INVESTIGATORY PROJECT

ON

CONTENTS OF SOFTDRINKS

SUBMITTED BY MASTER

SUBMITTED TO MR.

KENDRIYA VIDYALAYA

CERTIFICATE

This is to certify that " NAME OF STUDENT " a student of class 12th has successfully completed the project on the topic " PROJECT NAME " under the guidance of Mr TEACHER NAME The reference taken in making this project has been declared at the end of this project.

Signature {subject teacher}

Signature {examiner}

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to my guide TEACHER NAME for his exemplary guidance, monitoring and constant encouragement throughout the course of this project . The blessing, help and guidance given by him time to time shall carry me a long way in the journey of life on which I am about to embark.

I also take this opportunity to express a deep sense of gratitude to Principal Kendriya Vidyalaya Panna for his cordial support, valuable information and guidance, which helped me in completing this task through various stages.

Lastly, I thank almighty, my parents, brother, sisters and friends for their constant encouragement without which this assignment would not be possible.

Student's Name

PURPOSE

In recent days, soft drink brands were put into various questions regarding their purity. News flashed that they contain harmful pesticide, which arouse interest in knowing its contents because I have been drinking them for years. I wanted to confirm that whether the charge impose on these brands are true or not.

Another fact which inspired me to do this project is that I am in touch with qualitative analysis whose knowledge with other factors helped me to do so.

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

CONTENTS

THEORY

Cold drinks of different brands are composed of alcohol, carbohydrates, carbondioxide, phosphate ion, etc. These soft drinks give feelings of warmth, lightness and 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 naturally occuring 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 carbohydrate are classified as:-
Monoasscharide, 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-reducting 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

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APPARATUS

- Test Tube
- Test Tube Holder
- Test Tube Stand
- Stop Watch
- Beaker
- Burner
- pH paper tripod stand
- China Dish
- Wire Gauge
- Water Bath

Chemical Required

⇒ Iodine Solution
⇒ Potassium Iodine
⇒ Sodium Hydroxide
⇒ Fehling's A & B solution
⇒ Lime Water
⇒ Concentrated HNO_3
⇒ Benedict Solution
⇒ Ammonium Molybdate

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.

Observation

Serial No.	Name of Drinks	Change in color	pH value
1	Coca - Cola	Pink	1.2
2	Fanta	Light Green	2.3
3	Limca	Pinkish	3 - 4
4	Sprite	Orange	3

Inference

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

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

Observation

Serial no.	Name of Drink	Time Taken	Conclusion
1	Coca-Cola	26.5	CO_2 is Present
2	Fanta	36	CO_2 is Present
3	Limca	35	CO_2 is Present
4	Sprite	21	CO_2 is Present

Inference:
All the soft drinks 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.

Chemical Reaction Involved:

$$Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$$

TEST FOR GLUCOSE

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

1. Benedicts's Solution Test

A small smaple of cold drink of different brands was 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 conforms the presence of glucose in cold drinks.

Observation

Serial No.	Name of Drinks	Observation	Conclusion
1	Coca-Cola	Reddish	Glucose
2	Fanta	Reddish	Glucose
3	Limca	Reddish	Glucose
4	Sprite	Reddish	Glucose

Inference:

All the samples gave positive test for glucose with Benedict's reagent. Hence all the drinks contain glucose.

TEST FOR PHOSPHATE

Sample of each brand of cold drink we taken in a separate test tube and ammonium molybdate followed by concentrated nitric acid (HNO_3) was added to it, the solution was taken heated and the color of precipitate confirms the presence of phosphate ions.

Observation

Serial No.	Name of Drink	Observation	Conclusion (present)
1	Coca-cola	Canary-Yellow Precip.	Phospate
2	Fanta	Canary-Yellow Preci-	phosphate
3	Limca	Canary-Yellow Preci	Phosphate
4	Sprite	Canary-Yellow Preci	Phosphate

Inference:
All the soft drinks contain phosphate ions which are detected by the presence of phosphate when canary yellow obtained.

Chemical Reaction Involved

$$CH_3CH_2OH + 4I_2 + 6NaOH \longrightarrow CHI_3(s) + HCOONa + 5NaI + 5H_2O$$

Iodoform

TEST FOR ALCOHOL

Sample of each brand of cold drink 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 min. yellow colored precipitate confirmed the presence of alcohol in cold drinks.

Observation

Serial No.	Name of Drinks	Observation	Conclusion
1	Coco-cola	Yellow - precipitate	Alcohol is present
2	Fanta	Yellow-precipitate	Alcohol is present
3	Limca	Yellow-precipitate	Alcohol is presen
4	Sprite	Yellow-precipitate	Alcohol is present

Inference

All the brands of cold drinks contain alcohol.

Chemical Rxn Involved

$$CH_3CH_2OH + 4I_2 + 6NaOH \longrightarrow CHI_3 + HCOONa + 5NaI + 5H_2O$$

RESULT

★ After conducting several tests, it was concluded that the different brands of cold drink namely

1. Coca cola
2. Sprite
3. Limca
4. Fanta

★ All contains glucose, alcohol, sucrose, phosphate ions and CO_2. All are acidic in nature

★ On comparing the pH value of different brand coca-cola is most acidic and limca is least acidic of all the four brands taken.

★ pH value of coca-cola is nearly equal of ~~detergent~~ disinfectant which is harmful for body

★ Sprite has maximum amount of dissolved carbon dioxide and fanta has minimum amount of dissolved carbon dioxide.