GOVERNMENT DEGREE COLLEGE, CHENNOOR, DIST. MANCHERIAL TELANGANA STATE

DEPARTMENT OF CHEMISTRY

PROJECT REPORT

ON

ANALYSIS OF SOFT DRINKS

PROJECT PREPARED BY:

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3	K. Sai	B.Sc.(BZC)III YEAR	051-20-3211
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Signature of the Lecturer

(U.SRINIVAS)

Signature of the Principal

(Ms.K.SRIDEVI)

PRINCIPAL
Govt. Degree College
Chennoor, Dist: Mancherial.

CERTIFICATE

This is to certify here by that, the original and genuine investigation work has been carried out to investigate about the subject matter and the related data collection and investigation has been completed sincerely and satisfactorily by the following group of B.Sc. Students, Government Degree College,Chennoor regarding their project titled "ANALYSIS OF SOFT DRINKS" under the supervision of Shri. U.Srinivas, Lecturer in Chemistry.

S.No.	Name of the Student	Class	Hall Ticket No.
1	P.Siddharth	B.Sc.(BZC)III YEAR	051-20-3213
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Teacher's Signature

AIM

Comparative study and qualitative Analysis of different brands of Cold drinks available in market.

PURPOSE:

In recent days soft drinks brands have been put in to various questions regarding their quality, news flashed that they contain harmful pesticides which aroused interest in knowing about the composition of these drinks consumed highly world-wide.

I wished to investigate if these claims were true. I am in touch with the Quantitative analysis and so, chose this project on determination of contents of cool drinks out of concern for public health.

INTRODUCTION:

Soft drinks are complex mixtures containing variety of substance such as coloring compounds, flavoring agents, acidifiers, sweeteners, preservatives and caffeine.

The era of cold drinks began in 1952 but with the industrialization in India soft drinks marked its beginning with launching of Limca and Gold Spot by Parley group of Companies. Since then, the business was highly profitable and so many multinational companies like Pepsi and Coke launched their brands India. Now-a-days, it is observed, in general that majority of people viewed Sprite, Fanta and Limca to give feeling of lightness, while Pepsi and Thumsup to activate pulse and brain.

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. This 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 major source of energy to our body. General formula of carbohydrates is $C_x(H_2O)_Y$.

On the basis of their molecule size carbohydrates are classified as:-

1) Monosaccharide

2) Disaccharides and

3) Polysaccharides.

Glucose is a monosaccharide with formula $C_6H_{12}O_6$. It occurs in free-state in the ripened grapes 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 contains 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 fructose .It is non-reducing in nature whereas glucose is reducing.

Also, cold drinks are a bit acidic in nature and their acidity can be measured by finding their P^H value. The P^H values also depend upon the acidic contents such as citric acid and Phosphoric acid.

AIM: Comparative Study and Qualitative Analysis of different brands of cold drinks available in market.

Apparatus:-

Test Tubes

Test Tube Holder

Test Tube Stand

Stop Watch

Beaker

Burner

P^H Paper Tripod Stand

China Dish

Wire Gauge

Chemical Required:-

Iodine Solution

Potassium Iodide

Sodium Hydroxide

Lime Water

Fehling's A&B Solution

Concentrated Nitric Acid

Benedict Solution

Ammonium Molybdate

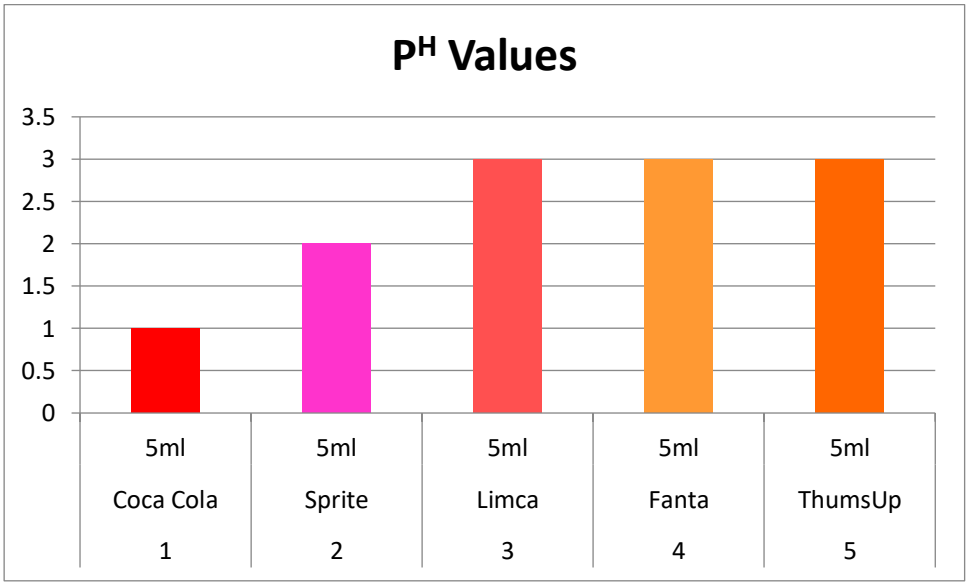
Detection of P^H:

Experiment:

Small samples of cool drinks of different brands were taken in a test tube and add few drops of Ph indicator(Qualigens Universal Indicator). The change in color of samples was noticed and it was compared with standard P^H scale.

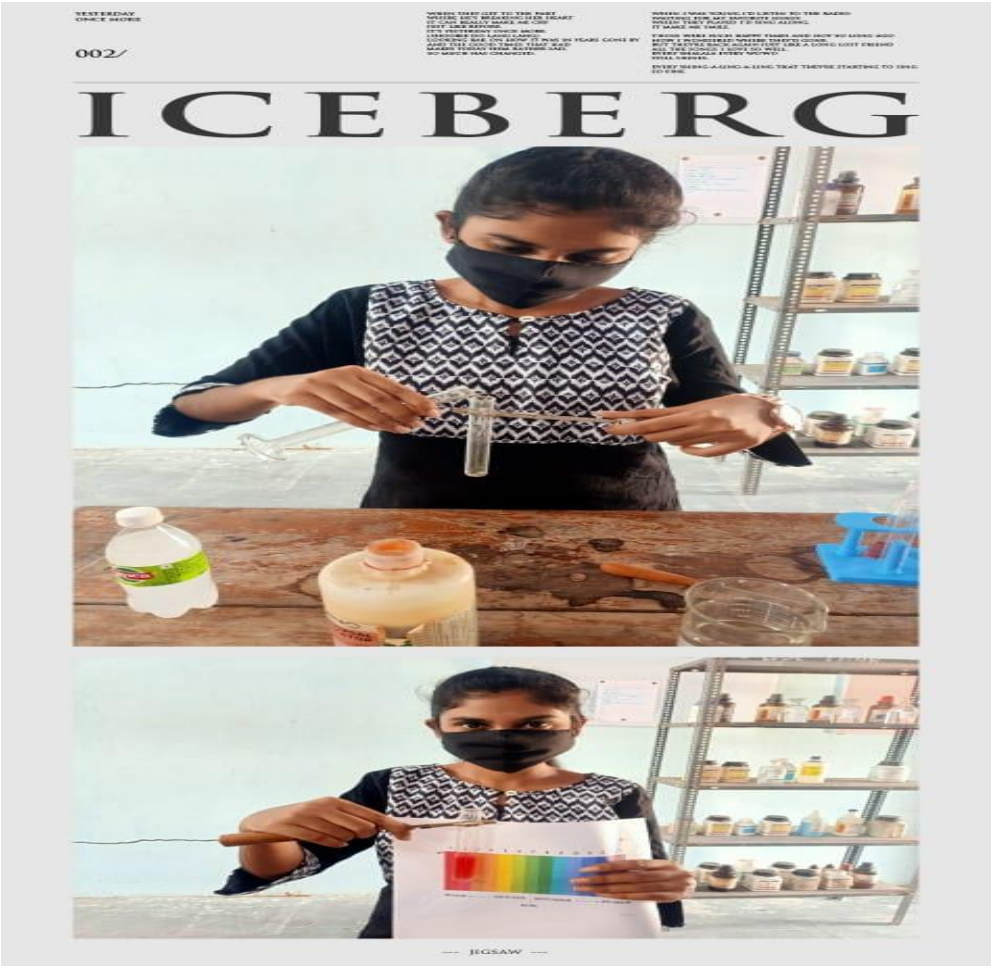
Observation:

Sl.No	Name Of the Drink	Quantity of Drink Taken	Colour Change	P^H Value
1	Coca Cola	5ml	Red	1.0
2	Sprite	5ml	Pinkish	2.0
3	Limca	5ml	Orange Pink	3.0
4	Fanta	5ml	Light Orange	3.0
5	ThumsUp	5ml	Dark Orange	3.0



Inference:

P^H values of different brands are different and all are acidic in nature. Almost all the brands tested are showing P^H values in the range of 2-3 on 14 point scale which suggests that they are all highly acidic in nature. Of the tested samples, Coca-Cola may be relatively most acidic and Limca the least acidic.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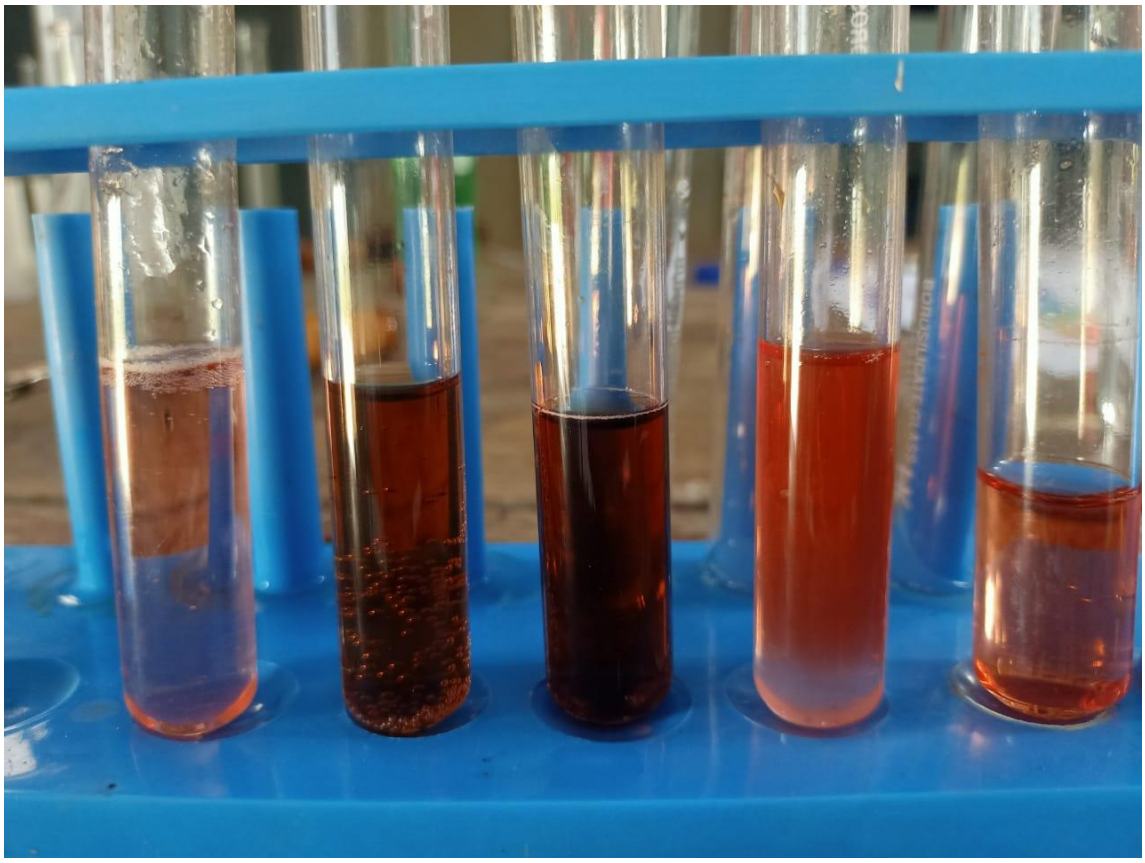


TEST FOR CARBON DIOXIDE:

Experiment: As soon as the bottles were opened one by one the sample the passed through lime water.

Observation:

Sl.No	Name Of the Drink	Time Taken (Sec)	Conclusion
1	Coca Cola	28	CO_2 is Present
2	Sprite	20	CO_2 is Present
3	Limca	38	CO_2 is Present
4	Fanta	36	CO_2 is Present
5	Thumsup	26	CO_2 is Present

Inference:

All the soft drinks turned lime water milky suggesting all of them contain dissolved carbon dioxide in Water. The carbon dioxide (CO_2) dissolves in water to form carbonic acid, which is responsible for its tangy taste.

$Ca(OH)_2(s) + CO_2(g)$----------$CaCO_3(s) + H_2O(l)$

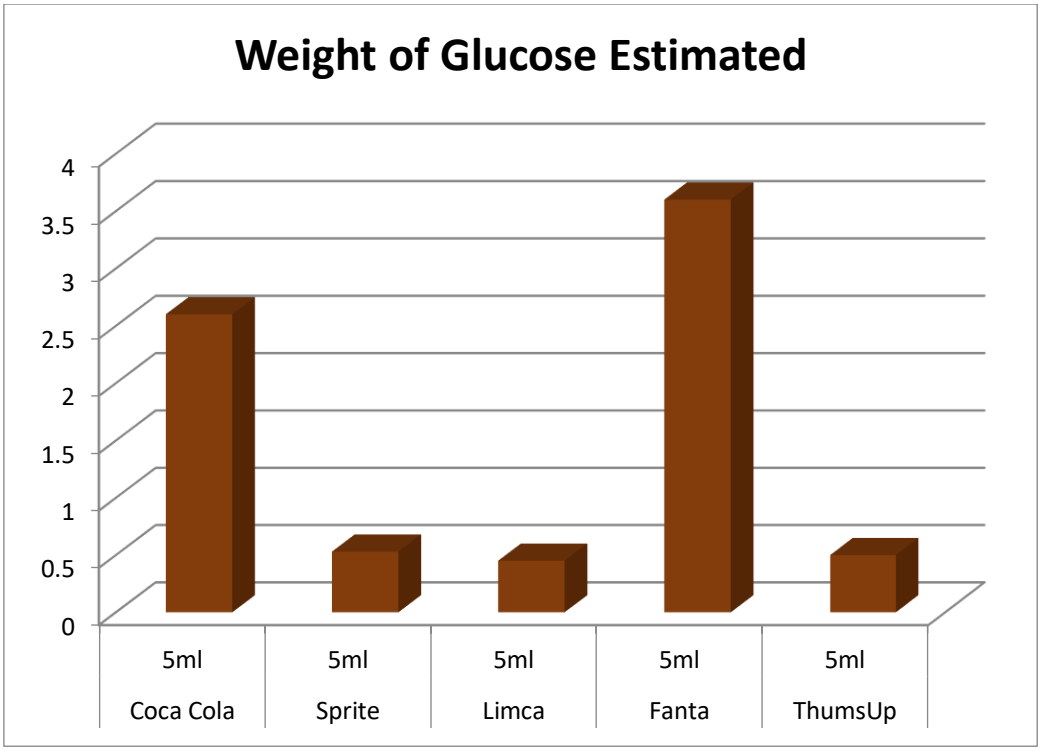
Test for Glucose:

Experiments: Glucose is a reducing sugar acid. Its presence is detected by the following test:-

1. Benedict's Reagent Test: Small Samples of cold drinks of different brand were taken in a test tube and a few drops of Benedict's reagent were added. The test tube was heated for few seconds. Formation of reddish color confirmed the presence of glucose in cold drinks.

Observation:

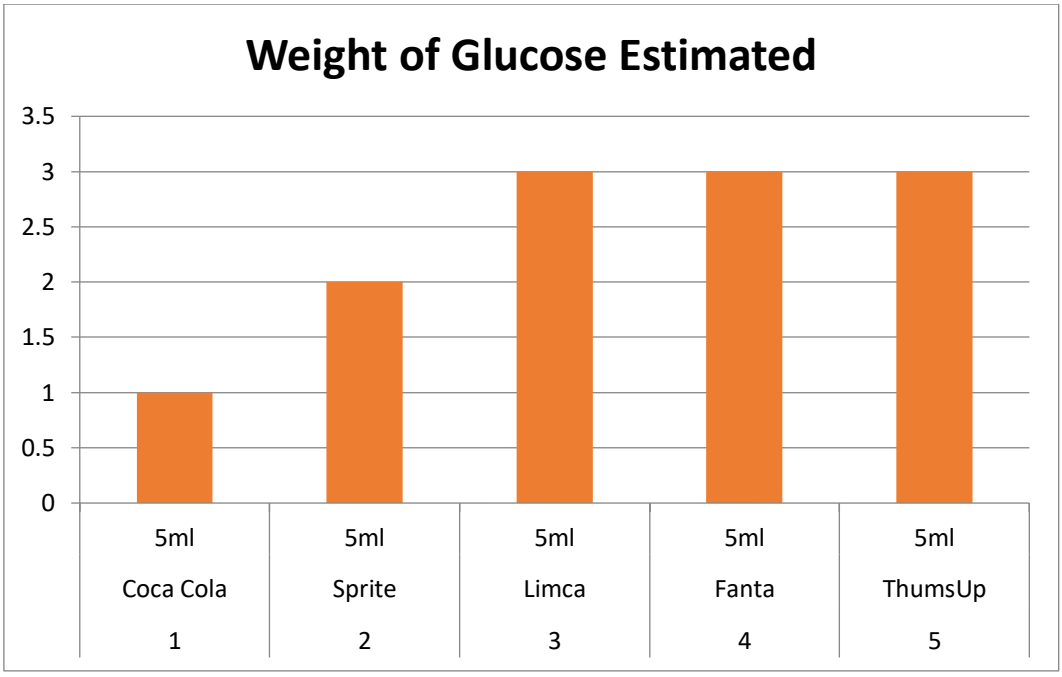
S.No	Name Of the Brand	Quantity of drink Taken	Regent used for testing	Observation	Inference	Conclusion
1	Coca Cola	5ml	Benedict's Reagent	reddish color precipitate	2.6gm	glucose is present
2	Sprite	5ml	Benedict's Reagent	reddish color precipitate	0.53gm	glucose is present
3	Limca	5ml	Benedict's Reagent	reddish color precipitate	0.45gm	glucose is present
4	Fanta	5ml	Benedict's Reagent	reddish color precipitate	3.6gm	glucose is present
5	ThumsUp	5ml	Benedict's Reagent	reddish color precipitate	0.5gm	glucose is present



2.Fehling Reagent Test: Small samples of cold drinks of different brands were 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 water bath for 10 minutes. Appearance of brown precipitate confirmed the presence of glucose in cold drinks.

Observation:

S.No	Name Of the Brand	Quantity of drink Taken	Regent used for testing	Observation	Inference	Conclusion
1	Coca Cola	5ml	Fehling reagent	reddish color precipitate	3.0gm	glucose is present
2	Sprite	5ml	Fehling reagent	reddish color precipitate	2.5gm	glucose is present
3	Limca	5ml	Fehling reagent	reddish color precipitate	1.2gm	glucose is present
4	Fanta	5ml	Fehling reagent	reddish color precipitate	3.9gm	glucose is present
5	ThumsUp	5ml	Fehling reagent	reddish color precipitate	1.4gm	glucose is present



Inference:

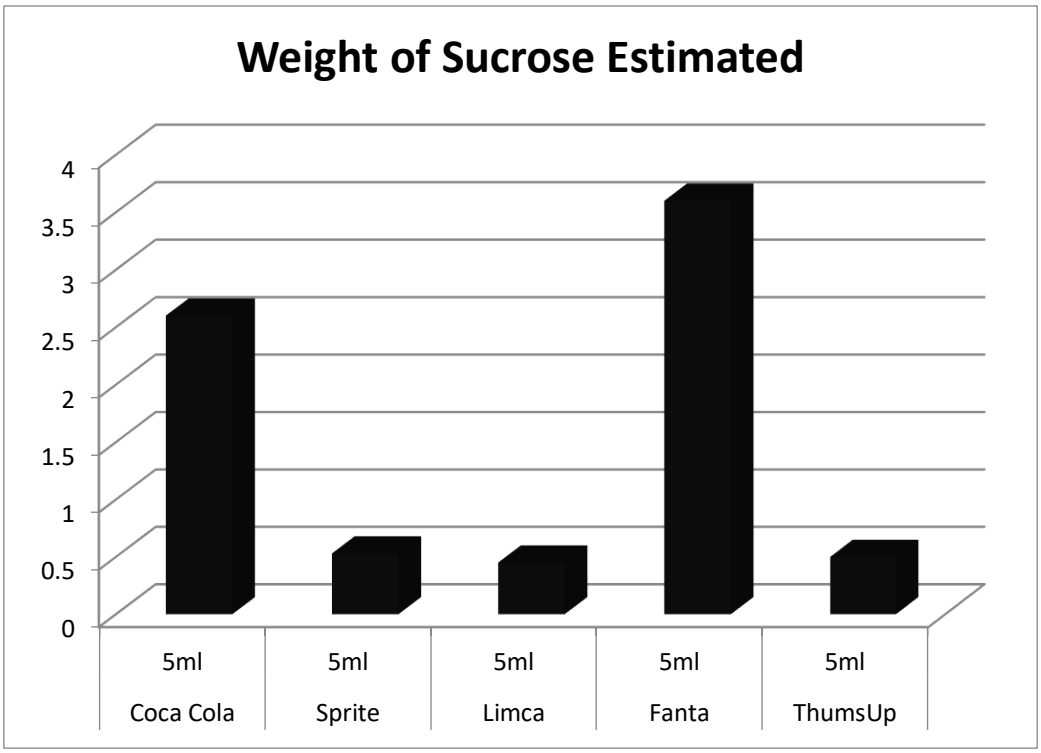
All sample gave positive test for Glucose with Fehling's(A&B) Solutions. Hence, all the cool drinks contain glucose. Different brands gave different gms of ppt when the same portions of reagent and samples are used indicating glucose level is more in Fanta and least in Limca of the samples studied.

Test for Sucrose:

Experiment: 5ml samples of each brand of cold drinks were taken in separate china dishes and were heated very strongly until changes occur.

Observation:

S.No	Name Of the Brand	Quantity of drink Taken	Observation	Inference	Conclusion
1	Coca Cola	5ml	Black Residue	2.6gm	Sucrose is present
2	Sprite	5ml	Black Residue	0.53gm	Sucrose is present
3	Limca	5ml	Black Residue	0.45gm	Sucrose is present
4	Fanta	5ml	Black Residue	3.6gm	Sucrose is present
5	ThumsUp	5ml	Black Residue	0.5gm	Sucrose is present



Inference:

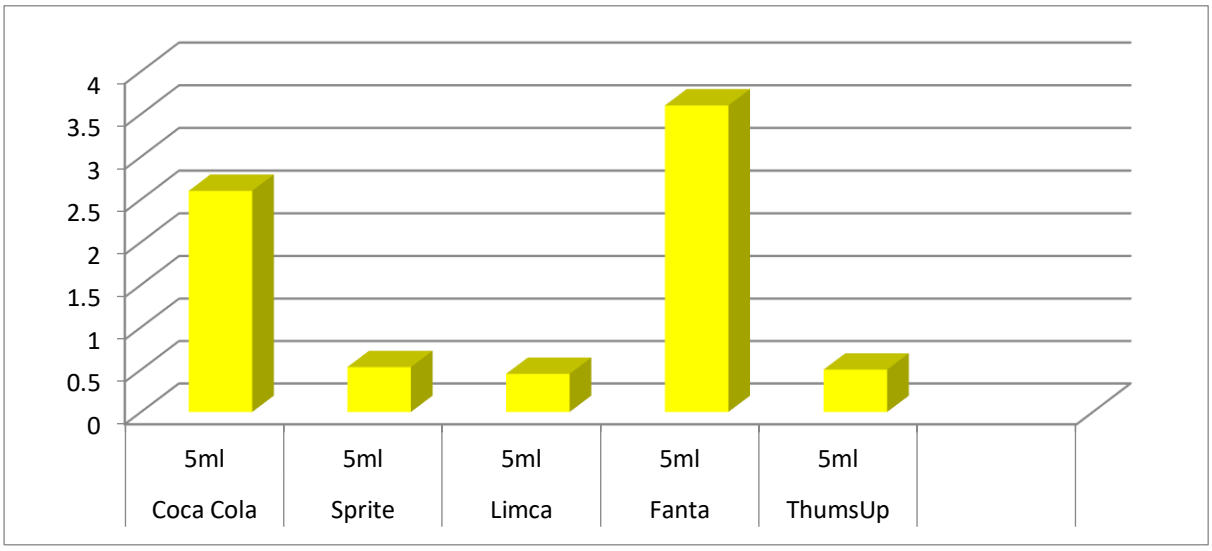
Black colored residue left confirmed the presence of sucrose in all cool drinks. All the brands of cool drinks contain sucrose. But, amount of sucrose varies in each brand of drink. Fanta shows highest amount of sucrose.

Test for Phosphate:

Experiment: Small samples of each brand of cold drinks were taken in separate test tubes and Ammonium Molybdate followed by concentrated Nitric Acid was added to it. The solution was heated.

Observation:

S.No	Name Of the Brand	Quantity of drink Taken	Chemicals used for testing	Observation	Inference	Conclusion
1	Coca Cola	5ml	Ammonium molybdate& Con.nitric acid	Canary yellow precipitate	0.11gm	Phosphate is Present
2	Sprite	5ml	Ammonium molybdate& Con.nitric acid	Canary yellow precipitate	0.55gm	Phosphate is Present
3	Limca	5ml	Ammonium molybdate& Con.nitric acid	Canary yellow precipitate	3.4gm	Phosphate is Present
4	Fanta	5ml	Ammonium molybdate& Con.nitric acid	Canary yellow precipitate	2.1gm	Phosphate is Present
5	Thumsup	5ml	Ammonium molybdate& Con.nitric acid	Canary yellow precipitate	1.9gm	Phosphate is Present



Inference: All the soft drinks samples gave positive test for phosphate ions. Appearance of Canary-Yellow precipitate confirmed the presence of phosphate ions in cool drinks. Hence, all the cool drinks contain phosphate.

Test for Alcohol:

Experiment: Small samples of each brand of cold drinks were taken in separate test tubes and Iodine followed by KI and NaOH Solution was added to each test tube. Then the test tubes were heated in hot water bath for 30 minutes. Appearance of yellow colored precipitate confirmed the presence of alcohol in cold drinks.

The tests suggest that the alcohol levels are as low as 10mg in every litter and this works out around 0.001% alcohol.

Small amount of alcohol may be present in a soft drinks .but, alcohol content must be less than 0.5% of the total volume of the drink.

Observation:

Sl.No	Name of the drink	Observation	Conclusion
1	Coca Cola	yellow precipitate	Alcohol is Present
2	Sprite	yellow precipitate	Alcohol is Present
3	Limca	yellow precipitate	Alcohol is Present
4	Fanta	yellow precipitate	Alcohol is Present

Inference: All the Cool drinks samples gave positive test for alcohol. Hence, all the cool drinks contain alcohol but the percentage of content could not be verified.

$CH_3CH_2OH + 4I_2 + 6NaOH$----------$CH_3I + HCOONa + 5NaI + 5H_2O$

DIS-ADVANTAAGES OF COLD DRINKS:

- Soft drinks are little more harmful than sugar solution. As they contain sugar in large amount which cause problems in diabetes patients.
- Soft drink can cause weight gain as they interfere with the body natural ability to dissolve the calcium so they are also harmful for our bones.
- Soft drinks contain "phosphoric acid'' which has a P^H of 2.8. So they can dissolve a nail in about 4 days.
- Soft drink has also ability to remove blood so they are very harmful to our body.

USES OF COLD DRINKS:

- Cool drinks can be used as toilet cleaners.
- They can remove rust spots from chrome car hampers
- They clean corrosion from car battery terminals.
- Soft drinks are used as an excellent detergent to remove grease from clothes.
- They can lose a rusted boil.

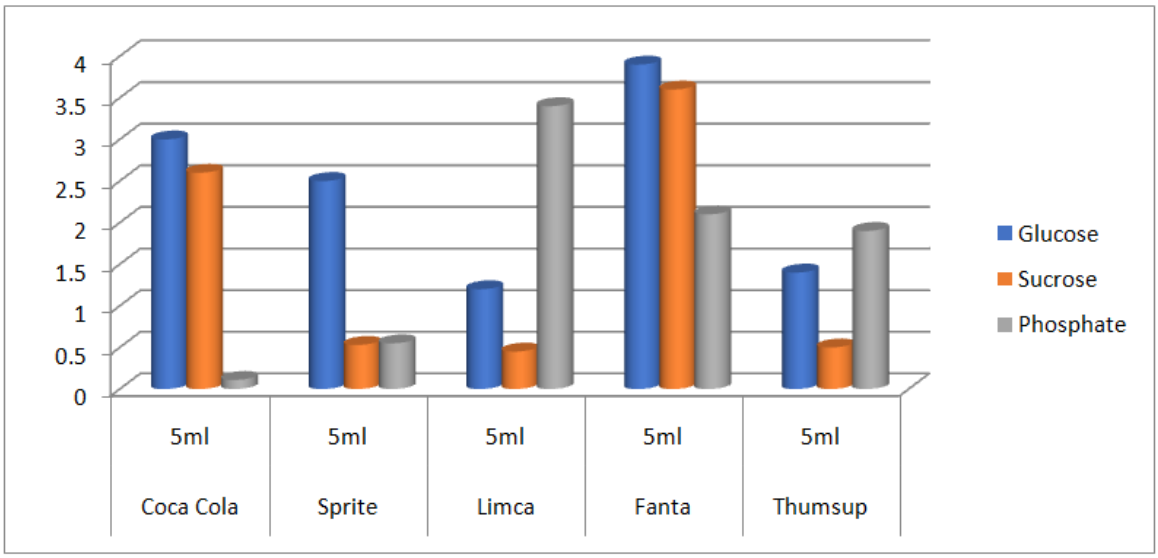
Precautions:

Some of the precautions which need to be taken care of are:-

- Concentrated solutions should be handled with immense care.
- Hands should be washed thoroughly after performing each experiment.
- If possible, one should wear hand gloves to prevent from any possible damage.
- If chemicals come into contact with your skin or eyes, flush immediately with copious amounts of water.
- Never leave burners unattended. Turn them off whenever your workstation.
- Never point a test tube or any vessel that you are hearing at yourself or your neighbor.

Conclusion

S.No	Name Of the Brand	Quantity of drink Taken	Glucose	Sucrose	Phosphate
1	Coca Cola	5ml	3.0gm	2.6gm	0.11gm
2	Sprite	5ml	2.5gm	0.53gm	0.55gm
3	Limca	5ml	1.2gm	0.45gm	3.4gm
4	Fanta	5ml	3.9gm	3.6gm	2.1gm
5	Thumsup	5ml	1.4gm	0.5gm	1.9gm



After conducting several tests, it was concluded that the different brands of cold drinks namely:

Coca Cola, Sprite, Limca, Fanta, Thumsup all are contains glucose ,alcohol, sucrose, Phosphate and Carbon dioxide. All cold drinks are acidic in nature on comparing P^H value of different brands.

- Coca cola is the most acidic and Limca is least acidic of all the five brands taken.
- Among the five samples of cold drinks taken, Sprite has the maximum amount of dissolved CO2 and Fanta has the minimum amount of dissolved CO2.
- Most of the soft drinks contain one or more of three common acids –citric acids, carbonic acids and phosphoric acid.
- for example, Fanta drinks are not good for our body at all .because they contain very high levels of sugar and fooding colour,excess citric acid ,phenylalanine as well as a host of artificial preservatives.

Bibliography

- Following books and websites were a source for my project.
- Comprehensive chemistry Lab manual
- www.Google.com
- www.Wikipedia.com
- www.Unoregon.edu

Government Degree College, Chennoor Dist.Mancherial

Department of Chemistry

PROJECT ON "ANALYSIS OF SOFT DRINKS"

Name of the Student: K. Navyanjali

Class& Year: BSC BZC IInd year

Test conducted for presence of: Glucose

Method: 5ml sample of cold drinks of different brands were taken in a test tube and 1:1 ratio of Fehling's A solution and Fehling B solution was added. these solutions was heated for few minutes The change in colour was noticed. And these solutions was centrifuged. The reddish brown colour precipitate was observed. we weighted this solution through the analytical weight machine and notified the readings

S.No	Brand Used	Amount	Inference
1	sprite	5ml	3.0 gm
2	Fanta	5ml	2.5 gm
3	Limca	5ml	1.2 gm
4	cocacola	5ml	3.9 gm
5	Thumsup	5ml	1.4 gm

K. Navyanjali

Government Degree College, Chennoor Dist.Mancherial

Department of Chemistry

PROJECT ON "ANALYSIS OF SOFT DRINKS"

Name of the Student: A. Supriya.

Class& Year: B.S.C, B.Z.C (II nd year)

Test conducted for presence of: pH

Method:

Small sample of cold drinks of different brands are taken in different test tubes. Add few drops of universal indicator. the change in colour of samples was noticed, and it was compared with standard pH scale.

S.No	Brand Used	Amount	Inference
1	cocacola	5ml	colour - Red pH value = 1
2	sprite	5ml	Pinkish pH value = 2
3	limca	5ml	orangish pink pH value - 3
4	fanta	5ml	Light orange. pH value - 3
5	thumsup	5ml.	dark orange pH value - 3.

A. Supriya.

Government Degree College, Chennoor Dist.Mancherial

Department of Chemistry

PROJECT ON "ANALYSIS OF SOFT DRINKS"

Name of the Student: B. Vanaja

Class& Year: B.SC - BZC, 3rd year

Test conducted for presence of: Test for phosphate

Method: 5ml of Each brand of cool drinks were taken in separate test tubes and Ammonium molybdate followed by Concentrated nitric acid added to it. the solution was heated. appearance of Canary-Yellow Precipitate Confirmed the Presence of Phosphate ions in cool drinks. we weighted this solution through the analytical weighing machine and notified the readings.

S.No	Brand Used	Amount	Inference
1	Sprite	5ml	0.11 gm
2	Fanta	5ml	0.55 gm
3	CocaCola	5ml	3.4 gm
4	Thums up	5ml	2.1 gm
5	Limca	5ml	1.9 gm

Vanaja

Government Degree College, Chennoor Dist.Mancherial

Department of Chemistry

PROJECT ON "ANALYSIS OF SOFT DRINKS"

Name of the Student: P. SIDDHARTHA

Class& Year: B.Sc. BZC – IInd Year

Test conducted for presence of: ALCOHOL

Method: 5 ml Samples of each brand of cooldrinks were in separate test tubes and Iodine followed by KI and NaoH solution was added to each Test tube. Then the test tubes were heated for few minutes. Yellow coloured precipitate was observed. Small amount of alchol may be present in soft drinks.

S.No	Brand Used	Amount	Inference
1	LIMCA	5 ml	Yellow colour Precipitate.
2	FANTA	5 ml	Yellow colour Precipitate.
3	COCOCOLA	5 ml	Yellow colour Precipitate
4	SPRITE	5 ml	Yellow colour Precipitate.
5	Thumsup	5 ml	Yellow colour Precipitate.

P. Siddharthan

Government Degree College, Chennoor Dist.Mancherial

Department of Chemistry

PROJECT ON "ANALYSIS OF SOFT DRINKS"

Name of the Student: K. Sai

Class& Year: B.Sc BZC III year

Test conducted for presence of: Carbon dioxide

Method: As soon as the 5ml samples of cooldrinks were taken in test tubes, 1 ml of lime water were added the lime water turned into milky.

S.No	Brand Used	Amount	Inference
1	Fanta	5ml	turned milky
2	cocacola	5ml	turned milky
3	Thums up	5ml	turned milky
4	Sprite	5ml	turned milky
5	Limca	5ml	turned milky

K. Sai