



THE OXFORD SENIOR SECONDARY SCHOOL
I Phase, J P Nagar, Bengaluru-560078

CHEMISTRY PROJECT

“ANALYSIS OF COLD DRINKS ”



Submitted to: Mrs. Jojoy Joseph

Submitted by: Ritwik Chawda

STUDENT NAME: RITWIK CHAWDA

CLASS: XII 'A'

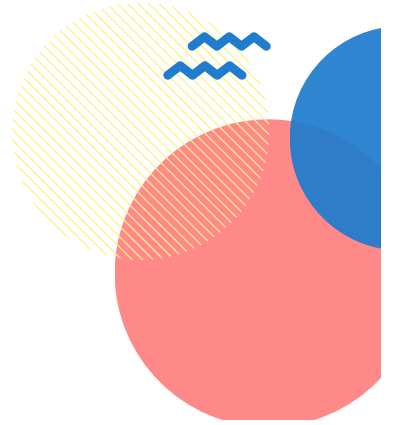
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-Ritwik Chawda

-XII 'A'

CERTIFICATE



THE OXFORD SENIOR SECONDARY SCHOOL

(Affiliated to C. B. S. E., New
Delhi)

I Phase, J P Nagar, Bengaluru-
560078



This is to certify that the project entitled '**ANALYSIS OF COLD DRINKS**' is a bonafide work done by Ritwik Chawda of Class XII(Science), Session 2024-25 as prescribed by CBSE 2025 and has been carried out under my supervision and guidance.

Roll Number	: 23
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Signature of the Principal	:

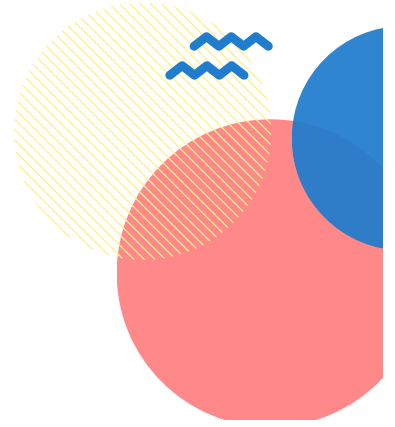


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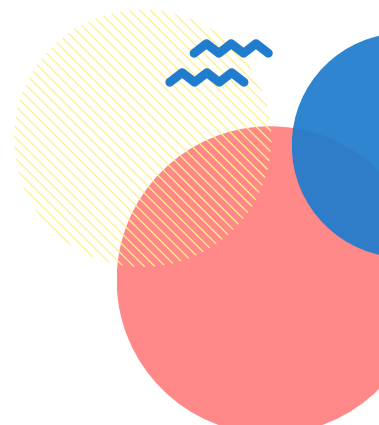


INTRODUCTION



The era of cold drinks began in 1952 but the indianization of industry marked its beginning with launching of limca and goldspot by parley group of companies. Since, the beginning of cold drinks was highly profitable and luring, many multinational companies launched their brands in India like pepsi and coke.

Now days, it is observed in general that majority of people viewed Sprite, Miranda, and Limca to give feeling of lightness, while Pepsi and Thumps Up to activate pulse and brain.



AIM:

Comparative study and qualitative analysis of different brands of cold drinks available in market.

THEORY:

Cold drinks of different brands are composed of alcohol, carbohydrates, carbon dioxide, phosphate ions etc. These soft drinks give feeling of warmth, lightness and have a tangy taste which is liked by everyone. Carbon dioxide is responsible for the formation of froth on shaking the bottle. The carbon dioxide gas is dissolved in water to form carbonic acid which is also responsible for the tangy taste.

Carbohydrates are the naturally occurring organic compounds and are major source of energy to our body. General formula of carbohydrates is $C_m(H_2O)_n$

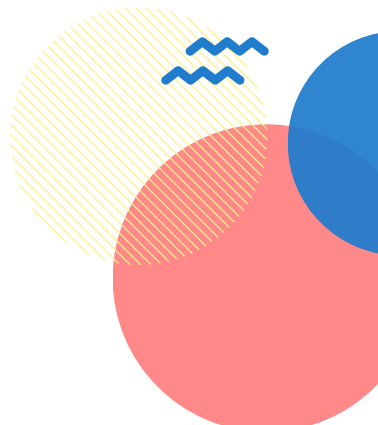
On the basis of their molecule size carbohydrates are classified as:- Monosaccharide, Disaccharides and Polysaccharides. Glucose is a monosaccharide with formula $C_6H_{12}O_6$ It occurs in Free State in the ripen grapes in bones and also in many sweet fruits. It is also present in human blood to the extent of about 0.1%. Sucrose is one of the most useful disaccharides in our daily life. It is widely distributed in nature in juices, seeds and also in flowers of many plants. The main source of sucrose is sugar cane juice which contain 15-20% sucrose and sugar beet which has about 10-17% sucrose. The molecular formula of sucrose is $C_{12}H_{22}O_{11}$. It is produced by a mixture of glucose and free dose. It is non-reducing in nature whereas glucose is reducing. Cold drinks are a bit acidic in nature and their acidity can be measured by finding their pH value. The pH values also depend upon the acidic contents such as citric acid and phosphoric acid.



APPARATUS AND CHEMICALS



- TEST TUBES
- BEAKER
- PH PAPER
- CHINA DISH
- TITRATION FLASK
- BURETTE
- PIPPETE
- NaOH SOLUTION
- FEHLING'S SOLUTION A & B



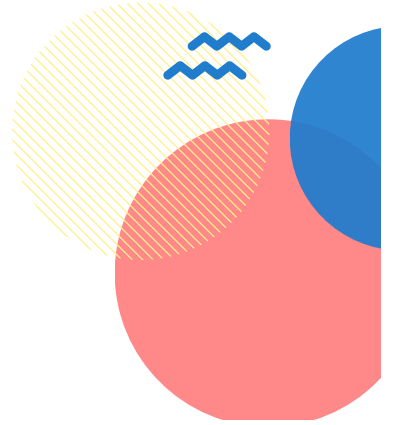
DETECTION OF pH

1-2 drops of the sample of cold drink of each brand was taken and put on the pH paper. The change in the color of pH paper was noticed and was compared with the standard pH scale.

SERIAL NO	NAME OF DRINKS	CHANGE IN COLOUR	pH VALUE
1.	LIMCA	YELLOW	3
2.	SPRITE	YELLOW	3
3.	THUMBS UP	YELLOW	3

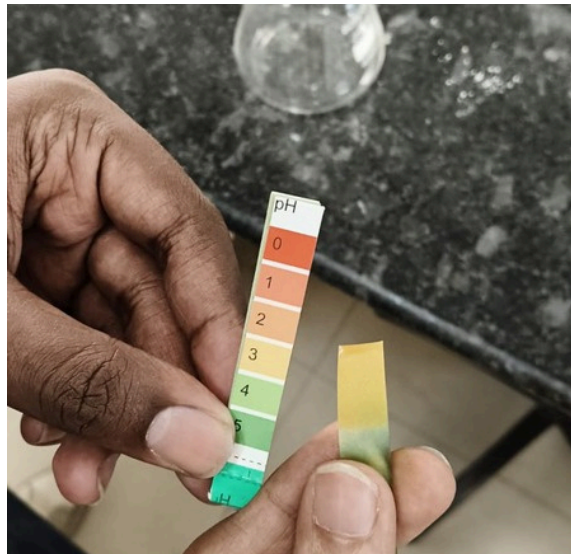
INFERENCE

Soft drinks are generally acidic because of the presence of citric acid and phosphoric acid. pH values of cold drink of different brands are different due to the variation in amount of acidic contents.



pH test experiment

☐ Thumbs Up



☐ Limca :



☐ Sprite:





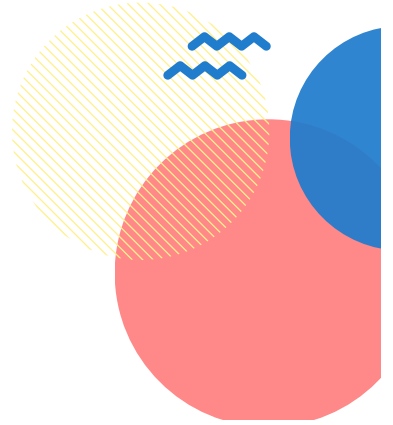
DETECTION OF GLUCOSE

A small sample of cold drink of different brands was taken in a test tube and a few drops of Fehling's A solution and Fehling's B solution was added in equal amount. The test tube was heated in a water bath for 10 minutes. Appearance of brown precipitate confirms the presence of glucose in cold drinks.

SERIAL NO	NAME OF DRINK	OBSERVATION	CONCLUSION
1.	SPRITE	RED BROWN PPT	GLUCOSE PRESENT
2.	LIMCA	RED	GLUCOSE PRESENT
3.	THUMBS UP	GREEN	GLUCOSE PRESENT

INFERENCE

All the samples give positive result for glucose with fehling's solution A&B. Hence all the cols drinks contain glucose.

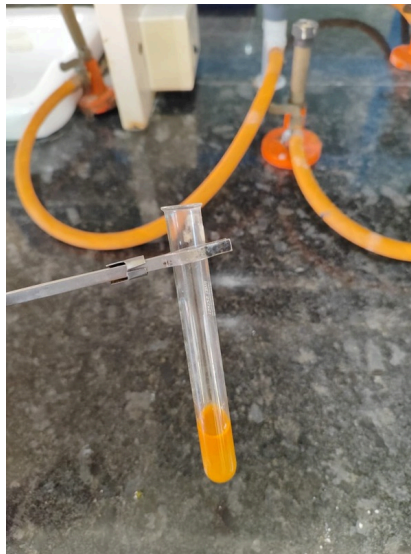


Glucose test experiment

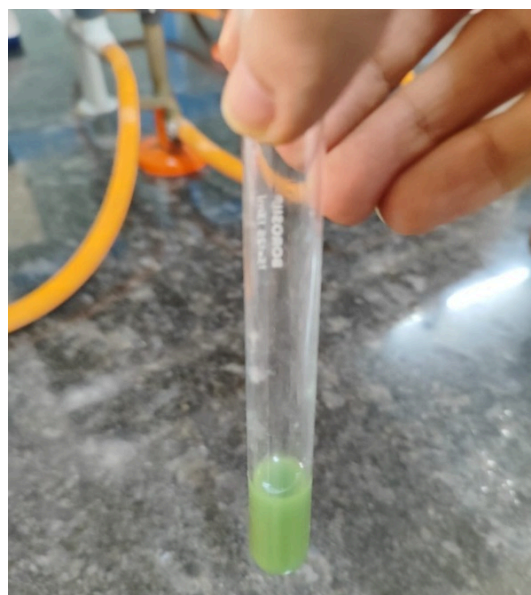
☐ Thumbs Up:

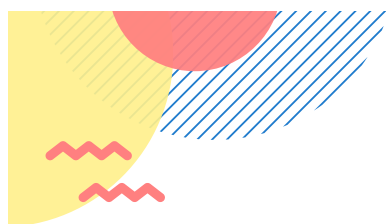


☐ Limca :

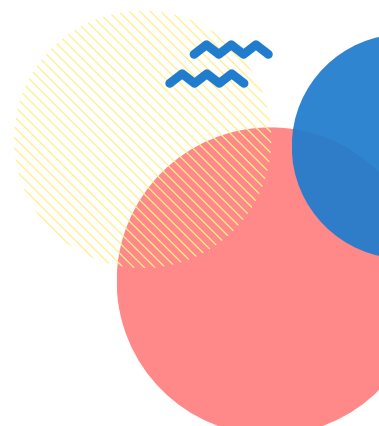


☐ Sprite





TITRATION



Fill the burette with 0.1M NaOH solution. Add a measured volume of the soft drink sample to the conical flask and a few drops of phenolphthalein indicator. Titrate with NaOH until the solution turns pink, which indicates the endpoint.

S.NO	Soft Drink	Volume of NaOH (ml)
1.	Thumbs Up	1.8
2.	Limca	1.4
3.	Sprite	1.6

CALCULATIONS (MOLARITY):

Molarity of NaOH used (M1) : 0.1 M

Normality Factor for NaOH (NF1) : 1

Normality Factor for Carbonic Acid : 5

Volume of soft drink sample used (V2) : 20 ml

Volume of NaOH used (V1) : *refer the above table for each

Using formula : $(M1)(V1)(NF1) = (M2)(V2)(NF2)$

☐ Thumps Up

$$(0.1 \text{ M})(0.0018 \text{ L})(1) = (M_2)(0.02 \text{ L})(5)$$

$$0.00018/0.10 = M_2$$

$$M_2 = 0.0018 \text{ M}$$

☐ Limca

$$(0.1 \text{ M})(0.0014 \text{ L})(1) = (M_2)(0.02 \text{ L})(5)$$

$$0.00014/0.10 = M_2$$

$$M_2 = 0.0014 \text{ M}$$

☐ Sprite

$$(0.1 \text{ M})(0.0016 \text{ L})(1) = (M_2)(0.02 \text{ L})(5)$$

$$0.00016/0.10 = M_2$$

$$M_2 = 0.0016 \text{ M}$$

CALCULATION (pH):

☐ Thumbs Up

$$\text{Molarity}([H]) = 0.0018 \text{ M}$$

$$\text{pH} = -\log[H^+]$$

$$\text{pH} = -\log(0.0018)$$

$$\text{pH} = 2.745$$

☐ Limca

$$\text{Molarity}([H]) = 0.0014 \text{ M}$$

$$\text{pH} = -\log[H^+]$$

$$\text{pH} = -\log(0.0014)$$

$$\text{pH} = 2.854$$

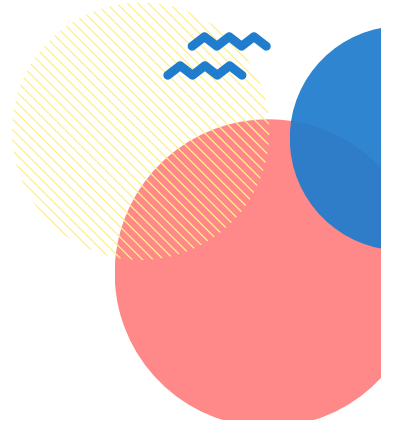
☐ Sprite

$$\text{Molarity}([\text{H}]) = 0.0016 \text{ M}$$

$$\text{pH} = -\log[\text{H}^+]$$

$$\text{pH} = -\log(0.0016)$$

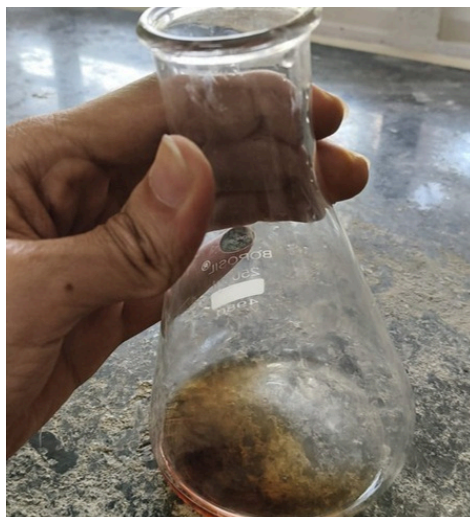
$$\text{pH} = 2.798$$



TITRATION EXPERIMENT

☐ Thumbs Up:

Before Titration



After Titration

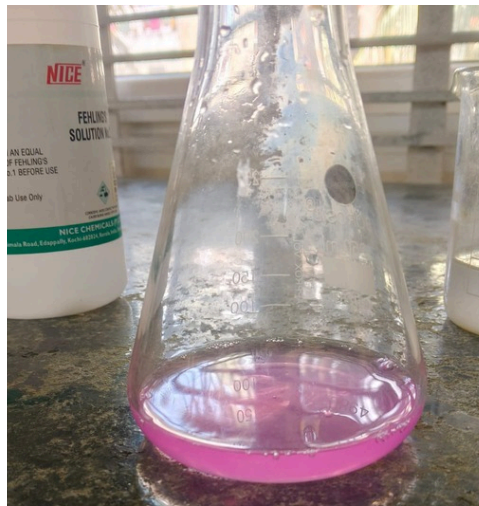


☐ Limca :

Before Titration

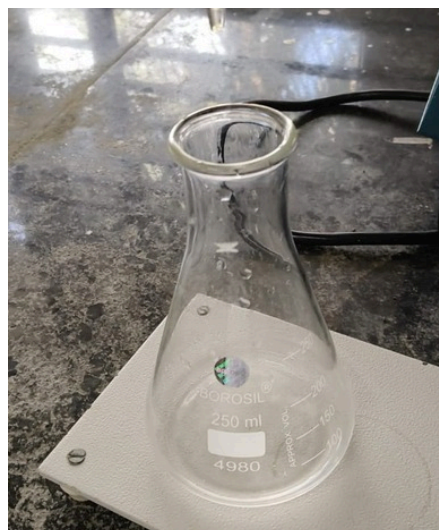


After Titration



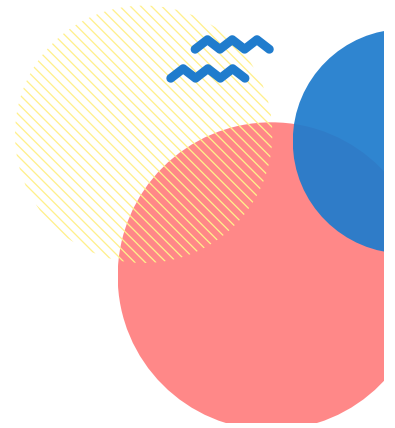
☐ Sprite :

Before Titration



After Titration





CONCLUSION

This project analyzed the chemical properties of Thumbs Up, Sprite, and Limca. The results showed:

- 1. pH Levels:** All three soft drinks are acidic, with pH values between 2.8 and 3.2.
- 2. Glucose Presence:** Glucose was found in Thumbs Up and Limca, but not in Sprite.
- 3. Acidity Measurement:** The titration revealed varying acidic content, providing insights into their chemical makeup.

The findings highlight the importance of understanding what we consume and its potential health effects. This project emphasizes the need for informed choices regarding soft drink consumption.

DISADVANTAGES OF COLD DRINKS

- 1. Soft drinks are little more harmful than sugar solution. As they contain sugar in large amount which cause "diabetes".**
- 2. Soft drinks can cause weight gain as they interfere with the body's natural ability to suppress hunger feeling.**
- 3. Soft drinks have ability to dissolve the calcium so they are also harmful for our bones.**
- 4. Soft drinks contain "phosphoric acid" which has a pH of 2.8. So they can dissolve a nail in about 4 days.**
- 5. Soft drinks have also ability to remove blood so they are very harmful to our body.**

USES OF COLD DRINKS

1. Cold drinks can be used as toilet cleaners.
They can remove rust spots from chrome car humpers.
2. They clean corrosion from car battery terminals.
3. Soft drinks are used as an excellent 'detergent' to remove grease from clothes.
4. They can loose a rusted bolt.



BIBLIOGRAPHY



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