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To Find the Content of Cold Drinks Available in the Market

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***Abstract*: 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 $C_X(H_2O)Y$. Glucose is a monosaccharide with formula C6H12O6. 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.**

***Keywords*: cold drinks, carbohydrates, monosaccharide, disaccharides, reducing, non-reducing.**

1. Methods

A. Detection of P^H

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.

Table 1
Observation

S. No.	Name of Cold Drinks	Colour Change	pH Value
1	Coca cola	Pink	1-2
2	Sprite	Red	2.5
3	Limka	Pink	4
4	Funta	Light orange	2-4

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.

B. Test for carbon dioxide

Experiment:

As soon as the bottles were opened, one by one the sample was passed through lime water. The lime water turned milky.

Table 2
Observation

S. No.	Name of old Drinks	Time Taken (Sec)	Conclusion
1	Coca cola	25	CO2 is present
2	Sprite	20	CO2 is present
3	Limka	32	CO2 is present
4	Funta	35	CO2 is present

Inference: All the soft drinks contain dissolved carbon dioxide in water. The carbon dioxide (CO2) dissolves in water to form carbonic acid, which is responsible for its tangy taste.
Chemical Reaction Involved:

$$Ca(OH)2\ (s) + CO2(g) \text{ ---> } CaCO3\ (s) + H2O(s)$$

C. Test for glucose

Glucose is a Reducing sugar acid. Its presence is detected by the following test:

1) Benidicts's solution test

A small sample of cold drink of different brands was taken in a test tube anda few drops of Benedict's reagent were added. The test tube was heated for few seconds. Formation of reddish color confirms the presence of glucose in cold drinks.

Table 3
Observation

S. No.	Name of Cold Drinks	Observation	Conclusion
1	Coca cola	Reddish Color	Glucose is Present
2	Sprite	Reddish Color	Glucose is Present
3	Limca	Reddish Color	Glucose is Present
4	Funta	Reddish Color	Glucose is Present

2) Fehling's solution test

Table 4
Observation

S. No.	Name of Cold Drinks	Observation	Conclusion
1	Coca cola	Reddish Brown Color	Glucose is Present
2	Sprite	Reddish Brown Color	Glucose is Present
3	Limca	Reddish Brown Color	Glucose is Present
4	Funta	Reddish Brown Color	Glucose is Present

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 a water bath for 10 minutes. Appearance of brown precipitate confirmed the presence of glucose in cold drinks.

Inference: All the samples gave positive test for glucose with Fehling's (A & B) solutions. Hence all the cold drinks contain glucose.

D. Test for alcohol

Samples of each brand of cold drinks are taken in sample test tube and iodine followed by potassium iodide and sodium hydroxide (NaOH) solution is added to each test tube. Then the test tube are heated in hot water bath for 30 minutes yellow colored precipitate confirmed the presence of alcohol in cold drinks

Table 5
Observation

S. No.	Name of Cold Drinks	Observation	Conclusion
1	Coca Cola	Yellow color ppt.	Alcohol is present
2	Sprite	Yellow color ppt.	Alcohol is present
3	Limca	Yellow color ppt.	Alcohol is present
4	Funta	Yellow color ppt.	Alcohol is present

Inference: All the cold drinks samples gave positive test for alcohol. Hence all the cold drinks contain Alcohol.

Chemical Reaction Involved:

CH3CH2OH + 4I2 + 6NaOH --------CHI3+ HCOONa + 5NaI + 5H2O

E. 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 (HNO3) was added to it. The solution was heated. Appearance of canary-yellow precipitate confirmed the presence of phosphate ions in cold drinks.

Table 6
Observation

S. No.	Name of Cold Drinks	Observation	Conclusion
1	Coca Cola	Canary-Yellow color ppt.	Phosphate is present
2	Sprite	Canary-Yellow color ppt	Alcohol is present
3	Limca	Canary-Yellow color ppt	Alcohol is present
4	Funta	Canary-Yellow color ppt	Alcohol is present

Inference: All the soft drinks samples gave positive test for phosphate ions. Hence all the cold drinks contain phosphate.

Chemical Reaction Involved:

NaHPO4+12(NH4)2MoO4+21HNO3+3H+ ⟶ (NH4)3PO4.12MoO3+ 21HN4NO3+12H2O

2. Conclusion

After conducting several tests, it was concluded that the different brands of cold drinks namely 1. Coca cola 2. Sprite 3. Limca 4. Fanta All contains glucose, alcohol sucrose, phosphate, ions and carbon dioxide. All are acidic in nature. On comparing the pH value of different brands coca cola is most acidic and limca is least acidic of all the four brands taken. pH value of coca cola is nearly equal to disinfectant which is harmful for body. Carbon Dioxide Among the four samples of cold drinks taken –sprite has maximum amount of dissolved carbon dioxide and Fanta has minimum amount of dissolved carbon dioxide.

A. Disadvantages of cold drinks

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

B. Uses of cold drinks

- Cold drinks can be used as toilet cleaners.
- They can remove rust spots from chrome car humpers.
- 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 bolt.

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