Carbonated Drinks: Good Hosts to Bad Health

The very name sends pleasurable sensations down one's throat!

These drinks are everywhere, in myriad avatars - sending celebrities into swoons or into undertaking death defying feats!

Sparkling and twinkling, creating a fizzy haze, making consumers down vast quantities of junk food, helped by the pleasurable gulps.

We tested 16 brands - a merry mix of colas and orange drinks, the sparkling variety and the Diet option for the weight conscious.

What did we find? Nothing - well almost - and we can declare with impunity - 'All is well' in pleasure land - packaging, labeling, marking, quantity, no heavy metals, pesticides or microbes - nothing to worry ...go ahead and swill with a clear conscience - except!!!!

This one product is sending the western hemisphere into a tizzy with obese people tripling every decade -- with untold health problems and consequent financial burdens for the health providers.

How can we Indian consumers be far behind our colonial cousins? We follow them as faithfully as ever, stuffing our fridges with the lethal brew, and letting our children splurge uncontrolled, even feeding them to toothless babies, condemning them to life-long tooth troubles.

Our test has thrown up some questions about corporate and consumer responsibility, as well an immediate need for stringent action by regulatory authorities. Some of these are:

Why do we have products with proven long term as well as short term negative effects on consumer health as well as the environment? When asking around, we got the following response from consumers: 'Oh you know the sector employs so many people and they'll all be without jobs if this was shut down.' Just goes to show the level and understanding of consumers towards their responsibility to society!

SO WHAT'S NEXT?

Next : 'Its a question of consumer choice - no one is forcing anyone. Consumers don't need to buy this stuff if they don't want to.'

Well yes of course, except the fact that children and the poor, at least in the west, form the largest consumer segment hooked on to these products. There is a long history of sugar dependence from the days of slave labour, when slaves were given rations of sugar in the sugar plantations to keep their energy levels high on least cost for the employers. Only now the employers have been replaced by Corporates and Consumers are the new slaves.. slaves to sugary options, netting huge profits for the manufacturers as well as the

health providers at the ultimate cost of their own health.

If consumers have been alerted to concerns about sugar, how about the sugarless option?

The sugarless option, namely the Diet-Coke, our test shows , has indeed no sugar, but it has aspartame or even worse Acesulfame-K, as declared on their labels. So what consumers get is a product not only nil in nutrition, but also minus the energy spiking sugar, and a more costly product to boot.

What about the regulatory authorities?

Well the standards that are in place are about parameters that are cosmetic, as discussed earlier. The labels need to carry alerts " Not fit for consumption by children below the age of ----, if consumed, the portions need to be limited to maximum ...

This product is no less risky than cigarettes or alcohol and needs similar alerts and warnings.

Cold Drinks or Carbonate Drinks.

Carbonated drinks are known by various names world over like soda, sparkling, and also as 'thanda' in India. All the carbonated drinks come with a fizz that is produced by the carbon dioxide gas that is pressurised into the water. Other than the effervescent water, carbonated drinks or soda primarily contain ingredients like sweetener (artificial or natural), a synthetic taste enhancer like caffeine and a flavouring agent, in a combination of one or more. The sweetener may be a sugar, high fructose corn syrup, or a sugar substitute in the case of diet drinks. A soft drink, mainly in cola category may also contain caffeine. Widely sold soft drink flavours are cola, lemon-lime, root beer, orange, grape vanilla, ginger ale, fruit punch and sparkling lemonade. The Name and the ranking of the brands and variants of carbonated beverages tested by *Consumer VOICE* are as follows:

Brand	Ranks
Cola	
Coca Cola	1
RC Cola	2
Catch	3
Pepsi	4
Thums Up	5
Big Cola	6
Orange	
Fanta	1
Mirinda	2
Lime	
7 Up	1
Limca	2
Arora Lemon (local)	3
Sparkling	
Sprite	1
Mountain Dew	2
Appy Fizz	3
Diet Cola	
Diet Pepsi	1
Diet Coke	2

Packing standards touches the benchmark

As per the Indian Standard, Carbonated Beverages should be filled in glass containers, cans or food-grade plastic containers under strict sanitary conditions. To avoid contamination after packaging, the containers should be cleaned and/or sterilized. And finally the containers must be hermetically sealed with clean new crown or caps.

Contrary to negative speculation about hygiene, all the brands of

Key Findings

All the brands of carbonated beverages were found free from contamination of pesticides residues and without any microbial contamination as well as heavy metals.

In organolaptic properties like colour, appearance, flavor & taste, brand Coca Cola performed well followed by Mirinda and Sprite.

Brand Diet Pepsi (71.56ppm) was found with lowest caffeine content however brand Diet Coke (130.48ppm) was found with highest caffeine content.

Sugar was found between the ranges of 10.02 to 13.62. Brand Catch (10.02%) had lowest sugar however Mirinda (13.6%) had the highest quantity.

Brand Mountain Dew claimed caffeine contain on its label but was not detected while testing.

carbonated beverage were found to be properly packed in PET bottle. All the carbonate drinks container tested, including Arora Lemon which is packed in typical glass bottle seal through marble ball, scored 3 out of 3 in our rating.

Diet Cola scores a perfect 10 in labelling and instruction

As per the Indian Standard, The containers of carbonated beverages should be legibly and indelibly bear a number of information that gives the consumer a complete idea of the product they are drinking. The mandatory information on the Containers is as follows.

a) Name of the product
b) Name and address of the manufacturer
c) Date of manufacture
d) Batch Number
e) Net volume of content
f) Green dot (Veg. mark)
g) FPO license number
h) Storage instructions
i) Instructions of use/consumption
j) List of key ingredients
k) Nutritional information
l) Disposal of Packaging/recyclability of packaging

Except Diet Coke and Diet Pepsi all other brands did not mark instructions for use on their label. Diet Coke was found with adequate information on its label. Brand Arora Lemon was found with lowest required information on its label. And half of the brands did not give instructions for storage. And a50% of them did not give the green dot that indicates that the product is vegetarian. Seven out of the 16 products scored 4.5 out of 5 in our ranking system with Diet Coke scoring a perfect 5, which is no surety that this 'Diet' versions is a better option for consumers.

Manufacturers generous in filling the containers

It is a good thing that the big brands in India are generous in pouring more than the printed amount in the containers. Our results show that 11 out 16 brands had at least 5 ml more than what is claimed on the label. And the rest were filled to absolute perfection. Hence we gave full marks to all the brands.

Sugar content kept in check

Brix (symbol °Bx) is the sugar content in the aqueous solution. One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percentage by weight (% w/w). If the solution contains dissolved solids other than pure sucrose, then the °Bx is just an approximate of the dissolved solid content. As per the Indian standard the sugar content should not be less than 8°Bx. Carbonated drinks low down in rating contain artificial sweeteners.

All the brands we tested met the minimum requirement for Brix and were found between the ranges of 10.15 to 13.78. In our assumption the sugar content should neither be too high nor too low, and hence the highest ranking for the right amount of sugar content given to Pepsi followed by Big Cola. The lowest ranking was given to Miranda which had the highest sugar content brix ration of 13.78 in our test. Requirement of brix does not apply to Diet cola drinks, as these brands are sugar free and add artificial sweeteners as sweetening agent.

Sugar content within limits

Sugar (Sucrose) is a Disaccharide that can be made from the combination of Monosaccharides, glucose and fructose. It is a sweet crystalline or powdered substance, consisting of sucrose obtained mainly from sugar cane and sugar beets and used in many foods, drinks, and medicines to ostensibly improve their taste. As per the Indian Standard, it should

Our Desi Lemon since 19th Century

Locally manufacture soda is sold in India—packed in distinctive, green-tinged, Codd-neck bottles and closed with a marble. Lines of green bottles, in crates with lemons perched on them are a common sight around tea stalls in India. Sodas are made in one room

bottling operation and are a cottage industry. These sodas are part of the Indian culture, and have been around long before independence. Hence, even when the market is taken over by branded carbonated drinks; desi soda still has its share of the market. To open a soda bottle is an art in itself, just press down the marble and the bottle opens like champagne. The local soda industry in facing a crisis as the raw material for making the bottles is costly. But this small room soda making industry lives on as Ordinary people identify with this drink and it is part of the culture.

not be less than 5% in carbonated beverages.

All brands of carbonated beverages met the minimum requirement for sugar content in it. The sugar was found between the ranges of 10.02 to 13.62. Catch (10.02%) had lowest sugar content among all Mirinda (13.6%) had the highest quantity. In our ranking system Coca Cola got the highest ranking of 4.99 out of 5 for the right amount of sugar content, while Mirinda got the lowest rating of 3.96. This test is not applicable on Diet Coke and Diet Pepsi as these brands are sugar free and add artificial sweetener as sweetening agent.

Hazardous Caffeine found to be in permissible quantity

Caffeine is a stimulant which is mainly derived from a plant and widely used in many food products and aerated drinks especially the cola based variety. Caffeine is used to increase the flavour in soft drinks. As per the Indian Standard, it should not be more than 145ppm (parts per million) in carbonated beverages. However some health experts warn that caffeine is an addictive, and hence it should not be taken more than 500 to 600 milligram per day. Caffeine is also said to cause several health hazards such as seizures, strokes or even death, if taken in excess and continuously.

All the cola brands we tested were found within the maximum limit of caffeine content. Brand Diet Pepsi (71.56ppm) was found with lowest caffeine content however brand Diet Coke (130.48ppm) was found with highest caffeine content among all the brands. Non cola drinks in orange, lime and sparkling category do not contain caffeine. One cola based brand Big Colas claimed as being caffeine free was found to be correct.

Aspartame and Acesulfame-K

Aspartame, also known by the brand names Nutrasweet and Equal, is an additive found in so-called diet foods such as low-calorie desserts, gelatins, drink mixes, and soft drinks. It also comes in individual packages used in place of sugar as a sweetener. The safety of aspartame, as combination of two amino acids and methanol, has been the focus of hundreds of scientific studies. Conclusion by the U.S. Food and Drug Administration, the World Health Organization, the ADA, and the Food and Agriculture Organization indicated that the additive is safe. Conversely, the Center of Science in the Public Interest gave it their lowest ranking in a review of food additives, quoting animal studies in 1970 and in 2007, which suggest that there is a link between aspartame and cancer. Gerbstadt, an organization that supports the general safety of aspartame – says that the additive might be unhealthy for some people – especially those with the disease phenylketonuria, an enzyme disorder – because it contains phenalalanine. "Some people may be sensitive to it and it's easy to avoid,' she says.

Acesulfame-K

This is a relatively new artificial sweetener, approved by the U.S. Food and Drug Administration in 1998 for use in soft drinks. It is also found in baked goods, chewing gum, and gelatine desserts. Acesulfame-K – the "K" is the chemistry symbol for potassium - is considered 200 times sweeter than sugar. While Gerbstadt isn't specifically concerned about the sweetener when used in moderation, there is a general concern that testing on this product has been scant. Some studies showed additive may cause cancer in rats, but the substance makes top 12 lists of additives to avoid because further study is needed to conclude whether or not acesulfame-K harmful.

Source: Consumer VOICE, July 2008

Cold drinks are acidic in nature

According to experts, due to carbonation process the oxygen in soda is reduced, whereby reducing the pH value of the drink. 7 is neutral pH which is not harmful. However, as you move down to 6 or 5 and so on it makes that product acidic. The colas have a pH of around 3.0 which meant it is quiet acidic and can be harmful. Effervescence is the release of gas from the drink. In colas or beer when dissolved carbon dioxide is depressurized it forms bubbles and makes the fizzing. Some experts feel that such pH levels change the pH levels of our body, which may not be as healthy. Moreover the acidic nature of carbonated drinks and soft drinks can be harmful and can cause tooth to decay — www.tutorials.carbonatedselzerwater.com

pH is a numerical value that expresses the acidity of a solution. The acidity of a solution is determined by the concentration of hydrogen ions in it. Aqueous solutions at 25 degree C with a pH less than seven are considered Acidic, while those with a pH greater than seven are considered Basic (Alkaline).

pH was found between the range of 2.63 to 3.22 in all brands. Catch (2.63) was found with lower pH whereas 7Up (3.22) had a higher pH.

Carbohydrates that gives the fizz....

Carbohydrates are a source of energy and since carbonated beverages are sugar based product except the specially made category, hence they are expected to be high in carbohydrates. In Indian Standard no requirement is specified for carbohydrates content.

Carbohydrates were found between the ranges of 10.02 to 13.67 gm/100gm. Fanta (13.67) was found with higher carbohydrates content

Diet sodas: free of calories, not of consequence!

Those who drink diet sodas have bigger waist sizes, say a new research. Two new studies have linked drinking diet soda to poorer health compared with those who don't drink the beverage.

People who said they drank two or more diet sodas a day experienced waist size increases that were six times greater than those of people who didn't drink diet soda, according to researchers from the University of Texas Health Science Center at San Antonio.

A second study found that the sweetener aspartame raised blood sugar levels in diabetes-prone mice.

"Data from this and other prospective studies suggest that the promotion of diet sodas and artificial sweeteners as healthy alternatives may be ill-advised," said study researcher Helen P. Hazuda, professor and at the university's school of medicine. "They may be free of calories, but not of consequences."

The human study was based on data from 474 participants in a larger, ongoing study called the San Antonio Longitudinal Study of Aging. In that study, the participants were followed for nearly 10 years. Diet soft drink drinkers, as a group, experienced 70 percent greater increases in waist circumference compared with those who don't drink diet soda.

Abdominal fat is a major risk factor for diabetes, cardiovascular disease, cancer and other chronic conditions, the researchers said. In the mouse study, researchers fed aspartame, a calorie-free sweetener used in some diet sodas, to diabetes-prone mice. One group of mice ate chow to which both aspartame and corn oil were added; another group ate chow with only corn oil added.

After three months, the mice that ate aspartame showed elevated blood sugar levels. "These results suggest that heavy aspartame exposure might directly contribute to increased blood glucose levels, and thus contribute to the associations observed between diet soda consumption and the risk of diabetes in humans," said study researcher Gabriel Fernandes, professor of rheumatology and clinical immunology at the university.

(The studies were presented on June 25, 2011 at the meeting of the American Diabetes Association.)

whereas Catch (10.02gm) had a lower count. This test is not applicable to Diet Coke and Diet Pepsi as these brands are sugar free and add artificial sweetener as sweetening agent.

How high is the Soda in giving energy?

Energy value is the amount of calories which our body obtains from the foods. As carbonated beverages are mainly consumed for giving instant energy, it is expected that they are high in energy value.

Energy value was found between the ranges of 37.38 to 51.26 kcal/100g. Brand Catch (37.38) was found with lowest Energy value however brand Fanta (51.26) was found with highest. This test is not applicable on Diet Coke and Diet Pepsi as these brands are sugar free and sugar is the only source of energy in soft drinks.

So consumers need to reconsider their options. Why do consumers take 'Diet' drinks? What is their selling point? If the selling point is no calorie factor there is a study that Diet soda guzzlers are actually obese.

Products free of contaminants

VOICE tested carbonated drinks for heavy metals, pesticides and microbes, all found in this products. However we found all brands we tested, qualified as safe and free of all these contaminants. The testing done for contaminations are as follows:

- Pesticides tested for presence of O,P-DDT, P,P-DDT, O,P-DDE, P,P-DDE, O,P-DDD, P,P-DDD, Gamma-HCH (Lindane), Alpha -HCH, Beta-HCH, Delta- HCH, Alpha-Endosulfan, Beta- Endosulfan, Endosulfan Sulphate,

Can Your Cola Habit

Soft drinks can raise your blood pressure. According to a new study, adults who consumed more than 74 grams of fructose per day – the amount in two-and-a-half colas – increased their likelihood of developing high blood pressure by 36 percent. That's in addition to a bloated risk of obesity, diabetes, and tooth decay. And diet cola may not be any safer. In a recent Harvard Medical School study, women who drank two or more servings of artificially sweetened cola daily were found to have doubled the risk of kidney function decline, which can destroy that organ. For all soft drinks, the devil's in the dose, so make cola a special treat, or at least practise portion control. Cola fans, take note: If you must have it, cut it down to half a bottle or glass. And there's always the best option: drink water instead.

Source: Readers Digest

Monocrotophos, Ethion, Chlorpyrifos, Phorate, Phorate Sulphoxide, Phorate Sulphone, 2,4-D, Butachlor, Isoproturon, Alachor, Atrazine, Methyl parathion, Methyl paraxon, Malathion, Malaoxon, Aldrin, Deildrin.

- Heavy Metals tested as Arsenic, Lead, Copper, Iron, Tin, Zinc, Cadmium and Mercury
- Microbe : Total plate count, yeast and mount, and coliform.

Conclusion

The testing was mainly based on the requirements of Indian Standard IS: 2346 – 1992 and PFA, out of overall parameters the key parameters for which carbonated beverages tested were pesticides residues, caffeine content, heavy metals, microbiological tests and sensory properties. Since carbonated beverages are mainly sweetened carbonated water, it is necessary that it should be free from contamination of any type of pesticides as there may be chances of pesticide presence in carbonated drink through water. Fortunately none of the brands of carbonated drink was found with pesticides and all passed this test. Caffeine is also a critical issue with carbonated beverages, it is a stimulant which is permitted to be added in carbonated drinks upto 145ppm by Indian Standard, and if found beyond the permitted level then it may have negative health effects. All brands of carbonated drink were found within the maximum limit of caffeine content.

Based on the analysis and evaluation of all test parameters and observations brand Coca Cola scored top among all the brands in cola category followed by RC Cola and Catch. In orange flavour brand Fanta was on top; in lime flavour brand 7up scored top; in sparkling carbonated beverages brand Sprite performed on top position and in diet cola category brand Pepsi scored top.

Energy drinks from the lap of Mother Nature

The water of tender coconut, technically the liquid endosperm, is the most nutritious wholesome beverage that the nature has provided for the people of the tropics to fight the sultry heat. It has caloric value of 17.4 per 100 gm. It is unctuous, sweet, increasing semen, promoting digestion and clearing the urinary path,' says Ayurveda on tender coconut water (TWC).

Numerous medicinal properties of tender coconut water reported are:-

Good for feeding infants suffering from intestinal disturbances.

Oral rehydration medium.

Contains organic compounds possessing growth promotion properties.

Keeps the body cool.

Application on the body prevents prickly heat and summer boils and subsides the rashes caused by small pox, chicken pox, measles, etc.

Kills intestinal worms.

Presence of saline and albumen makes it a good drink in cholera cases.

Checks urinary infections.

Excellent tonic for the old and sick.

Cures malnourishment.

Diuretic.

Effective in the treatment of kidney and urethral stones.

Can be injected intravenously in emergency case.

Source: Consumer VOICE, July 2010

COMPARATIVE TEST PERFORMANCE SCORE OF CARBONATED BEVERAGES

	Cola							Orange		Lime			Sparkling			Diet Cola	
Brand Parameter	**Wt.%**	**Coca Cola**	**RC Cola**	**Catch**	**Pepsi**	**Thums Up**	**Big Cola**	**Fanta**	**Mirinda**	**7Up**	**Limca**	**Arora Lemon**	**Sprite**	**Mountain Dew**	**Appy Fizz**	**Diet Pepsi**	**Diet Coke**
Pack Size, ml		600	2000	250	600	600	425	600	600	600	600	200	600	600	500	600	600
MRP, ₹		25	55	10	24	25	15	25	24	24	25	6	25	24	25	25	30
Physico-chemical Tests 30%																	
Brix Value	3	2.89	2.91	2.74	2.99	2.84	2.95	2.22	2.16	2.84	2.92	2.8	2.7	2.65	2.39	NA	NA
Sugar	5	4.99	4.96	4.82	4.83	4.92	4.9	3.97	3.96	4.69	4.95	4.91	4.56	4.46	4.19	NA	NA
Caffeine	6	6	6	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	6
Carbohydrate	5	4.13	4.15	4	4.24	4.07	4.19	4.91	4.9	4.35	4.15	4.07	4.45	4.52	4.72	NA	NA
Energy Value	6	4.49	4.52	4.24	4.7	4.39	4.61	5.91	5.88	4.89	4.53	4.72	5.07	5.2	5.56	NA	NA
pH	3	2.08	2.15	2	2.43	2.3	2.42	2.38	2.62	3	2.59	2.49	2.98	2.77	2.57	2.72	2.33
Net Quantity	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Pesticide Residue* 12%	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Heavy Metals 10%** (Pb, Cu, As, Sn, Zn, Cd, Hg & Fe)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Microbiological Tests 10% (Total Plate Count, Yeast & Mould Count & Coliform Count)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Sensory Tests* 25%** (Colour, Appearance, Odour, Flavour & Body)	25	22.3	19.67	20.55	19.2	18.85	16.95	20.8	21.42	20.4	19.87	13.22	21.22	19.45	15.55	18.92	17.92
General Parameters 8%																	
Packing	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Marking	5	4.5	4	4	3.5	4.5	4.5	4.5	3.5	3.5	4.5	3	4.5	3.5	4	4	5
Overall Score	**100**	**93.4**	**90.36**	**90.35**	**89.89**	**89.87**	**87.78**	**92.22**	**91.95**	**91.13**	**90.96**	**82.13**	**93.06**	**89.94**	**86.14**	**90.91**	**90.43**

*Rating: >90 – Excellent *****, 71-90- Very Good ****, 51-70- Good ***, 31-50- Average **, upto 30 – Poor **

** Pesticides tested for presence of O,P-DDT, P,P-DDT, O,P-DDE, P,P-DDE, O,P-DDD, P,P-DDD, Gamma- HCH (Lindane), Alpha- HCH, Beta- HCH, Delta- HCH, Alpha- Endosulfan, Beta- Endosulfan, Endosulfan Sulphate, Monocrotophos, Ethion, Chlorpyrifos, Phorate, Phorate Sulphoxide, Phorate Sulphone, 2,4-D, Butachlor, Isoproturon, Alachor, Atrazine, Methyl parathion, Methyl paraxon, Malathion, Malaoxon, Aldrin, Deildrin.*

***Heavy Metals tested as Arsenic, Lead, Copper, Iron, Tin, Zinc, Cadmium and Mercury*

****Sensory tests as organolaptic tests conducted involving testing experts from lab one external (VOICE)*