore other factors that may impact its degradation. Nonetheless, our project provides valuable insights into the relationship between temperature and vitamin C concentration in apples.