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PHYSICO-CHEMICAL EVALUATION OF SOME NON-ALCOHOLIC BEVERAGES

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ABSTRACT

The physicochemical characteristics of the Soft Drinks were studied. Five drinks namely Thumpus, Coco-cola, Fruti, Fanta and Sprite were randomly collected from a shop that stored them at ambient temperature. Biochemical (Protein, Carbohydrate and Fatty acid) and Physiochemical Analysis of soft drinks is carried out. Colour, Odour, Temperature, Turbidity, Salinity, pH, Electrical conductivity, Total dissolved solid, Dissolved oxygen, Biological oxygen Demand, and chemical oxygen demand are analyzed the soft drinks. Higher protein concentration (0.88 mg/ml) present in Fruiti and lowest concentration in (0.35 mg/ml) in Sprite. Higher Total Carbohydrate present in (0.91mg/ml) in Fruiti and lowest present in (0.47mg/ml)in Coca-cola. Higher present Fatty Acid in (0.81mg/ml) in Thumps up and lowest present in (0.33mg/ml) Sprite.. Biological Oxygen Demand is highest in Fruiti (10.0) and Fanta (9.5) and lowest in Thumps up (8.0) and Coca cola (7.7). The investigation of these study show that the different physicochemical evaluation of the non alcoholic beverages.

KEYWORDS: Soft Drinks, Beverages, Non-alchohalic, Fatty Acid.

Non-alcoholic beverages play a very important role in the dietary pattern of people in developing countries like India. They are regarded as after meal drinks or refreshing drinks during the dry season in rural and urban centers. Most of these beverages are made up of about 90% water, sugar, flavoring agents and sometimes preservatives. Juice is a liquid naturally contained in fruit or vegetable tissue. Juice is prepared by mechanically squeezing or macerating fresh fruits or vegetables without the application of heat or solvent. For example, orange juice is the liquid extract of the fruit of the orange tree (Doyle, 1991). Juice may be market in concentrate form, sometime frozen, requiring the user to add water to constitute the liquid back to its "original state" (Doyle, 1991). However, concentrates generally have a noticeable different taste than their comparable "fresh squeezed" versions. Other juices are reconstituted before packaging for retail sale (Brandon and Ferreiro, 1998). Soft drinks are complex mixtures containing different variety of substances such as coloring compounds, flavoring agents, acidifiers, sweeteners, preservatives and caffeine (ISO, 2005). Soft drinks are generally synthesized with water plus 1 – 3% liquid carbon dioxide, 3 – 5% liquid sugar, acidified to a pH of about 3.5, emulsifiers, colors, flavors and/or spices, herbs and extracts of roots, leaves, seed and flower or bark. Chandrakar *et.al*., 2014 observed Clastogenic effect of soft drink on root tip of Allium cepa. Soft drinks are referred to as "carbonated beverages", "soda water", "soda", "pop" or "drinks" (Woodroof and Phillips, 1974). The objective of this study was to identify the physico-chemical characteristics of soft drink

MATERIALS AND METHODS

Five Different Soft Drinks Thumpus, Coco-cola, Fruti, Fanta and Sprite are collected from different shops. Biochemical (Protein, Carbohydrate and Fatty acid) and Physiochemical analysis of soft drinks.

Biochemical Test

Protein Estimation by Lowry's Method

Estimation of Protein Pipette out 0.2, 0.4, 0.6, 0.8 and 1ml of the working standard into a series of test tubes. Pipette out 0.1ml and 0.2ml and 0.2ml of the sample extract in two other test tubes. Make up the volume to 1ml in all the test tubes. A tube with 1ml of water serves as the blank. Add 5ml of reagent C to each tube including the blank. Mix well and allow standing for 10 min. Then add 0.5ml of reagent D, mix well and incubate at room temp in the dark for 30min.Blue colour is developed. Take the readings at 660nm. Draw a standard graph and calculate the amount of protein in the sample. This procedure can be done 3 times for accurate result.

Determination of total Carbohydrate by Anthrone Method

Estimation of Carbohydrate

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Weigh 100ml of the sample into a boiling tube. Hydrolyse by keeping it in a boiling water bath for three hours with 5ml of 2.5ml N-HCL and cool to room temperature. Make up the volume to 100ml and centrifuge. Collect the supernatant and take 0.5 and 1ml aliquots for analysis. Prepare the standards by taking 0, 0.2, 0.4, 0.6 and 0.8 and 1ml of the working standard.'0' serves as blank. Make up the volume to 1ml in all the tubes including the sample tubes by adding distilled water. Then add 4ml of anthrone reagent. Heat for eight minutes in a boiling water bath. Cool rapidly and read the green on dark green color at 630nm. Draw a standard graph by plotting concentration of the standard on the X-axis versus absorbance on the axis. From the graph calculate the amount of carbohydrate present in the sample tube. This procedure can be done 3 times for accurate result.

Estimation of Free Fatty Acids

Dissolve 1-10ml of oil or melted fat in 50ml of the neutral solvent in a 250ml conical flask. Add a few drops of phenolphthalein. Titrate the contents against 0.1N potassium hydroxide. Shake constantly until a pink color which persists for fifteen seconds is obtained. This procedure can be done 3 times for accurate result.

Physiochemical Test

Physiochemical Analysis of soft drinks is carried out. Colour, Odour, Temperature, Turbidity, Salinity, pH, Electrical conductivity, Total dissolved solid, Dissolved oxygen, Biological oxygen Demand, and chemical oxygen demand are analyzed the soft drinks.

RESULTS AND DISSCUSSION

Biochemical Analysis

We can analysis the concentration of Protein, Carbohydrate and Fatty Acid in Soft Drinks.

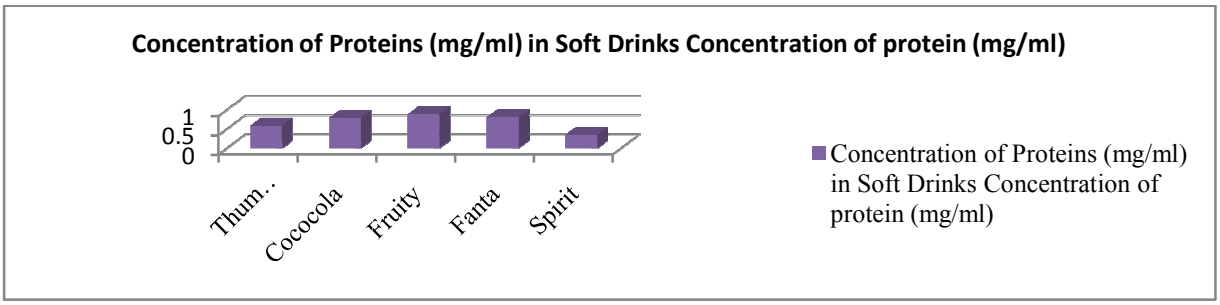
Concentration of Proteins Carbohydrate and Fatty Acid in Soft Drinks

S.No.	Soft Drinks	Concentration of protein (mg/ml)	Concentration of Carbohydrate (mg/ml)	Concentration of Fatty Acid (mg/ml)
1	Thumps up	0.58	0.47	0.81
2	Cococola	0.78	0.73	0.73
3	Fruiti	0.88	0.91	0.77
4	Fanta	0.80	0.89	0.69
5	Sprite	0.35	0.77	0.33

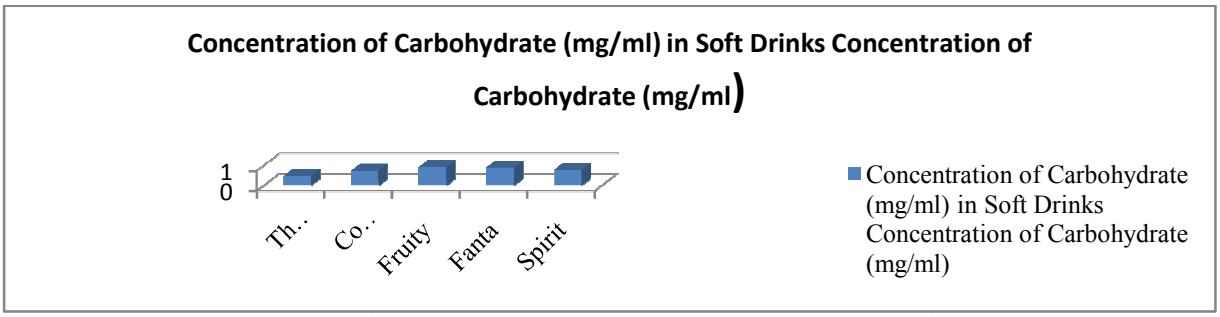
Physiochemical Parameters

Soft Drinks	Colour	Odour	Temperature (ºC)	Turbidity (600nm)	Salinity (mg/ml)	pH	EC (µmoh/cm)	TDS(mg/ml)	(DO) mg/li	(BOD) mg/li	(COD) mg/li
Thumps up	Brown	Funky	32ºC	0.02	0.48	5.8	1565	4.470	5.5	8.0	13.45
Cococola	Brown	Funky	33ºC	0.05	0.44	5.9	1513	4.325	5.4	7.7	14.50
Fruity	Orange	Fruity	30ºC	0.01	0.97	6.3	1630	5.540	4.5	10.0	13.78
Fanta	White	No Odor	30ºC	0.04	0.57	6.6	1519	6.562	4.2	9.5	15.81
Spirit	Colour less	lemon-lime flavored	32ºC	0.02	0.62	5.4	1616	5.284	5.0	8.9	14.54

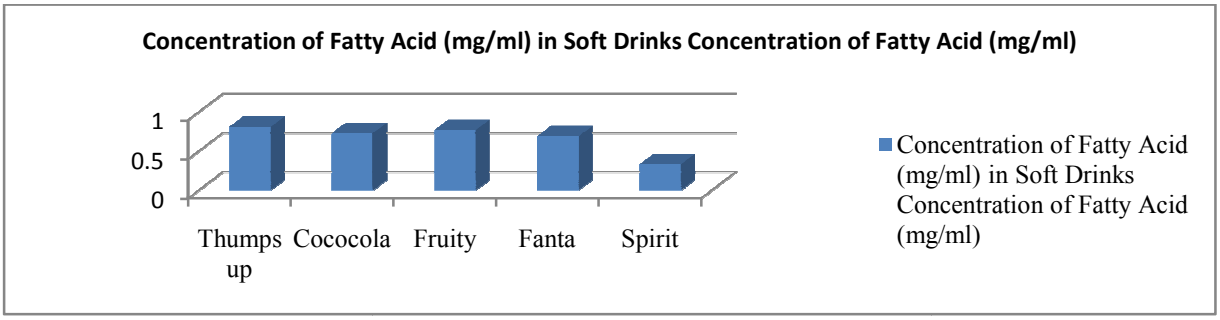
Graph 1: Shows Concentration of Proteins (mg/ml) in Soft Drinks



Graph 2: Shows Concentration of Carbohydrate (mg/ml) in Soft Drinks



Graph No. 3 Shows Concentration of Fatty Acid (mg/ml) in Soft Drinks



Higher protein concentration (0.88 mg/ml) present in Fruity. And lowest concentration in (0.35 mg/ml) in Spirit. Higher Total Carbohydrate present in (0.91mg/ml) in Fruity and lowest present in (0.47mg/ml). Higher present Fatty Acid in (0.81mg/ml) in Thumps up and lowest present in (0.33mg/ml) Spirit. Biological Oxygen Demand is highest in Fruity (10.0) and Fanta (9.5) and lowest in Thumps up (8.0) and coca cola (7.7).Many microorganisms are found in fruit juice and soft drinks as environmental or raw material contaminations either during their growing in fields, orchards, vineyards or greenhouse or during harvesting, post-harvest handling and distribution. But relatively few can grow within the acidic and low oxygen environment, yeast are the most significant group of microorganisms associated with spoilage of fruit juice and soft drinks. According to WHO (2003), a food is deemed to be adultered if its content is composed in whole or in part of any poisonous or deleterious substance, which renders its contents injuries to health. Improper washing of fruits adds these bacteria to juices leading to contamination (Durgesh *et al.,* 2008). In addition lack of appreciation of basic safety issues by vendors contribute to augmentation of the microbial loads (Durgesh *et al.*, 2008). These include use of crude stands and carts, unavailability of running water for dilution and washing, prolonged preservation without refrigeration, unhygienic surroundings with swarming flies and airborne dust(Lewis *et al.*, 2006; Durgesh *et al.,* 2008).

CONCLUSION

The investigation of these study show that the fruity and Fanta are highly contaminated. Some physico-chemical indices of soft drinks are highly acidic. The analysis of our data showed that soft drinks are not hygienic. The Biological oxygen demand and chemical oxygen demand are very high and dissolved oxygen is low. That shows the availability of microbes. However, the average ranges obtained for the bacteria and fungi indicated a public health concern as they showed counts far above this limit. These high counts are suggestive of heavy bacterial and fungal contamination of the packaged soft drinks during handling since they are liquid, which could have contributed to the development as well as multiplication of these contaminants.

The results confirm that the water and fruits are used is not a hygienic and also processing and handling is not sterilized.

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