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Study on Seven Tropicana brand beverages with respect to Calcium and Nitrate ion Concentrations

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ABSTRACT: *In the present work we tried to find out calcium and nitrate ion concentrations of seven tropicana brand fruit juices. All these packed fruit juices are very common, available and widely sold within India. The calcium ions found in very low concentrations in most of the juices. Nitrate ions also present in very low concentrations within all the beverages. The juices are safe to consume in reference to nitrate ions.*

Keywords:*Tropicana, fruit juices, calcium ion, nitrate ion.*

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INTRODUCTION

Calcium ion is one of the bulk metal ion which is very important for human body. Calcium is the major component of bone, teeth etc. Calcium is also important for enzyme activation. The natural nitrate concentration in groundwater is a few milligrams (4-9) per literand depends greatly on soil type. In general in drinking water nitrate concentration do not exist 10 mg/L According to WHO permissible limits for nitrate in drinking water is 50 mg/L. According to Bureau of Indian Standards, 2012, the nitrate concentration above 45 mg/L in drinking water may cause serious health hazards (Taneja *et al*., 2015). Calcium ion concentration is almost constant within human body fluids and blood. The studied fruit juices provide calcium ion to human body. The $[Ca^{2+}]_{outside\ cell}/[Ca^{2+}]_{inside\ cell} = 1000$ (approx). The packed beverages containing milk products generally provide more calcium ion than fruit juices. It is reported that fruit drinks are relatively higher TDS values and do not contain caffeine. Literature study shows all are the good source of potassium ion (Chatterjee and Ray, 2014). Within Mogu Mogu product packed food juices calcium concentrations are very high whereas nitrate concentrations are almost zero (Ray et al., 2021)

MATERIALS AND METHODS

All the samples subjected for study were sealed tetra packs and manufactured within last few months. Nitrate, and calcium ion concentrations are measured using Systronics (India) made ion meter model number SYS-460 at Environmental Chemistry Research Laboratory, Barrackpore Rastraguru Surendranath College, Barrackopre, North 24 Parganas, WB. Calcium ion concentration was measured using ISE 40 electrode. Nitrate ion concentration was measured using ISE 62 electrode. Ion free, redistilled water, prepared at laboratory, were used for all the analysis. All the measurements were carried out between 20°-23°C.

RESULT

Table 1: Energy value and make of studied Tropicana brand beverages

Sl No.	Name	Make	Batch Number	Energy Value (kcal/100ml)
1.	Cranberry Delight (Tropicana Beverage)	Schreiber Dynamix Dairies Ltd.	7467D24L20	43

2.	Apple Delight (Tropicana Beverage)	Schreiber Dynamix Dairies Ltd.	7467D26I20	48
3.	Pomegranate Delight (Tropicana Beverage)	Schreiber Dynamix Dairies Ltd.	7467D15J20	47
4.	Pineapple Delight (Tropicana Beverage)	Schreiber Dynamix Dairies Ltd.	7467D19K20	45
5.	Mango Delight (Tropicana Beverage)	Schreiber Dynamix Dairies Ltd.	7467D03K20	61
6.	Orange Juice (Tropicana 100%)	Schreiber Dynamix Dairies Ltd.	7467D28J20	45
7.	Apple Juice (Tropicana 100%)	Schreiber Dynamix Dairies Ltd.	7467D02I20	47

Table 2: Calcium and nitrate ion concentration of studied Tropicana brand beverages

Sl No.	**Name**	**Ca^{++} (ppm)**	**NO_3^- (ppm)**
1.	Cranberry Delight(Tropicana Beverage)	1.2	2.6
2.	Apple Delight(Tropicana Beverage)	1.7	9.6
3.	Pomegranate Delight(Tropicana Beverage)	0.082	4.8
4.	Pineapple Delight(Tropicana Beverage)	35	3.1
5.	Mango Delight(Tropicana Beverage)	12	0.246
6.	Orange Juice(Tropicana 100%)	18	1.8
7.	Apple Juice(Tropicana 100%)	3.8	7.2

DISCUSSION

Studied fruit juices provide energy value between 43 to 61kcal/100 ml. Calcium concentration varies within 1.2 ppm to 35 ppm except pomegranate delight. The order of fruit juices with reference to calcium concentration is pineapple delight > orange juice > mango delight >apple juice > apple delight > cran berry delight > pomegranate delight. All the fruit juices have low nitrate ion concentration. The order of fruit juices with reference to nitrate concentration is apple delight > apple juice > pomegranate delight >pineapple delight >cranberry delight >orange juice > mango delight.

CONCLUSION

Tropicana mango delight provide maximum energy and Tropicana cranberry delight provide minimum energy. Tropicana pomegranate delight contain extremely low calcium ions. Pineapple delight is a rich source of calcium ion. Now a days nitrate ion within drinking water is an issue of great concern for human health. Since all the juices contain less than 10 ppm nitrate ions, it maybe conclude that all the studied beverages are safe with respect to nitrate ions.

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