MoguMogu Brand Fruit Drinks with Reference to Physico-chemical Parameters, Bulk Metals and Nitrate ion.

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Abstract

In this study we had subjected MoguMogu juice drinks with nata-de-coco made by Sappe public Company Limited.We tried to find outphysico-chemical parameters like Salinity, TDS, Conductance, pH and biologically significant ions like sodium, potassium, calcium and nitrate present in these juice drinks. Generallyfruit product beverages are srongly acidic and have moderate TDS, salinity and conductance values [1][2]. All studied juicesare strongly acidic. All have moderate TDS, sodium ions and potassium ions. All these juice drinks contain high calcium ions and very low nitrateconcentration.

Keywords: *MoguMogu drinks,Physico-chemical parameter, Sodium, Potassium, Calcium, Nitrate*.

Introduction

Fruit juices are generally acidic due to presence of organic acids. In general most of the fruit juices have pH below 4. pH of human blood is slightly alkaline. TDS denotes total dissolved solids.Generallyfruit juice or drinks have TDS value between 100 -1000 ppm [1-5]. Salinity reflect the amount of salt present and Conductance value denotes the amount of ions present. All the Tropicana brand and Real brand packed juices contain relatively high potassium ion concentration and$[K^+]/[Na^+]$value lies between 1.07 to 48.57 [1].For carbonated soft drinks available like RC Cola, Pepsi, Coca cola and Thums-up the$[K^+]/[Na^+]$values are greater than unity[5].Sodium ion regulates blood volume, blood pressure, osmotic pressure and of pH of human blood. Potassium is the most important intracellular ion. Calcium ion is significant as they are the major component of the structural materials of bone, teeth and shell within the living systems [6].According to the Bureau of Indian Standards, 2012,Permissible limits for nitrate in drinking water is 45 mg/L NO_3^- and have a guideline value of 50 mg/L (WHO, 2011) above which it can pose serious health hazards [7].Sodium ion, potassium ion, calcium ion, chloride ion and nitrate ion concentrations are almost constant within human body fluid and blood.The exact

concentrations of these ions are different for different type of cells or body fluids.People consume refreshing packed drinks specially during summer, which provide sodium, potassium, calcium, chloride etc. ions to human bodyand compensate the loss of body fluid and ions due to sweating[6][8-20].potassium ion concentration outside cell is 0.2 g per litreand that for sodium is 3.45 g per litre(approx). Within the cellpotassium ion concentration is 6 g per litreand that for sodium is 0.23 g per litre(approx).The ratio $[Ca^{2+}]_{outside\ cell}/[Ca^{2+}]_{inside\ cell}$ is 1000 (approx) for human body[6].For our present study, samples subjected for analysis areMoguMogu apple juice drink with nata-de-coco, MoguMogu pineapple juice drink with nata-de-coco, Mogumogu orange juice drink with nata-de-coco and MoguMogu grape juice drink with nata-de-coco**.**

Materials And Methods

All the samples subjected for study were sealed poly bottles and manufactured within last four months. Nitrate, and calcium ion concentrations are measured using Systronics (India) made ion meter model number SYS-460. Calcium ion concentration was measured using ISE 40 electrode. Nitrate ion concentration was measured using ISE 62 electrode. The sodium ion concentrations and potassium ion concentrations were measured at the using Systronics (India) made Flame photometer 128 µC. Using EUTECH made Multi-parameter PCSTestr 35 Temperature, pH, Total Dissolved Solid (TDS), conductance and salinity were measured. Ion free, redistilled water, prepared at laboratory, were used for all the analysis. All the measurements were carried out between 25°-27°C. All experiments were carried out at environmental chemistry research laboratory, Barrackpore RastraguruSurendranath College, Barrackpore, North 24 Parganas, WB, India.

Results and Discussion

Table 1 : Name,Make, Batch number and Energy value of MoguMoguFruit Drinks

Sl No.	NAME	MAKE	BATCH NUMBER	ENERGY VALUE (Kcal/300ml)
1.	MOGU MOGU APPLE JUICE DRINK WITH NATA-DE-COCO	SAPPE PUBLIC COMPANY LIMITED	100 15	120Kcal
2.	MOGU MOGU PINEAPPLE JUICE DRINK WITH NATA-DE-COCO	SAPPE PUBLIC COMPANY LIMITED	100 13	160Kcal
3.	MOGU MOGU ORANGE JUICE DRINK WITH NATA-DE-COCO	SAPPE PUBLIC COMPANY LIMITED	100 18	150Kcal
4.	MOGU MOGU GRAPE JUICE DRINK WITH NATA-DE-COCO	SAPPE PUBLIC COMPANY LIMITED	100 19	150Kcal

Table 2 : Physico-chemical Parameter Data of MoguMoguFruit Drinks

Sl No.	NAME	pH	Conductance (µS)	TDS (ppm)	Salinity (ppm)
1.	MOGU MOGU APPLE JUICE DRINK WITH NATA-DE-COCO	3.55	920	646	448
2.	MOGU MOGU PINEAPPLE JUICE DRINK WITH NATA-DE-COCO	3.25	1864	1330	938
3.	MOGU MOGU ORANGE JUICE DRINK WITH NATA-DE-COCO	3.30	2560	1800	1310
4.	MOGU MOGU GRAPE JUICE DRINK WITH NATA-DE-COCO	3.74	1557	1100	781

Table 3 : Ion Concentration Data of MoguMoguFruit Drinks

Sl No.	NAME	Sodium ion (ppm)	Potassium ion (ppm)	Calcium ion (ppm)	Nitrate ion (ppm)
1.	MOGU MOGU APPLE JUICE DRINK WITH NATA-DE-COCO	342.9	95.6	8736	0.000
2.	MOGU MOGU PINEAPPLE JUICE DRINK WITH NATA-DE-COCO	608.9	164.7	5917	0.000
3.	MOGU MOGU ORANGE JUICE DRINK WITH NATA-DE-COCO	869.6	98.2	13721	0.732
4.	MOGU MOGU GRAPE JUICE DRINK WITH NATA-DE-COCO	458.8	82.2	15625	0.432

All the drinks have pH below 4 (Table 2). Mogumogu pineapple juice is most acidic and grape juice drink is least acidic. Orange juice showed maximum conductance whereas apple juice showed minimum conductance. Juice drinks maybe arranged according to TDS as MoguMogu apple juice drink with nata-de-coco<MoguMogu grape juice drink with nata-de-coco<MoguMogu pineapple juice drink with nata-de-coco<Mogumogu orange juice drink with nata-de-coco (Table 2).According to salinity the order is MoguMogu apple juice drink with nata-de-coco<MoguMogu grape juice drink with nata-de-coco<MoguMogu pineapple juice drink with nata-de-coco<Mogumogu orange juice drink with nata-de-coco (Table 2). Sodium ion concentration is minimum for apple juice drink and maximum for orange juice drinks. The order of potassium ion concentration and calcium ion concentration are not similar. With reference to potassium ion they maybe arranged as MoguMogu grape juice drink with nata-de-coco<MoguMogu apple juice drink with nata-de-coco<Mogumogu orange juice drink with nata-de-coco <MoguMogu pineapple juice drink with nata-de-coco (Table 3). As per calcium ion concentration MoguMogu pineapple juice drink with nata-de-coco<MoguMoguapple juice drink with nata-de-coco<Mogumogu orange juice drink with nata-de-coco <MoguMogu grape juice drink with nata-de-coco(Table 3). Nitrate ion concentrations for

MoguMogu apple juice drink with nata-de-coco and MoguMogu pineapple juice drink with nata-de-coco are 0.000ppm.MoguMogu grape juice drink with nata-de-cocoand Mogumogu orange juice drink with nata-de-cocohave very low (below 1 ppm) nitrate ion concentration (Table 3).

Conclusion

None of these fruit drinks contain caffeine. The energy value per 300 ml for various fruit drinks are listed in Table 1. MoguMogu pineapple juice drink provides maximum energy while MoguMogu apple juice drink provides minimum energy to our body. All the juice drinks are acidic. MoguMoguapple juice drink have moderate TDS and all other have high TDS values. MoguMoguPineapple juice drink and MoguMoguorange juice drink have high salinity. MoguMogu apple juice drink andMoguMogu grape juice drink shows moderate salinity. Conductance value is high for MoguMogu pineapple juice drink,MoguMogu orange juice drink andMoguMogu grape juice drink. These data confirms the presence of more salts, hence more ions in the above mentioned fruit drinks. It must be noted that MoguMogu juice drinks contain higher sodium ion concentration than other fruit drinks available in Indian market like Tropicana brand products, Real brand products etc [1]. Interestingly common non-fruit soft drinks available in Indian market contain potassium ion concentration 0-80 ppm [5]. Potassium concentration of MoguMogu products lies between 82.2 to 164.7 ppm, which is lower than Tropicana brand products and Real brand products. All the juice contain high calcium ion and all are rich source of calcium ion. Calcium ion concentration is maximum for MoguMogu grape juice drinks and minimum for MoguMogu pineapple juice drink. Nitrate ions are insignificant for all these drinks. If we look into the ratio of sodium ion, potassium ion and calcium ion concentration in these fruit juice drinks, for MoguMogu apple juice drink the ratio is 3.59:1:91.38, for MoguMogu pineapple juice drink the ration is 3.9:1:35.93, for MoguMogu orange juice drink the ratio is 8.86:1:139.73 and for MoguMogu grape juicr drink the ration is 5.58:1:190.08. None of these fruit drinks contain added vitamins.

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