

**MORE REASONS TO RETHINK ABOUT COLAS: THE NOXIOUS FIZZY DRINKS****Raaz K Maheshwari***Department of Chemistry, SBRM Govt PG College, Nagaur, Rajasthan**\*Corresponding author: [draazecoethics151260@gmail.com](mailto:draazecoethics151260@gmail.com)*

Have you ever thought what you are drinking, when you go for a carbonated drink? You are gulping down carbon-dioxide, phosphoric acid, caffeine, fructose/aspartame and minute quantity of an organic diol (ethylene glycol), an 'antifreeze' that makes your drinks 'really chill', which is also a slow poison. Consider the known facts about the poisonous brew.

To begin with, each can contains the equivalents of 8-10 spoons of sugar in a particularly harmful form known as high fructose corn syrup. Humans on high fructose diets develop liver problems similar those in alcoholics. Dr Charles Best, the discoverer of insulin, says that teenagers who consume too many soft drinks suffer from cirrhosis of liver. It is also known to be associated with poor development of collagen in growing infants, especially with copper deficiency. What so wrong about fructose?

Dr Julian Whitaker, author of health and healing, and director of the Whitaker Wellness Institute (California) highlights the dangers of the hidden menace of this fruit sugar. The unique arrangement of atoms in the fructose is what makes it so sweet- 100 per cent sweeter than glucose. Fructose is not absorbed into the blood stream directly from the gastro-intestinal tract, while it shunt to the liver and get metabolized there. Large amounts of fructose severely stress the liver. Significantly, much of this fructose is coming from non-fruity soft drinks.

Unlike glucose, fructose does not stimulate the secretion of insulin. One of insulin's role is to send a signal of fullness to the brain so that you stop eating. Another function of insulin is to promote the function of leptin, the 'anti obesity hormone' that plays a key role in longer-term appetite regulation. Because fructose doesn't stimulate insulin secretion, it also doesn't increase leptin levels. This is the reason why drinking a high fructose soft drink doesn't help in killing the hunger-pangs and makes you consume more calories over all as a result. Thus cold drinks make one obese.

Recently, the WHO released a draft report suggesting that almost the consumption of the soft drinks is a major cause of obesity in the children of modern societies, which rely upon junk food diets. Diet sodas contain a chemical sweetener called

aspartame, which is a potent neurotoxin and endocrine disrupter.

Another key ingredient of soft drinks is phosphoric acid, which is added to give it 'bite'. This is well known to cause tooth rot, bone loss, osteoporosis and gastro-intestinal distress. If you are women in the habit of drinking more than a cola a day, you had better know this: Colas have a gender bias. Recently published research in US suggests that excessive cola intake waste away the bones of women. Men, on the other hand, can guzzle as much cola as they want (American Society for Bone and Mineral Research). In accordance with a report of endocrinologist, cola consumption causes bone mineral density (BMD) loss, probably because of the phosphoric acid contents of the soft drinks. Bone structure is maintained through a balance between phosphorous calcium and vitamin D. In women, hormones are also involved. The phosphoric acid disturbs this balance. BMD loss from childhood could lead to an increased incidence of osteoporosis – the weakening of bones.

Guess what is the pH of soft drinks! The average pH of soft drinks is 3.4. Though all soft drinks are acidic, dark once like Coke & Pepsi are the most acidic and it has been found that it takes 15 tumblers of high pH (alkaline) water to neutralize a tumbler of cola. This level of acidity is strong enough to dissolve teeth and bones. Imagine what the drink must be doing to a child's soft intestines and stomach lining. Soft drinks cause hyper activity in kids. Also known as hyperkinesis, hyperactivity, is an attention deficit disorder(ADD) that can affect children's home, school and social life. Food items that have synthetic colours, flavours, sweeteners, preservatives and acidulants (viz: citric acid, malic or tartaric acid) are responsible for the physiological disorders and other problems in the children. In a competition held at Delhi University central hall on "who could drink most of coke", the winner drank eight bottles and fainted on the spot. Most soft drinks contain significant quantities of caffeine which, apart from being addictive, also stimulates the adrenal gland and is known to cause nervousness, irritability, sleeplessness, birth defects, behavioral problems and an increase in heart beat rate. Open sores, breaks, or holes in the inner lining of the oesophagus, stomach or duodenum are called peptic ulcers. Diets like spicy foods, beverages and soft drinks containing caffeine may be

responsible for this, as they also tend to aggravate existing ulcers.

In order to make soft drinks, which can be consumed really chilled (below freezing point of water), the manufacturers add an antifreeze compound called ethylene glycol, which is well known to cause cancer. Besides the carcinogenic effects, temperature of soft drinks is much less than body temperature, sometimes quite close to 'zero'. This lowers the effectiveness of the enzymes and puts stress on our digestive system. In fact, the food gets fermented. The fermented food produces bad smelling gases and forms toxins, which get circulated in blood and are delivered to whole body. This spread of toxins can lead to the development of various diseases. Soft drinks also contain toxic chemicals in the form of artificial colours and flavours, which cause problems like allergies. Soft drinks do not have any nutritional value (in terms of vitamins and minerals). It has been experimentally tested that children who consume sweetened beverages have more cavities than children who do not. Studies sponsored by soft drinks industry showed a correlation between the quantities of soft drinks consumed and exercise, as if consumption of soft drinks leads to exercise more! Obviously, this correlation means that those who play more games are likely to consume more soft drinks in an attempt to quench their thirst. But, in fact, it has been found that most soft drinks act as diuretics, meaning that they take out water from the body.

The CSE report points out that toxic substances like pesticides and heavy metals are found in excess of permissible limits in our beverages and water and our body is incapable of metabolizing them. Pesticides are the major health hazards and most of us are concerned. Pesticide-laced food items can play havoc with our body physiological system leading to various ailments. It is ridiculous that Indian farmers are freely using pesticides banned in West. Pesticides, if found in tiny quantities are deadly, as they accumulate over time in our body, suppress the immune system and make our body susceptible to diseases like cancer and miscarriages. Soft standards for pesticides residue in food and water we consume are deadly standards. This can't be acceptable.

### **In parts of Andhra Pradesh there is a new fizz to the fight against pests.**

The war on bugs is being fought not with pesticides but with soft drinks. Cotton farmers in Adila Bad bordering Maharashtra and Chhatis Garh are experimenting with cola sprays and claim Farmers are happier handling soft drinks than poisonous pesticides. There have been reports of several farmers, including chilli and cotton farmers in Guntur, trying out this fizz formula. Large PET bottles of cola are becoming scarce in rural part of Andhra.

In accordance with a report of experts from AP-CSA (Andhra Pradesh-Center for Sustainable Agriculture),

antibacterial agents in soft drinks like Phenol and high fructose concentration, probably attract natural predators such as ants to eat insect larva.



Japan, that boasts of the world's most stringent food regulatory laws, has approved the world's first cola for being "beneficial to health". The country's food regulatory authority has cleared 'Kirin Mets Cola' for the most sought after Foods for Specified Health Users (FOSHU) label. Japan's Health and Food Nutrition Association (JHNFA) states getting a highly sought after FOSHU certification – that can sometimes take over six months and cost as much as a million yen – greatly boosts the credibility of approved products.

Colas aren't really known for their health benefits. They are usually packed with sugar and have been fuelling the global epidemic of childhood obesity.

In January, about 300 people in the US suffered health problems from excessive consumption of energy drinks like Red Bull and Monster, as per the American Association of Poison Control Centers. The association has recently started tracking the toxicity of energy drinks that constitute the fastest growing market in the US. Canada, Australia and several European and Latin American countries have also acted against the caffeinated drinks following reports of deaths and seizures. Is India paying attention? The entered drinks market in the country is worth Rs 200crore and is growing unregulated. Red bull leads the market, followed by Coca Cola's Burn and Goldwin Healthcare's Cloud 9. In June last year, the Food Safety and Standards Authority of India prepared draft standards for energy drinks and invited public suggestions. But its efforts have not moved beyond the invites. As of now, energy drinks are labelled as proprietary food that has no prescribed standards. Unlike carbonated drinks in which caffeine is capped at 145 mg/litre, a can of energy drink has 320 mg/litre caffeine or more. "Caffeine acts as a stimulant," stated Anoop Misra, chairperson of the National Diabetes, Obesity and Cholesterol Foundation (NDOCF). "But excess of it may induce agitation, anxiety, irritability, insomnia and cause irregular heart function." Several recent studies corroborate Misra's concern.

High levels of caffeine in energy drinks sometimes have life threatening effects on blood pressure, heart, and brain functions, stated health researchers at University of Texas, USA, and University of Queensland, Australia. Writing in the Mayo Clinic Proceedings in November (2010), they warned patients with hypertension should not consume these drinks. In another study published in Paediatrics on February 15, 2011, researchers said energy drinks may be unsafe for children especially those with diabetes, seizures, heart abnormalities and behaviour disorders. Until we know more about the effects of energy drinks, children and teenagers should be encouraged from drinking them on a routine basis, stated Steven Lipshultz of the Miller school of Medicine in USA and senior author of the paper. Such beverages also contain Vitamin B and stimulant like taurine, glucronalactone and guarana to create the energy blend. There is not enough study to show the impact of caffeine on them, he stated, calling for more research. Amelia Arria, professor at School of Public Health at the Maryland University in the US cautions against mixing energy drinks with alcohol. It can have harmful effects especially on expecting mothers, stated Arria. Her study on the risks of energy drinks was published online in the Journal of the American Medical Association in January, 2011. In November last year, the US Food and Drug Administration (FDA) announced that caffeine is an unsafe additive to alcoholic beverages, prohibiting the sale of pre-mixed alcoholic energy drinks.

**Ploy in the name:** Companies have purposely placed energy drinks in proximity to sports drinks to confuse the consumer, stated John Higgins, professor of medicine at the Texas University. “This ploy needs to be stopped as we have young children buying them,” stated Higgins, also an exercise specialist. Sports drinks like Powerade and Gatorade are meant to replace the electrolyte and carbohydrate lost during exercise. But energy drinks increase the carbohydrate level in the blood beyond the recommended limit and affect renal function, he added. Higgins’ colleague and exercise physiologist Troy Tuttle stated the sugar rush from energy drinks comes from 13 teaspoonfuls of sugar in a 500 ml can. Such a high dose of sugar impairs absorption of fluid in the body, resulting in dehydration and cramps. Higgins added, “We need to determine whether the long-term use of energy drinks will translate into deleterious effects later.”

### Cola ingredients up cancer risk

Artificial caramel colouring used in Coca-Cola, Pepsi and other soft drinks contains two cancer-causing chemicals. Researchers at the National Toxicology Program, a wing of the US Department of Health and Human Services, have found “clear evidence” that both 2-methylimidazole (2-MI) and 4-methylimidazole (4-MI) are animal carcinogens and likely to pose a risk to humans. The colouring is produced by exposing sugars to industrial chemicals, ammonia and sulphites. The

reaction results in formation of 2-MI and 4-MI. In EU countries, artificial colours have largely been phased out and replaced with plant based dyes. Researchers at the University of California, Davis, found 4-MI about 12 times more than the permissible limit in five brands of cola, including Diet Coke and Coke Zero.]

However, according to JHNFA, this FOSHU labelled cola has zero amount of sugar and contains an indigestible form of Dextrin – a compound used as fibre supplement, which restricts the body’s ability to absorb fat while eating. “When consumed with a high fat diet like hamburger, the drink slows down the body’s ability to absorb fat thereby saving us from putting on weight. It also helps in digesting the food easily,” Akira Yabuki, general manager department of FOSHU at JHFNA, told TOI. Yabuki added, “We are very strict with who is given the FOSHU label. However, this was the first time that a cola was given such a FOSHU tag. It didn’t satisfy requirements to be healthy. The drink doesn’t contain sweeteners at all and tests have shown that the drink keeps levels of neutral fats low after eating.”

Experts state the cola’s target demographic is youngsters who find irresistible cola but are worried about their weight, as well as those who have stopped buying soft drinks for health reasons. It was in 1987 that Japan’s ministry of health and family welfare introduced functional foods. The FOSHU system was introduced in 1991 and the first FOSHU approval was given in 1993. It is an individually evaluated approval system that takes into account scientific evidence on effectiveness, safety and quality. As of December 19, 2011, 983 products have been certified as Foods for Specified Health Users. Of these, 24% are soft drinks like tea based beverages, mineral water, jelly or fruit beverages and powered soft drinks, 55% are dairy products like lactic acid bacteria beverages and cultured milk, 12% are processed foods like processed meat and fish, cooking oil, vinegar and sweeteners like candies, cookies, chewing gum and dehydrated soups.

### Japan clears world’s first healthy cola: Clinical trials show health benefits

It’s being called the world’s first “healthy cola”. Japan, that boasts of the world’s most stringent food regulatory laws, has approved the world’s first cola for being “beneficial to health”. The country’s food regulatory authority has cleared ‘Kirin Mets Cola’ for the most sought after Foods for Specified Health Users (FOSHU) label. Japan’s Health and Food Nutrition Association (JHNFA) states getting a highly sought after FOSHU certification – that can sometimes take over six months and cost as much as a million yen – greatly boosts the credibility of approved products. “Data from clinical trials on 10 to 100 subjects have to clearly indicate the health benefit of the Product if it contains a new ingredient, testing and approving for FOSHU can take 203 years time. Some of the nutrient function claims that have cleared the FOSHU test

includes Vitamin A which help maintain good vision at night, iron which is necessary for red blood corpuscles formation, calcium which is necessary for bone and teeth, folic acid which contributes to a normal development of a foetus and vitamin E which helps protect fat in the body from being oxidized and helps maintain healthy cells,” Yabuki added. A recent study stated aerated drinks increases the chances of heart disease by 20% among those gulping them daily. Also, people who drink diet sodas every day have a 61% higher risk of bursting a blood vessel. Even children, who consume 40-70ml of soft drinks a day, may put on 305 kilos every year as one cola is equivalent to having 7 to 8 spoons of sugar at a time.

The Indian Council of Medical Research (ICMR) along with 9 institutes have been conducting a study that covers 10,000 households and involves interviews of nearly 70,000 people of all ages and social status to gauge how much aerated drinks Indians consume daily, monthly and annually, and what is the country's annual production of such drinks. The study will also look at which states consume the most and least amount of cola, which are the months for highest consumption, which age group drinks the most and what are the health hazards they face due to their consumption. Several studies conducted by some of the world's top researchers have stated colas are bad for health. The studies claim these cause brittle bones, contain fructose in concentrated amounts that triggers weight gain in the body and leads to cell damage, switching off vital parts of DNA, eventually leading to the liver and degenerative diseases such as Parkinson's.

The nation must thank the Center for Science and Environment (CSE) for opening its eyes to the pesticides contained in 12 brands of soft drinks, having pesticides far above the EU norms. The issue raised by CSE transcends soft drinks and indeed goes to the root of citizens' right for clean and safe drinking water, which appears to be the main source of the pesticides in soft drinks. Now some recent 'findings' made by CSE seem to have taken the fizz out of this industry. Coke and Pepsi have been charged with using water containing carcinogenic pesticides like lindane, DDT, chlorpyrifos, endosulfan and malathion which were detected in packaged drinking water earlier.

Considering the quality of drinking water supplied by our government agencies, citizens will die from water borne diseases long before the poisons in the soft drinks start taking effect. There has been an alarming increase in the incidence of diabetes, obesity and hypertension, especially in the young urban population, recently. It would not be coincidental that the same period has also seen a rapid increase in soft drinks consumption. So, quite apart from the pesticides found in soft drinks, it is their other ingredients that make them virtually a poisonous brew, causing more serious threat to public health than even tobacco. The best alternative is to turn traditional drinks like sharbat, flavoured plain milk, fruit juice, chhaas, coconut water, herbal shakes and even lemon water. So be natural. Keeping in view, the alarming results of various studies done on soft drinks, awareness campaigns with posters, photographs and videos must be carried out to either curb their consumption or to familiarize the people with hard facts of the toxicity of soft drinks.