ISSUE NO 27

FEB '19

ESSEN RIVESTA

ENTWINE WORLD AND NUTRITION

SWEETNERS

CONTENTS

Election Report.....

Sweet News for Farmer.... 4

Food safety concerns increase as U.S. Government shutdown continues.....5

McHUGH Named Director of USDA Research Centre.....5

Sweetener.....6

Sweeteners-Boon or Bane.....7

Limit the Unlimited.....12

Stevia- Bio Sweeteners.....13

"Too much of anything is good for nothing ".....14

"Sweet" Isn't all there is to artificial sweeteners

Sweetness Is It Wholesome?!.....16

Beauty in Nature!!.....17

Sweeteners of Non-Sweeteners.....18

Who Am I??.....19

ugar free candies for Diabetes.....19

Mangoes makes us want until its season; but no one seems to be angry on it!.....20

Honey makes Money!!.....21

Evaporated Cane Juice.....22

Farm to Fork.....23

Social Media drive Ruby Chocolate in Asia.....24

Taste Determinants.....25

Shaq Attack.....25

Current Job Opportunities.....26

Comics.....27

Book Alert.....30

Review of a book.....31

Do Diet Soda Makes Us Lose Weight.....32

Sugar Secrets.....32

Sweeteners Not Only belongs to Carbs,...33

Stat for Sweeteners.....36

ABOUT THE EDITION,

ONE CANNOT THINK WELL, LOVE WELL, SLEEP WELL, IF ONE HAS NOT DINED WELL.

This was our motto for starting up this magazine. It has been a true pleasure for us to work with so many talented people. We take immense pleasure in unveiling before you the magazine about artificial sweeteners.

The industry of magazine is vast and very competitive. Essen Rivesta is grateful for all the supports we received from the professors of TNAU, enthusiastic students and other organizations. Your support encourages us to continue to serve as a platform that inspires new talent and publish their creativity.

This magazine links every people like who have planted it, raised it, harvested it and with whom we dine with. Remember the saying "**The belly rules the mind**". The importance which we give to palatability of the food should also be given to its healthiness. This issue deals with sweeteners whose market level is potentially rising. It aims at delivering information to the people about the nutrient content, daily recommendations and the bleakness in consuming beyond the recommended level.

Food can either bless us or curse us, nourish us with good health or haunt us. It is in our hands to make it healthy and blissful one. We may have missed out a few spots. But we that hope we have given our best in delivering what we could. We once again thank the phenomenal talent of each and every contributor. Let's keep up giving our best!

Editor: Adhikeshavan B

Co-Editor: Shangamithra SM

AGRICULTURAL ENGINEERING COLLEGE AND RESEARCH INSTITUTE

TNAU, Coimbatore, Tamilnadu-641003

Cordially post your feedback to eesenrivesta@gmail.com

Don't forget to view our other publications at: www.foodxploretnau.com

PH.No : 9445110036, 9789743772

SWEETNER FOR SUGAR INDUSTRY ELECTION REPORT: 'LOAN OF ₹12,000 CRORES'

Keerthiga R R

The Narendra Modi government is looking at yet another relief package for sugar companies, and this is going to be twice the size of one announced in September 2018.This relief package facilitates the loan which is nearly ₹12,000 crore for which the ex-chequer will bear 5-6% interest subvention for 5 years. The loans will be granted for enhancing ethanol production. The package is being finalised by the Prime Minister's Office, Finance Ministry, Agriculture Ministry and the Food Ministry.

India is staring at a second consecutive year of surplus sugar production this season. Indian Sugar Mills Association has estimated the country's sugar output in 2018-19 at 31.5-32 million tonnes.

Though similar loans on last September were facilitated to sugar mills, the industry since then has been making representations that this is not enough to alleviate the pain from depressed sugar prices and a supply glut in the system. This pressurize the Modi government to introduce a huge relief package this time round, coincidently ahead of Elections.

Besides helping the debt-ridden sugar companies with mills struggling to clear outstanding arrears to cane farmers, the relief package is also being seen as one of the ways to reduce India's capacity for crude imports. Besides that, the agriculture ministry is pitching the package as an environment friendly move. It believes the sops can enable sugar mills to divert cane for the production of the eco-friendly ethanol.

SWEET NEWS FOR FARMERS: NOW, A DISEASE-RESISTANT SUGARCANE

Sujakumari M

Indira Gandhi Krishi Vishwavidyalaya has produced tissue culture saplings of disease-free sugarcane plant with naturally high level of sweetness, which will translate into good quality sugar in mills. This is the first time such a sapling has been produced.

IGKV has four lakh such saplings available for sale at a rate of ₹8 per piece. The IGKV tissue culture lab developed the variety using sugarcane from Coimbatore. Lab in charge, Dr SL Verma said, farmers generally sow sugarcane either as a mature step bud shoots, or by extracting buds by a chipping machine and sowing them directly in the soil. "The practice however requires massive quantity of buds and mature stems, one hectare requires 55 to 60 quintals of sugarcane sets, which needs heavy transportation cost. Whereas, the IGKV tissue culture saplings are tried and tested and can be produced cost-effectively at the local level."

The tissue culture plants grown in the first year are meant to produce sets of sugarcane in their own field, which can be used as a nursery to multiply the sugarcane sets. The farmer can harvest the sugarcane in its second year of cultivation.

The tissue culture variety is disease resistant and fungus resistant. The tissue culture variety includes nearly ₹1.50 lakh sugarcane species of code 86032 and 0265 and about 50 thousand tissue culture plants of species B671 are available for sale.

Reference: https://m.economictimes.com/news/economy/agriculture/

FOOD SAFETY CONCERNS INCREASE AS U.S GOVERNMENT SHUTDOWN CONTINUES

Manikandan R

On January 15, the U.S. Food and Drug Administration (FDA) resumed some food safety inspections that had stopped since the government shut down began on December 22, according to CNN. The inspectors back on the job were doing so without pay.

Scott Gotlieb, FDA Commissioner, tweeted-on January 14 that they were restarting the high-risk food inspection. He also stated that they would do a compound inspection the following week. And they started sampling high risk imported products in the north-east region that day. He also added that, they would expand their footprint as the week progresses.

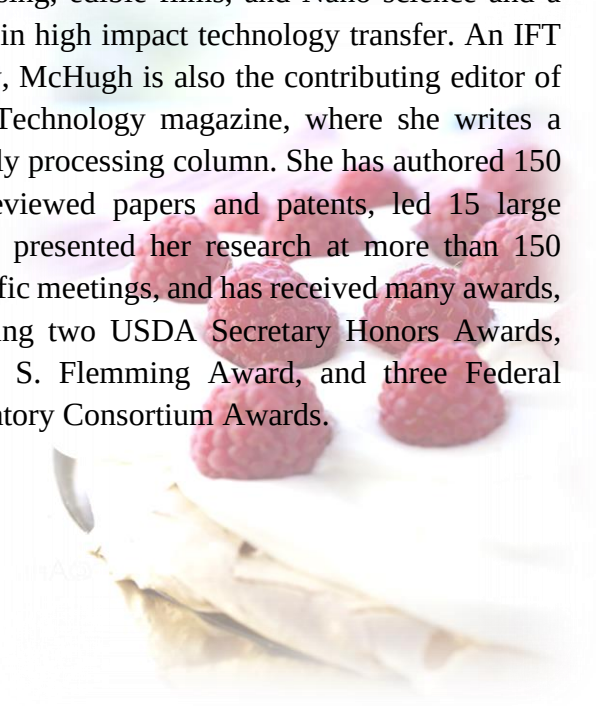
Gotlieb said that the FDA were taking steps to expand the scope of food safety surveillance inspections that they were doing during the shutdown to make sure that they continue inspecting high risk food facilities. He noted that 31% of their inventory in domestic inspections were then resumed by the agencies which were applied to routine domestic surveillance inspections of foods which included seafood, bakery products filled with custard, soft and semisoft ripened cheese and cheese products, unpasteurized juices, fresh and processed fruits and vegetables, sandwiches, and infant formula, among the other food items.

Gotlieb tweeted a week before that there were no questions that this approach has caused such an impact, and it was not business as usual. There was a very concerted effort to stand up critical functions and to focus on their consumer's protection mission, in many cases relying on expected employees not being paid.

McHUGH NAMED DIRECTOR OF USDA WESTERN RESEARCH CENTER

Jeffrin J S

The U.S. Department of Agriculture's Agricultural Research Service (USDA ARS) has named Tara McHugh centre Director for its Western Regional Research Centre (WRRC). McHugh, who received her PhD from the University of the California - Davis in Food Science, is an expert in innovative Food processing, edible films, and Nano science and a leader in high impact technology transfer. An IFT Fellow, McHugh is also the contributing editor of Food Technology magazine, where she writes a monthly processing column. She has authored 150 peer-reviewed papers and patents, led 15 large grants, presented her research at more than 150 scientific meetings, and has received many awards, including two USDA Secretary Honors Awards, Arthur S. Flemming Award, and three Federal Laboratory Consortium Awards.



Reference: www.ift.org

Artificial Sweetener as a Historical Window

Sai Nisetha M Prabha M

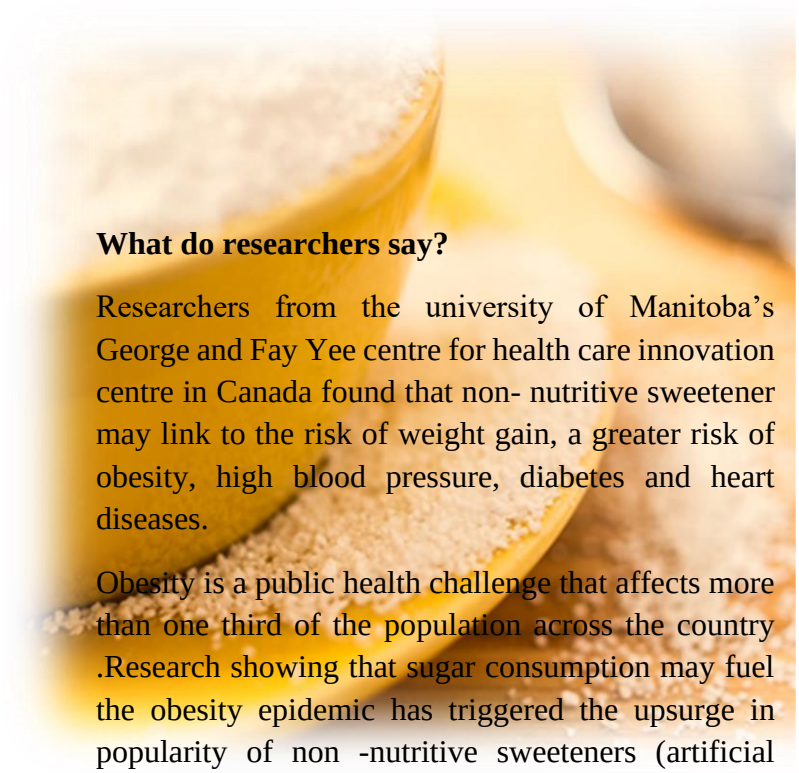
The Cultural Extensification that enables Artificial Sweetener to shift, between 1950 and 1980 from an unappealing adulterant to a desirable commodity from the perspective of a majority of consumers all around the world.

First discovered in the late 19th century in the United States, Saccharin enabled individuals experience sweet taste in food with dramatic reductions in caloric consumption over nutritive sweeteners. Between 1890 and 1930 saccharin was the only artificial sweetener produced in the United States, and its consumption was limited to diabetics who eschewed sugar for medical reasons. Beginning in the 1950s with saccharin and cyclamates, extending to aspartame in the early 1980s ,and now with sucralose , chemical sweetener have found a primary market among the consumers who could consume nutritive sweeteners, but choose not to in order to lose weight. This shift in consumer practices can be linked to three market place shifts 1) The development of second-generation sweeteners that improves the taste of the products 2)The rise in popularity of dieting and diet programs 3) The improved marketing and branding practices in food companies.

Today millions of people use artificial sweetener instead of nutritive sweetener in order to enhance their health. This is not to say that artificial sweeteners are healthy. They are in fact non-nutritive. They do not contribute as how vitamins and proteins do. Yet artificial; sweetener will be understood as “health foods” for two reasons. First, because those who make the decision to use them are largely motivated by the desire to meet standardized metric of the weight developed in the 20th century and those metrics have termed it “healthy”. And second from a cultural perspective, and food that consumers use in order to pursue health as they understand it should be considered as healthy. Thus, in spite of the non-nutritive, they are valid site to look at the ways in which consumers have connected health and food in the 20th century.

DEBATE?!?!?!

Artificial sweeteners satisfy a craving but do they come with a cost? Artificial sweeteners have been a tool to reduce calorie intake but Mayo clinic dietician Kate Zaretsky says research continues on how these sweeteners affect appetite in one example. An Australian study recently revealed how the brain senses and integrates the sweetness and calories in food and in that when we consume artificial sweeteners our brain gets the message that we ate something sweet yet it doesn’t have any calories to pair it and so we might have a greater desire for sweeter later on.



What do researchers say?

Researchers from the university of Manitoba's George and Fay Yee centre for health care innovation centre in Canada found that non- nutritive sweetener may link to the risk of weight gain, a greater risk of obesity, high blood pressure, diabetes and heart diseases.

Obesity is a public health challenge that affects more than one third of the population across the country .Research showing that sugar consumption may fuel the obesity epidemic has triggered the upsurge in popularity of non -nutritive sweeteners (artificial sweeteners) such as aspartame, stevioside and sucralose. In fact in 2008 more than 30 percent of U.S. adults consumed artificial sweeteners daily, and this proportion is on rise .

Emerging evidences indicates that artificial sweetener may have an adverse effect on metabolism, gut bacteria and appetite. What is more, studies suggest that chronic exposure to artificial sweeteners may result in increased food consumption and weight gain.

Dr Ryan Zarychanski and Dr Meghan Azad, assistant professors of the Rady faculty of Health Sciences at the University of Manitoba, and colleagues aimed to determine whether regular artificial sweetener consumption is associated with adverse long-term effects on weight and heart diseases. The team conducted a systematic review that included 37 studies that followed more than 400000 individuals for 10 years. In total, seven of the studies were randomized controlled trials, which are considered the gold standard in clinical research. The randomized controlled trials followed 1003 people for around 6 months.

Dr Sarah Hallberg, a physician at the Indiana university says that, artificial sweeteners are many different categories. There are sugar alcohols, saccharine, chemically created non-nutritive sweeteners. some of them are xylithol, sorbitol, erythritol, neanotol and they can all actually impact which tends to have least impact on us are xylitol and potentially erythritol. She also added that sweeteners with high doses when consumed might end with some gastro intestinal issue. She even says that "our bodies make xylitol is found, erythritol too, a lesser degree naturally in fruits and vegetables. So again that's high on our recommendation list. And coming to the non-nutritional sweetener which has no or low calorie itself does not have impact on the blood sugar and that's been shown in multiple studies. For example, take Splenda, a lot of people consume Splenda but not all end up with problems in them. Maybe some individuals might have problems but that depends on the adaptation of the individual. If it is in the liquid form, I would say that it has no carbohydrates and no calories but when it is in powdered form it will have carbohydrates cause the powder is made of bulky substances which is used in making cakes and thus providing carbohydrates to the powdered form of artificial sweetener.

We know there are lots of myths around the no calorie and low-calorie sweeteners used in our drinks.

Low and no calories sweeteners are some of the most thoroughly researched ingredients in the world . They have been considered safe by the European safety authority (EFSA). They are used in place of sugar in many other foods and drinks and are commonly used in yoghurt, sugar free chewing gum as well as soft drinks. To provide people with reduced calorie alternative sweetener a lot of companies use artificial sweetener as they have zero calorie. Artificial sweeteners normally advertise zero calorie so people always love to consume it.

Artificial sweetener doesn't metabolize in order for your body to obtain calories from your food it needs to break down. If it can't be broken down then our body gets no energy. Despite the fact that they are structured molecularly to bind to our taste buds which creates a sweet taste once in the gut the sweeteners just get passed through the system. So, you taste it, you chew it, you swallow it, then you poop it out, all without getting any kind of energy or calories from it.

What do we say :)

Traditionally sweeteners weren't a huge part of the human diet and in some parts of the world it was rare. Yes, humans have always praised whatever fruits, berries or honey could give but all these were available seasonally. When people were afraid that too much of sugar may give too much of calories and in return it causes obesity but as a ray of sunshine in the middle of the thick forest artificial sweeteners brought a new hope in everyone's mind because it either had some calories or no calories and on top of that it was 200 times sweeter than sugar.

Our tongue is made up of tons of lingual papillae commonly known as taste buds which makes eating so enjoyable. If the taste buds are made up of lumps of 50 to100 taste cells, the proteins that bind with food molecule arrest the specific flavour. Most of the animals in the world can enjoy sweeteners with the exception of those in the cat family because cats can't taste sugar because they lack in taste receptors in their tongue.

Not only can we taste sweeteners but we are going to have the source of delicate range of flavours from honey, agave, maple syrup to fructose, glucose in plants and fruits. As well as more recently adaptations like high fructose corn syrup and the host of artificial sweetener on the market. Natural sugars trigger our taste buds immediately feeling our senses with all kind of goodness before gently feeding away without leaving any after taste. Chemically it is a beautiful synthetic process. It is made denyingly elusive to duplicate. Artificial compounds affect our taste buds in all our way to natural sweeteners but because of course if you don't use all other. This artificial sweetener binds to receptors much more aggressively and so sweeteners come across in us a gentle flavour so much as a slap in our tongue which is why saccharin tastes about 300 times sweeter than plain sucrose. Interestingly other animals are unable to taste these artificial sweeteners because their taste buds are set up differently. Each artificial sweetener has different molecular shape so each bind to our taste receptors in a distinct way giving a signature flavour to their un natural sweeteners.

When we step into a restaurant, we can find a ramekin rainbow on all the tables. Have you ever thought what could it be? Can u guess it? Yeah! it's all we are talking about, artificial sweeteners.

The first sachet you see in the ramekin is none another than the hero of the artificial sweetener, saccharin.

Anything containing saccharin used to come with warning label that it may cause cancer. In 1970, saccharin caused cancer in rats and FDA tried to ban that stuffs in 1977 but congress intervened it and suggested that it carries a warning label instead which hardly get people for drinking it after extensive law being from the diet food industry with sufficiently claimed that earlier studies where flawed and the label was removed in 2000.

Next to the pink sachet comes the blue sachet which is aspartame. It was discovered in the 1960's when another chemist absent minded licked his fingers. Aspartame popped up in the products in the early 1980 as an alternative to saccharin .it is about 200 times sweeter than sugar and unlike other synthetics our bodies can metabolise it and aspartame breaks down into three components ,the amino acids phenyl alanine aspartic acid as well as methanol .and finally we have that sunny yellow sucralose made by chemically reacting sucrose with chlorine.it was also accidentally created in the mid 1970 in London .maybe by now u wonder in about the potential risks associated with artificial sweetener.So all I say is for what u first remember that anything that you buy at

the grocery store sprinkle on your cereal has been tested and approved and it is regulated by the fda as safe enough.

From lab accident to wonder drug to chemical has been, saccharin's history tracks the raise of consumer's consciousness, government regulation, and uncertainty underlying scientific evidence .you see in almost every restaurant: those small packets blue, yellow or pink ,emblazoned equal, Splenda, or sweet's low.in little over 50 years artificial sweetener have become a ubiquitous part of the dining experience where diners once found a sugar bowl they are more likely to find a multi coloured collection of single-serving chemicals .one compound blazed a trail for other artificial sweeteners .saccharin ,it was touted to consumers as the gate way to a world of sweeteners without consequences. from the beginning, consumers and regulators wondered whether saccharin was too good to be true whether it's sweetness could truly be harmless.

Discovery and commercialisation:

In the early years of saccharin:

Saccharin was discovered in 1878 in the Johns Hopkins university lab of ire Remsen ,a professor of chemistry while he was formulating chemical dye made from coal tar.in 1958,cumber land packing corporation introduced sweet'n low, a mixture of saccharin and cyclamate .sweet'n low arguably tasted more like real sugar, and those little pink packets bought artificial sweeteners into dinners and coffee shops. Meanwhile the use of artificial sweeteners continued to increase among weight conscious consumers. Between 1963 and 1967 artificially sweetened soft drinks (coco cola's tab) nearly tripped their market share, going to over 10% of the soda market.in the late 1960's three trends converged: increased=sing government regulation in the food processing industry, raise of artificial sweeteners and growing complexing and sophistication of health science.

One of the first results of this convergence was ban on cyclamates.

"Consumption of free sugars including products like sugary drinks is a major factor in the global increase of people suffering from obesity and diabetes "said dr. douglas bettcher, director of who's department for the prevention of non-communicable diseases.

If government tax products like sugary drinks, they can reduce sufferings and save lives. They can also cut health care cost and increase revenues for invest in health services. The who guidance says that we should our intake of free sugars to a max of 10% of our energy needs, preferably 5%.

So many reports and news regarding sweeteners are published. Some of them are under your notice as follows:

1) Tesco cuts sugar in own brand drinks to avoid sugar tax (7th Nov 2016)
2) Soft drinks industry lobbies government to dilute sugar tax (21st oct 2016)
3) Sugar lobby paid scientist to blur sugars role in the heart disease report (12th sept 2016)
4) Young children copy parents' sugary drinks habits study suggest (31st Aug 2016)
5) An average 10-year-old kid has eaten 18-year worth sugar (2nd Jan 2019)
6) Children's yoghurt contains shocking amount of sugar, study finds (19th sep2016)
7) Food industry in England fails to meet sugar reductions target (22nd may)
8) WHO urges all countries to tax sugary drinks (11th oct 2016)
9) Energy drinks could case public health problems says WHOs study
10) Adults should cut sugar intake to less than a can of coke a day, says WHO

Now I am going to tell you how will it be if you stop eating donuts even if it's worth the effort

The changes are going to be incredible. Eating too much of sugar can seriously affect your health .it leads to weight gain, your mood swings and even addiction. some nutrionist consider sugar to be even more dangerous than fat. But we still don't pay much attention to the amount of sweetener we consume every day.

Point no 1 – You will overcome a serious addiction. Study states that sugar is actually more addictive than cocaine. So, it's better if we are in control.

No 2 – Your breath will be better. Sugar not only causes gum disease and diabetes but also provides source of food for bacteria. In appropriate conditions they reproduce more quickly which results in terrible breath.

Point no 3- studies show that more consumption of sugar may lead to less memory power. so, if you want to excel in studies then it's better to give chocolates to your friends rather than eating yourself (XD).

Point no 4- this is more likely point but actually not because there is a chemical in your brain known as BDNF (brain derived neurotropic factor). it helps the brain to form connections and make new memories.

No 5-your skin will look younger. a study in the American journal of clinical nutrition suggest that giving up sugar may result in your acne disappearance. sugar is inflammatory .an inflammation is the cause of acne. now this makes a lot of sense of not eating sweeteners.

No 6- more favourably your heart will thank you .people who eat too much of sugars have much higher risk of getting heart attack .sweet drinks like sodas are believed to be a trigger of coronary heart disease .another important thing is when you give up sugar it will lead to less insulin level and drop of average heart strokes. Your blood pressure will also decrease.

Point no 7- you will have a better mood. it's better to be constant with people. rather than allowing your mood to swing and it might let you down in public. a study even says that people who eat less or no sweeteners are not much depressed compared to the ones who eat.

Point no 8-yes, on top of all you will get good sleep which is mandatory for every single person. I would say that a person can be without eating but sleep is must for people like us. high intake interferes with you sleep cycle, which again is not that much to be liked.

Point no 9- u will also lower the risk of pancreatic cancer. because pancreatic cancer is often linked to high contents of sugar intake.

No 10- your eyesight will be better. fructose in insulin and glucose level leads to damage and decreased blood supply to your eyes.

No 11- the doctors are benefited more because you will have to visit them very often if you consume this more. if you stop eating then you will miss them more.

Last point – you can save a crazy amount of money. These sweeteners are more addictive so you have to buy more products and once you start eating you will get more health issues so you visit them often which is again money and time-consuming process .so it's better to stay away right!

Anything limited is fine but once you start crossing the line it brings a lot of problems to you.

SWEETENERS- BOON OR BANE

Phooja S & Sreepriya M

Sugar Substitute is a food additive that provides a sweet taste like that of sugar while containing less food energy than sugar-based sweeteners, making it a zero-calorie sweetener. In a broader sense, Sweeteners are the substances that are used to impart a sweet taste with or without providing energy. The sweetener system plays a crucial role in developing palatable formulations. Apart from the sweetening power, it is useful in other processing too. Hence the desire for sweet taste is inborn!

Generally, Sugar is the most important sweetening substance and inseparable part of the food we consume. For instance, the use of Honey Dates back to 2000BC, but it is the sugar which has been the sweetener of choice for centuries. Lately, for many years, we've known that the sweet substances (sugar or artificial substances) bind to sensor in our mouth called, "sweet-taste receptors" send a message to our brain and tell us that we're eating something sweet.

Overtime, a number of other substances which are the alternatives to sugar have been developed and implemented within the food industry. Artificial sweeteners were introduced into the commercial market several decades ago and were mostly sold as healthy alternatives to real sugar, as these don't have any calories and allegedly help in weight loss.

Some do not taste anything like sugar, and can take some getting used to. Others, can cause bloating or cramps. And there are concerns regarding the safety of some of the artificial ones. On the positive side some have properties superior to sugar. For example, Maltitol actually improves the taste of chocolate over sugar!

Saccharin- A major Artificial Sweetener, discovered in 1878, which is 200 to 700 times sweeter than sugar, used as a non-caloric sweetener and substitute in foods and beverage industry for more than years, have overwhelmingly supported its benefits. It has also been hailed as the, "King of Sweeteners". Besides Saccharin, there are many other artificial sweeteners which includes, Aspartame, Acesulfame potassium, Sucralose, Neotame, etc.

On the other hand, they're becoming increasingly popular as people try to reduce calorie consumption. As these artificial sweeteners, are relatively new inventions, there is still a prevailing debate about their potential benefits and side effects.

Scientific studies are very clear that consuming artificial sweeteners in moderate and controlled amounts doesn't bring any harm to our body, but overdoing it might lead to negative impacts on our health. Because of the up and down, history surrounding sweeteners used in the food industry it can be quite confusing to understand what they are and how they are used.

To glean a clearer picture, a group of researchers recently pored over existing studies in the hunt for conclusive answers.

Therefore, Moderation is always the key when it comes to artificial sweeteners…

Reference: www.healthline.com/nutrition/

LIMIT THE UNLIMITED

Karthick Raj S M K

Yesterday, while I was purchasing some soft drinks at the local retail store, I happened to come across a new ingredient called high fructose corn syrup. As a food engineer I always have a curious mind towards the ingredient used in the product, and after arriving home I did some research toward the topic and came to the know gross facts about the ingredient

Corn Syrup was Developed due to the increase in demand of Sweeteners in US during mid Twentieth Century. The First "Corn Syrup" was prepared by mixing Corn starch with dilute hydrochloric acid and it was prepared by a German chemist Gottlieb Kirchoff. Then, the Industry found a cheap alternative during 1950's. The First "High Fructose Corn Syrup" was introduced by Richard O. Marshall and Earl R. Koii in 1957. They contain more Fructose which lead to the Cheaper and Sweeter alternative to Sucrose.

High fructose corn syrup are many times sweeter than normal sucrose and many times cheaper too. The Level of consumption is also increased when High fructose corn syrup is used. Recrystallization of sugars is stopped when high fructose starch is used while recrystallization occurs when sucrose is added.

Current Production Process

It is a Multi-Step Bio-Process. Initially, Alpha-Amylase produced by certain bacterial cultures mainly produced by Bacillus species is added to the Starch which converts Starch into Oligosaccharides. Then the Glucoamylase (Gamma Amylase) Produced by certain fungal cultures are used to convert Oligosaccharides into Glucose. In the final stage D-Xylose Isomerase is then Added to convert Glucose into Fructose which is sweeter.

Classification

Light Corn Syrup seasoned with Vanilla and Salt is Light in colour and is moderately sweet. *Dark Corn Syrup* is a combination of Corn syrup with molasses and it has a caramel colour, flavour and some salts. Molasses present in them enhances the Flavour and Sodium benzoate is used as preservative.

1. HFCS 42: Contains 42% Fructose – used in processed foods and breakfast cereals.
2. HFCS 55: Contains 55% Fructose – used in Soft Drinks
3. HFCS 65: Contains 65% Fructose – used in Coca-Cola Freestyle machines.
4. HFCS 90: Contains 90% Fructose – used for preparation of HFCS 42 and HFCS 55.

Normal Sucrose (Table Sugar) contains Equal amount of Glucose and Fructose (50%-50%).

Fructose Vs Glucose in Absorption

Glucose is major energy producing compound needed by our body. Our Brain and CNS gets its energy from Glucose. As Glucose enters our body it enters to our pancreas through transporter Glut-4. Which is Insulin Dependent path. Hence, Insulin secretion starts and the excess of Glucose is stored as Glycogen for future purposes.

Fructose enters the System directly into the Pancreas through transporter Glut-5. Which is an Insulin Independent pathway so, Insulin will not be secreted as Fructose enters the system hence the large amount of consumption may lead to increase in Blood sugar level and on a Long m=time may cause Diabetes Mellitus Type-2. Due to the Delay of Insulin Secretion it also leads to the delay in the production of Leptins. Leptins are the compounds that gives satisfaction and inhibits the intake. Delay in Production of Leptins leads to over intake and which leads to Obesity and certain hormone Syndromes.

According to American Heart Association daily Allowance of Sugar per person is 25grams/day for Women and 37.5/day grams for man.

Small amount of consumption of HFCS does not cause any harm but large and long-time consumption leads variety of diseases to our body.

Current Trend:

Industries and Many companies those are concerned about the health of the consumer are moving away from the usage of High Fructose corn syrup and again started using Sucrose. Certain companies those are using sucrose again are Hershey's, Gatorade Drinks, Yoplait yogurt and etc…

Reference: https://en.wikipedia.org/wiki/Corn_syrup

STEVIA BIO SWEETENER

Gopikadevi S

One sweetener that often gets lost amid the confusion is stevia…Say goodbye to the pink, blue and yellow packets of sugar! Wholesome organic stevia is the perfect natural replacement for artificial sweeteners. Stevia rebandiana plant is a small sweet leaf herb of South America origin. Moises Santigo Bertoni, an Italian botanist is often credited with the discovery of stevia in late 1800 s. Stevia is approved by the FDA in 2008. And the FDA deemed stevia generally recognized as safe, (GRAS).

SWEET STEVIA:

Stevia is a suitable replacement for sugar. Stevia is a natural sweetener with zero calories and it is a Non-Carbohydrates glycoside compound, Stevia is up to 300 times sweetener than sugar. According to the FDA, the acceptable daily intake for Stevia Glycosides is 4 milligram per kilogram of body weight. Stevia plant has many sterols and antioxidants compound like flavonoid and tannins. Stevia is used over 30 years in colas, ice cream, soy sauce and pickling products. Along with many FMCG companies such as Pepsi true and Coke life that are marketed as low-calorie carbonated drinks in some markets, use a mix of stevia and sugar. Stevia is beneficial for problems related to indigestion. It also helps with weight loss since it has no calories. Stevia has potential for treating Endocrine diseases such as Obesity, Diabetes and Hypertension. Stevia leaf extract does not cause cancer. The FSSAI has issued their draft approval stevia glycosides as a Sweetener for use in 11 Food and beverage calories for the Indian market. Stevia based sweeteners are natural because their sweeteners derive from a plant. The leaves were also chewed on their own as a sweet treat. Some food containing stevia include Teas, Candies, Chewing Gum and soft drinks.

CONCLUSION:

Stevia, a little leaf with a huge potential to forever change the over $50billion dollar sugar industry. By sweetening with stevia-based sweeteners you can get the sweetness you enjoy in a way that does not add the number of calories as if you were sweeten with sugar. It is safe to say that when consumed in reasonable amounts. Stevia is a good natural sugar substitute. Among the stevia products, *Cavalier chocolates* sweetened with stevia was named the most innovative product.

Reference: www.steviashantanu.com

"TOO MUCH OF ANYTHING IS GOOD FOR NOTHING"

Shalini

Sweeteners provide sweet taste in food and beverages which may be either natural or artificial. Natural sweeteners are of two types namely calorie containing (Honey, Maple syrup, Coconut palm, Sugar, Molasses), and the another one is non-calorie contain (Stevia).

SWEETENERS	BENEFICIAL	HARM
Honey	Antiseptic	Harmful to teeth
Coconut palm	Natural and eco friendly	Unsuitable for diabetics
Maple syrup	Rich in vitamin B, Lower glycemic index	Unsuitable for diabetics
Molasses	Rich in Mg, K ions, strong flavour	Low calorie content

Stevia is a Dried leaf is the most natural form of stevia. It is zero calorific and zero glycemic. It regulates blood sugar level. Food that are imparted with natural sweeteners are highly perishable than artificial sweeteners. Natural sweeteners are unsuitable for diabetic patient because it has higher glycemic index and highly caloric. So artificial sugars are widely used now a days. Artificial sweeteners are also called as intense sweeteners, because they have a sweetness power which is thousand higher than that of table sugar(Sucrose).Some of the artificial sugars are Acesulfame Potassium, Aspartame, Neotame , Saccharin, Sucralose. Artificial sweeterners are baned in Japan. Food with artificial sweeteners have better colour texture, flavor, sweeteness than the natural sweeteners. Artificial sweeteners have both positive and negative effects. First artificial sweeteners were discovered by Constantine Fahlberg. Artificial sweetners controls the weight because it has low calorie. It is used by diabetic patients because of absence of carbohydrates and low calories. So that it won't raise blood sugar level and lowers the glycemic index. It is Tooth friendly.Glycemic index represents the relative rise in the blood glucose level two hours after consuming the food.

One of the major artificial sweeteners is Aspartame (200-300 times sweeter than sucrose). Artificial sugars have certain limit to be added, beyond which will cause side effects. Some of the side effects are Dizziness, Mood changes, Diarrhoea, painful gas, Worsening IBS (Irritable Bowel Syndrome) symptoms, Bloating, Inflammation, Nausea, Vomiting, Headache, Depression. The artificial sweetener saccharin causes Bladder Cancer.

Can everyone consume artificial sweeteners?

No, it cannot be consumed by everyone. It has long term health effects at the time of pregnancy. "Pregnancy is a time where every bite and sip that a woman takes really matters". The consumption of artificial sweeteners during pregnancy causes carcinogenic effects on fetal life and results in preterm delivery.

As an efficient alternative to sugar the artificial sweeteners carry an immerse industrial potential. However, a rational innovation in the direction of health perspective with fewer health risks will be required, so that the artificial sweeteners could be truly projected as a healthy and low-calorie alternative.

Reference: https://www.medicinenet.com/artificial-sweeteners/

“SWEET” ISN’T ALL THERE IS TO ARTIFICIAL SWEETNERS

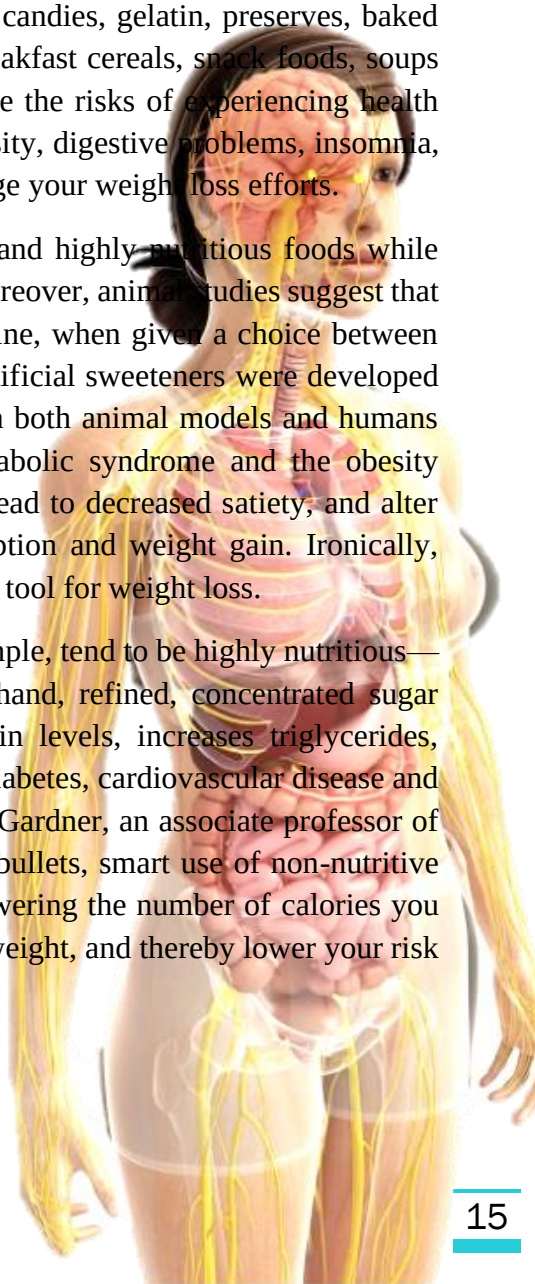
Indra T

We live in this diet obsessed nation where ‘zero-figure’ means the world to everyone, ultimately leading to the consumption of artificial sweeteners which persuades into one’s mind and goes by the name ‘zero-calorie’ or ‘low calorie sweetener’. There is this recent trend of reducing the calorie intake to lose weight for which artificial sweeteners are used which is utterly the wrong choice! Though the reality is, the shelves of all the supermarkets are filled with many varieties of ‘sugar substitutes’. And we consumers quickly reach for these products to satisfy our burning desire of craving for sweetness whilst ingesting little to no added calories. People are still unaware of the possibility of acquiring short term to life-long health effects due to their ignorance and carelessness. It is essential to steer clear of all artificial sweeteners.

The Food and Drug Administration has approved five artificial sweeteners: Acesulfame potassium, Aspartame, Sucralose, D-Tagatose and Saccharin. Most people think that they already know these “healthy”, aspartame-based products like the back of their hands. Truth is – and an ugly one at that – there are scientifically backed evidences and lab results showing the dangers and unproven safety of aspartame use. We consume these products without our knowledge on a daily basis which includes chewing gum, breath mints, beverages, alcoholic beverages, dairy products, salad dressings, desserts, candies, gelatin, preserves, baked goods, toothpastes, mouthwashes, yogurts, vitamins, pharmaceuticals, breakfast cereals, snack foods, soups and table top sweeteners. The usage of these products is inevitable so are the risks of experiencing health issues like headaches, dizziness, eczema, bloating, nausea, diarrhoea, obesity, digestive problems, insomnia, depression, memory loss, seizure, brain cancer, etc. Aspartame can sabotage your weight loss efforts.

Use of artificial sweeteners can make you shun healthy, filling, and highly nutritious foods while consuming more artificially flavoured foods with less nutritional value. Moreover, animal studies suggest that artificial sweeteners may be addictive. In studies of rats exposed to cocaine, when given a choice between intravenous cocaine or oral saccharin, most chose saccharin. Although artificial sweeteners were developed as a sugar substitute to help reduce insulin resistance and obesity, data in both animal models and humans suggest that the effects of artificial sweeteners may contribute to metabolic syndrome and the obesity epidemic. Artificial sweeteners appear to change the host micro biome, lead to decreased satiety, and alter glucose homeostasis, and are associated with increased caloric consumption and weight gain. Ironically, artificial sweeteners are marketed as a healthy alternative to sugar and as a tool for weight loss.

“Sugar-containing foods in their natural form, whole fruit, for example, tend to be highly nutritious—nutrient-dense, high in fiber, and low in glycemic load. On the other hand, refined, concentrated sugar consumed in large amounts rapidly increases blood glucose and insulin levels, increases triglycerides, inflammatory mediators and oxygen radicals, and with them, the risk for diabetes, cardiovascular disease and other chronic illnesses,” Dr. Ludwig explains. As said by Dr.Christopher Gardner, an associate professor of medicine at Stanford University in California -while they are not magic bullets, smart use of non-nutritive sweeteners could help you reduce added sugars in your diet, therefore lowering the number of calories you eat. Reducing calories could help you attain and maintain a healthy body weight, and thereby lower your risk of heart disease and diabetes.



Reference: https://draze.com/natural-sweeteners/

SWEETNERS IS IT WHOLESOME?!

Priydharshini R

As we are living in the modern world, everyone wants to lead a fit and healthy life. But people don't know the real meaning of "health". Apart from health, "Zero-figure" means to everyone. So they are running towards the word "Zero calories", thereby avoiding sugars and move towards the sweeteners. We really don't know what effect large amounts of these chemicals will have over many years.

In a multi ethnic study of Arthrosclerosis, daily consumption of diet drinks was associated with a 36% greater risk for metabolic syndrome and 67% increased risk for type 2 diabetes. One of the major health issues is that, it leads to cancer. Over the last few years, corn growers and affiliated association have pushed high fructose corn syrup (HFC's) as a natural sweetener. This is simply not true. The vast majority of HFC's is produced from genetically modified corn. Fructose is a simple sugar that is rapidly metabolised by the liver, causing a "sugar high". Researchers believe this quick acting sugar leads to increased storage of fat in the liver, resulting in non – alcoholic fatty liver disease, digestive upset and arthrosclerosis.

Apart from these health wise affecting sweeteners, there are many natural sweeteners that are healthy. According to a study in Journal of American dietetic association substituting healthy sweeteners including backstrap molasses, Maple syrup and honey can increase antioxidant intake. This study shows that replacing 130 grams a day of refined sugar with healthy sugar substitutes can increase the number of antioxidants which we consume each day. Some of the natural sweeteners are Stevia, Dates, Coconut sugar, Balsamic glaze, Banana puree, Brown rice syrup, Monk fruits etc...

Stevia is native to South America and has been used for hundreds of years in that region to support healthy blood sugar levels and prompt weight loss. Today Stevioside, the element in the leaves that make it more than 200 times as sweet as sugar, is available in liquid forms and packets. It has Zero calories, zero carbohydrates and none of the nasty side effects of artificial sweeteners making it an ideal sweetener. Generally, Stevia and Erythritol are typically the top sugar substitute recommendation of people following Ketogenic diet. The new low-calorie sweeteners are derived from natural substances rather than synthesized like Saccharin and Aspartame, so choosing them makes us feel somewhat healthy. Still, there are concerns. Some of the natural sweeteners are relatively new, so they haven't been studied as extensively as sugars. Sugars occur naturally in many plant foods. Most of the common sweeteners we consume are obtained by processing these plants (such as Agave cacti, Maple trees, Sugarcane, Coconut palm, Sugar beet and Corn) to extract and condense the sugars. As some chemical processes are involved in the extraction of these natural products from their sources, it's not truly to say that it is fully natural. On a cellular level, sweeteners are still sugars. So ultimately, they still cause our body to store excess fat. Though natural sweeteners are less burden, they are still a burden to us. But still, it's a dilemma to understand what they are and how they are.

Sweeteners create negative impacts on our health, only if we over consume it. No matter which sweetener we use, quantity is the real issue.

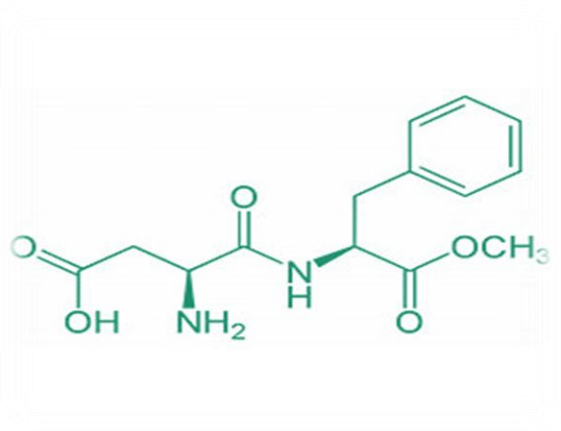
"TOO MUCH OF ANYTHING IS GOOD FOR NOTHING"

Reference: https://edition.cnn.com/2014/08/09/health/natural-sweeteners

BEAUTY IN NATURE!!

Soppya V

ASPARTAME:



Chemical formula: $C_{14}H_{18}N_2O_5$

Density: 1.35 g/cm³

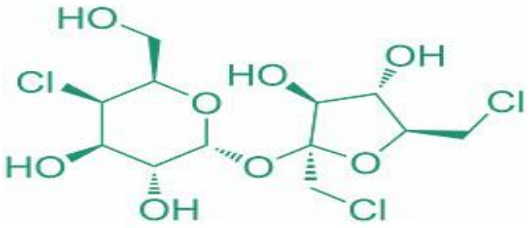
Average Molar mass: 294.30 g/mol

Melting point: 246°C (474.80°F)

IUPAC ID: N-(L-α-Aspartyl)-L-phenylalanine, 1-methyl ester

Inventor: James M. Schlatter

SUCRALOSE:



Chemical formula: $C_{12}H_{19}Cl_3O_8$

Melting point: 125°C (257°F)

Average Molar mass: 397.64 g/mol

IUPAC ID: 1,6-Dichloro-1,6-dideoxy-β-D-fructofuranosyl-4-chloro-4-deoxy-α-D-galactopyranoside

Density: 1.69 g/cm³

SACCHARIN:

Chemical formula: $C_7H_5NO_3S$

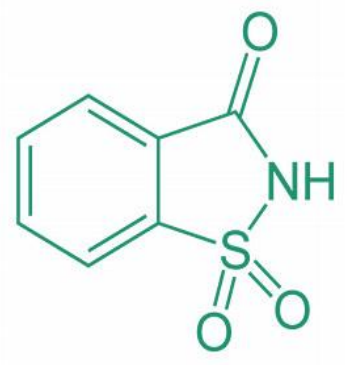
Melting point: 228.80°C (443.84°F)

Density: 0.83 g/cm³

Average Molar mass: 183.18 g/mol

IUPAC ID: 2H-1λ6,2-benzothiazol-1,1,3-trione

Inventor: Ira Remsen



Reference: www.wikipedia.com

SWEETNERS OF NON-SWEETNERS

Bharath J

Like sweets, but scared of artificial sweeteners. Here we get you to the world of natural non- sweeteners, but still they sweeten.

Sweet potatoes

They are rich with potassium magnesium, calcium and other nutrients. Here the concentrated juice of sweet potatoes is used as a concentrate. This is popularly manufactured as Carolina sweet by "Carolina sweet ingredients", situated in USA. This is used in preparation of marinades, barbecue, sauce, ketchup, baked desserts and condiments. This low in fructose with 75-Brix value which taste similar to honey but with a flavour of sweet potato.

Blue berries

Manufacturers have discovered that using blueberries and blueberry formats to provide sweetness offers the dual advantage of sweetening and enriching the product naturally.

In fresh blueberries, fructose is 50 percent and glucose is 49 percent of the total sugars. This pattern is similar to the distribution in sugar which is about 50-50. Per 100g, fresh blueberries are 9.96g total sugar, 0.11g sucrose, 4.97g fructose and 4.88g glucose. Blueberry concentrate (45-65° Brix) can be used to sweeten and colour confections.

Coconut sugar

Coconut sugar, also known as palm sugar, is produced by evaporating the sap made from the flowers of the coconut tree. It's naturally high in potassium, magnesium and zinc and has a molasses-type aroma, so it is very different from cane sugar. It has a larger granule size than cane sugar.

Coconut sugar can be used as a 1:1 replacement for cane sugar. Because coconut sugar has a lower melting point and higher burning temperature, it is well-suited to confectionary recipes. This is popularly manufactured by the Jedwards internationals.

Yacon syrup

Yacon syrup, a new sweetener is derived from the root of the yacon plant (Smallanthus sonchifolius), a type of perennial daisy native to South America's Andes Mountains. The yacon root's sugars are primarily composed of fructooligosaccharides (FOS), a low-calorie carbohydrate that is sweet like sugar. It has a consistency that is similar to molasses, so it is a very thick, dark brown sweetener.

High in potassium and antioxidants, yacon syrup is believed to have weight-loss properties and other health benefits. It can be used as a substitute for sugar, honey or molasses in baking and other cooking applications.

Allulose

One of the rare sugars which is popularly marketed by a Japanese company under the name of Astraea. Rare sugars occur in very small quantities in nature, too small to allow for economic separation from their sources typically figs, raisins and jackfruit. So most commercial versions are made through biological processes such as fermentation or enzyme conversion to create the identical compound.

Allulose is absorbed by the body but not metabolized, making it nearly calorie-free. Allulose has a texture and performance behaviour similar to sucrose providing comparable bulk, sweetness and functionality such as browning and freezing point depression.

A monosaccharide, or simple sugar, allulose is about 70 percent as sweet as sucrose. Allulose even decreases blood sugar levels slightly while increasing blood ketone levels. Allulose is an optimal sweetener for baked goods, cereals and beverages.

Reference: www.livescience.com

WHO AM I?!

Syed Ammal

I am a sweetening agent. I was discovered from the mountain region of Brazil and Paraguay. I was isolated in a pure form during 1970's in Japan. I am allowed to use in Japan since artificial sweeteners are banned almost 50 years ago. I am extracted from the leaf plant which is native to South America. It is also called as 'Honey leaf plant' which belongs to Compositae family. Glycosides is the main component responsible for my sweetness. Usually, I am used as a table top sweetener in the States. Normally, I am 30 times sweeter than sucrose. Under purified condition I am 200 – 300 times sweeter than sucrose. I am very stable at 200 deg Celsius. The WHO's Joint Expert Committee on Food Additives has approved me as an acceptable daily intake of about 4 mg /kg of body weight. I am one of the low-calorie sweeteners. Guess who am I?

SUGAR FREE CANDY FOR DIABETES

Gokilavani.

One of the most persistent myths is that sugar is off limits to people with diabetes. But in reality, people with diabetes can enjoy foods like desserts provided they keep within an overall healthy eating plan. But be wary of claims about sugar-free products like candy. To safely enjoy sugar-free candy, plan ahead and ensures to stay within the guidelines set by a health care provider or dietitian. A high sugar intake is a cause for concern because it is linked to a number of health problems. To avoid sugar when consuming candy, many people especially the diabetics choose sugar-free option. To make sugar-free candy sweet, sweeteners are widely used. Sugar doesn't directly cause disease, foods with too much of ingredients can make it more difficult to control blood glucose level." Generally, speaking, sugar-free candy will have less of an effect on blood glucose than its sugar containing counterpart", says Jo-Anne M. Rizzotto, RD, a certified diabetes educator at the Joslin Clinic in Boston. "The major difference between a regular and sugar-free candy is the kind of candy used", says Anna Taylor, RD, CDE at the Cleveland Clinic in Ohio. Sugar-free sweeteners include Splenda, saccharin, aspartame, stevia and sugar alcohols. While sugar-free candy itself hasn't been studied extensively, the artificial sweeteners it contains have a review of 37 studies found that consuming artificial sweeteners regularly may be dangerous for people with diabetes because they are associated with an increased risk for obesity, which can further worsen glucose intolerance. When managing diabetes experts agree that, at least based on current evidence, sugar-free candy is a better choice than candy made with regular sugar. Sugar-free candy often, though not always, contains fewer total carbohydrates, less sugar, and fewer calories than regular candy. That said, it's still crucial to practice portion candy contains sugar alcohols like sorbitol, xylitol, mannitol which contains carbohydrates, but to a lesser degree than sugar. Before popping that sugar-free candy in mouth, follow the tips for eating sugar-free candy when managing diabetes. Try to keep added sugar intake to no more than 25 grams per day for woman and no more than 36 grams per day for a man. Focus on PORTION CONTROL, limit the sugar alcohol consumption, when choosing candies consider saturated fat content as well. Choose QUALITY OVER QUANTITY. Ultimately, choose a treat that will be satisfying, so that you aren't tempted to overindulge. It is to be noted that, Ingestion of too many sugar alcohols, may cause uncomfortable gastrointestinal symptoms like bloating, gas and diarrhea.

Reference: https://www.everydayhealth.com

Mango makes us wait until it's the season; but no one seems to be angry on it.

Shangamithra

Mangoes are the alms of nature, not only for its inviting taste but also for its health benefits. This article tells us about all the unknown facts of mangoes. The mango exits in two races, one from India and the other from the Philippines and Southeast Asia. Alphonso mango is considered to be the most superior in terms of sweetness, richness and flavour. This variety of mango is famous in the Konkan region of Maharashtra. India is on the top of the list as the largest mango producer. A basket full of mango is considered as a sign of friendship in India.

Mangoes are known for its nutritional content and health benefits. These mangoes are rich in vitamin C, fibre and pectin that helps to control high cholesterol level. They are high in antioxidants thereby boosting our immunity. It supports cardiac as well as optical health. It descends the risk of cancers. Though it has many health benefits they were treated with scepticism in case of diabetics. As they are rich in sugar and carbohydrates, diabetes is mostly advised to eat mangoes in moderation. A recent study conducted at the Federation of American Societies for Experimented Biology (FASEM), says that eating mangoes every day may control and even lower blood sugar levels, despite their natural sugar content. A study conducted at the Oklahome University revealed that mango consumption helps lower insulin resistance and improves glucose tolerance in diabetics. Certain experts spurn the intake of mangoes. They recommend to take mangoes at moderate level.

They have special digestive enzymes like terpenes, aldehydes and esters that helps in breaking down food, leading to good digestion and prevents constipation. We all know the heat property of mangoes which cannot be reduced even after keeping it in refrigerated condition. So, refrigeration has no effect on mangoes in reducing the heat. Mangoes help in losing weight only if they are eaten with a specified calorie limit. It is good to eat savor mangoes around mid-morning or as an evening snack. Beauty conscious people are advised to take more mangoes. The beta-carotene, vitamin E, C and A are a wonderful source for skin antioxidant. It makes the skin smoulder.

Mangoes are the most popular food in the entire world. We Indians should be proud as its origin is India. There are certain health issues regarding intake of mangoes. If cholesterol builds up in the body, it can block the arteries and other blood vessels. This can cause heart disease, a stroke, or a myocardial infarction. Mangoes have more fibre. Having 3 to 4 mangoes per day will result in diarrhoea. It also increases heat in our body. Those who are overweight must avoid eating too many mangoes as they may cause hormonal changes in the body. Another important thing is that, one should not drink water before or after eating mangoes. The reason is that, water dilutes our digestive acids and the digestive strength.

The vibrant and rich colour of mango is due to carotenoids, which is a great antioxidant preventing the body internally from free radicals which causes cancer and heart diseases. It protects liver by acting as a detoxifying agent. As the proverb says ***"Make hay while the sunshine"*** **e**nhance your health by having mangoes in the commencing summer.

Reference: www.wikipedia.org

HONEY SAVES MONEY!!

Vikashini C J

Honey, which is considered to be nature's finest work, since ancient times honey has been used as both food and medicine. Honeybees produce this natural sugar syrup which is viscous in nature. Bees collect it from nectar of flowers and store them in the comb (waxy substance). The various colour of the flowers attracts the bees. The colour, aroma, and consistency of honey mainly depends upon the flowers on which the bees have been foraging. Bees commonly forage on flowers within two kilometres of their nest, although they can travel much further.

"To produce one kilogram of surplus honey requires bees to visit several million flower and to fly a total flight path equal in distance to six orbits around the earth!"

Bees produce honey to act as a food store for the colony of periods when there are no flowers or the climate is in adverse. Honey has the high levels of monosaccharides (fructose and glucose) and contains about 70% to 80% sugar that provides sweetness. Honey contains large quantity of fructose than glucose. When the glucose content in honey gets crystallized the honey becomes solid which is known as Granulated Honey. It is natural process and there is no difference in nutritional value between solid and liquid honey. Almost all honey will granulate if the temperature is low.

Honey is widely used as source of sugars for making honey wines and beers. Honey's sweetness depends on its high fructose content and acidity. Honey has the capacity to retain water and hence the food products made with honey remain moist for a longer period than those made with another sweetening agent. For consumers, the important features of honey are its aroma, flavour, colour and consistency which depends on the species of plants being visited by the bees. It is impossible to give a comparable value with respect to its flavour and aroma. Colour can sometimes be a useful indicator of quality as; honey becomes darker during storage.

Honey can be categorised based on its origin such as Blossom Honey, Monofloral Honey, Comb Honey, Extracted Honey, Pressed Honey, Creamed Honey. Raw honey contains an enzyme called glucose oxidase which when combined with water produces hydrogen peroxidase, a mild antiseptic that is responsible for the antibacterial properties. Honey is said to improve food assimilation and useful for chronic and infective problems such as constipation, duodenal ulcers and liver disturbances. Honey is also good for diabetics. In the healthy individuals the consumption of honey produced lowers the blood sugar readings than the consumption of some quantity of sucrose.

Reference: http//:www.medicalnewstoday.com

EVAPORATED CANE JUICE

Monica V

Food labels are intensely scrutinized on a daily basis. Each ingredient has been questioned, googled — all in hopes of determining if the product meets customer transparency expectations. Evaporated cane juice is one of the latest ingredients to find itself in the hot seat. It's a crystallized sweetener , very similar to refined white sugar. Boasting a golden hue, evaporated cane juice undergoes only slightly less processing than its familiar counterpart.

Evaporated cane juice is produced by extracting the liquid from sugar cane, through the milling process. The "juice" is then filtered to remove any solids that may be present. At this point, the remaining liquid undergoes an evaporation process, producing a syrup. Briefly passed through a centrifuge, removing some of the molasses still present, the syrup is then dried and cured. The end product is a crystallized mass. Walking the aisles of any local grocery store, evaporated cane juice will be found in many products on the shelves. It has been heavily utilized as a sweetener in yogurts, snack bars, cookies and soda.

Sugar does contain nutrients which most of us aren't aware. From the onset of its use, evaporated cane juice, has been promoted as a healthier option in the world of sweeteners. In large part these claims were based off the production process, which allowed evaporated cane juice to retain larger amounts of the naturally occurring nutrients- Vitamin A, Vitamin B and Calcium. Though these vitamins may be present in greater amounts, many argue that the nutritional value associated with their presence is negligible. "All sugar is evaporated cane juice," says Judy Sanchez, a spokesperson for the U.S. Sugar Corp. Some believe describing a sweetener as evaporated cane juice, is a ploy to portray a product as part of a healthy lifestyle.

In 2009, the FDA stepped in to address issues with initial draft guidance, suggesting manufacturers should instead refer to "Evaporate Cane Juice" as "Dried Cane Syrup". The FDA believed this title more aptly described the true nature of the sweetener being used.

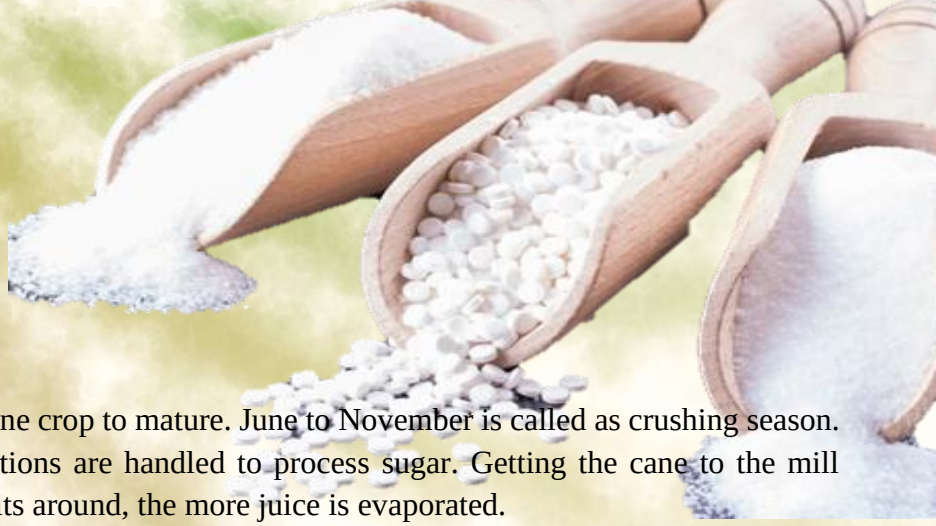
Despite the recommendations given by the FDA, evaporated cane juice continued to be used on packaging, with companies arguing this was the most accurate description of the product, and not misleading to the general public. Consumers voiced continued concern and confusion through lawsuits, most notably against Chobani.

In 2014, the FDA re-opened the discussion of evaporated cane juice. At this time, all pending court cases were dismissed without prejudice, pending the final determination of the FDA. Following the comment period, in May 2016, the FDA issued its final guidance and determined the following:

- Evaporated Cane Juice was, in fact, misleading, as it did not accurately depict "the basic nature and core properties" of the food product;
- Dried Cane Syrup caused more confusion and would be excluded from use;
- Food manufacturers should relabel any products containing evaporated cane juice to properly designate it as a sweetener.

Even though the FDA has issued their final conclusions about evaporated cane juice, this is not a legally binding document. Because of this, the FDA has great limitations regarding their ability to enforce labeling recommendations.The real impact of this ruling, will be witnessed in the final outcomes of current court cases. Legally binding or not, FDA decisions carry weight upon final deliberation. In an era where perception takes center stage, many manufacturers will have to ask if this is a battle worth fighting.

Reference: www.wikipedia.org

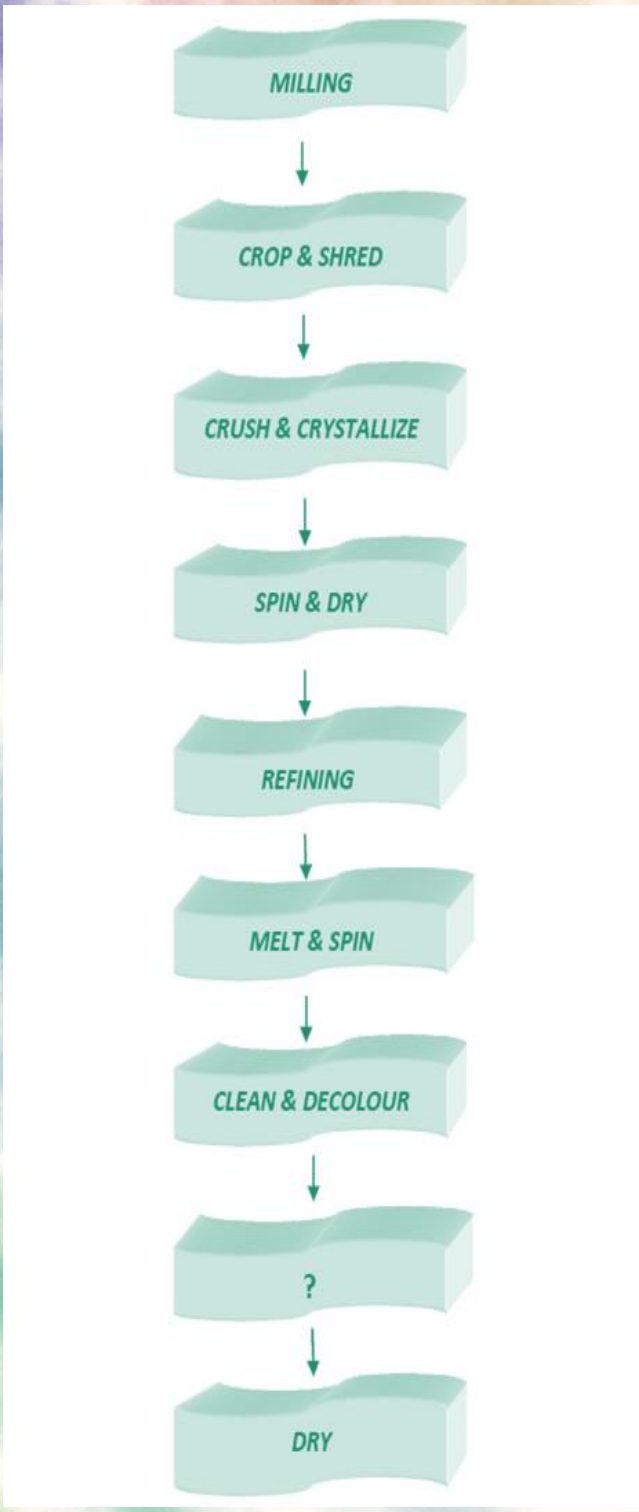


FARM TO FORK

Srivasupradha

SUGARCANE:

It takes nearly 16-24 months for a cane crop to mature. June to November is called as crushing season. Starting from harvesting, many unit operations are handled to process sugar. Getting the cane to the mill quickly is important because the longer it sits around, the more juice is evaporated.



UNIT OPERATIONS CROP AND SHRED:

During milling (crushing) sucrose is extracted.

CRUSH:

Raw sugar is obtained as a result of milling. The cane material is then crushed as it is fed through a series of rollers. The left-over fibrous material is them used as fuel to run the mill's boiler furnaces.

WASH AND CRYSTALLIZE:

The juice is pumped away to be turned into raw sugar. The juice is cleaned to remove
impurities and boiled. This is then concentrated by boiling further under vacuum. The concentrated syrup is then crystallized.

SPIN AND DRY:

The spinning process is done until the required color is reached. To remove color, the mixture is spinned in centrifuge till color from molasses flies off. In some cases, the mixture is moved in a current of whirling air from the intake feeder to the discharge end for drying.

REFINING PROCESS:

MELT AND SPIN:

The raw sugar is mixed with syrup to help soften the crystals. The syrup is then spun to remove even more color. The crystals left, are then mixed with hot water and then passed through a sieve.

CLEAN AND DECOLOR:

This process uses lime to remove unwanted bits and impurities. Series of clarifiers are used. The impurities are skimmed off at the top of the sugar liquid mixture. Sugar syrup is concentrated, sterilized (UV light) turned into the required stage and run in centrifuge to remove any lasting color from molasses.

DRYING:

The final stage includes drying, where the sugar is kept moving so it doesn't stick together.

Reference: www.wikipedia.org

SOCIAL MEDIA DRIVE RUBY CHOCOLATE IN ASIA

Kiran J

Chocolate giants Nestle and **Barry Callebaut** are expanding their offerings of ruby chocolate – a flavour that caught fire a year ago in Asia thanks mostly to social media.

Ruby chocolate is a variety of chocolate introduced in 2017 by Barry Callebaut, a Belgian-Swiss cocoa company.

The chocolate is made from the "ruby cocoa bean. "Ruby beans" are existing botanical cocoa bean varieties that have been identified as having the right attributes to be processed into ruby chocolate.

The chocolate's taste is described as "sweet yet sour", with "little to none" of the cocoa flavour traditionally associated with other varieties of chocolate.

With the production methods being kept a trade secret, publications note industry speculation that ruby chocolate is made with unfermented cocoa beans, which can have a natural red-pinkish colour. The company also registered a patent in 2009 for "cocoa-derived material" from unfermented cocoa beans (or beans fermented for no more than three days) that become red or purple after treating them with an acid and then defatting with petroleum ether.

The variety was not available for sale to consumers until 19 January 2018, when it was introduced in a new flavour of Kit Kat bar, in Japan and South Korea, as well as online. One stick was to cost 400 yen (USD$3.60). In April 2018, Kit Kat announced the release of the ruby chocolate in the UK but Fortnum & Mason beat them to it, launching the first ever ruby chocolate in Europe on 13 April 2018. Kit Kat launched on the following Monday.

Ruby chocolate was introduced by Nestlé in Kit Kat bars in Japan last year as the "fourth chocolate" after milk, dark and white. The product immediately went viral, with young Asian consumers sharing photos of themselves enjoying it on Instagram and other social media. More than 40% of Japanese consumers are aware of ruby chocolate and 5% have tasted it, according to a poll cited by Bloomberg.

Nestlé is bringing out a new ruby Kit Kat with dried cranberries and nuts. Meantime, Barry Callebaut, the world's largest bulk chocolate processor, is pursuing an ambitious social-media marketing campaign. Callebaut is putting together a website that will bring together social-media mentions of ruby chocolate, detected by an algorithm, and encourage visitors to share ideas about the product.

Ruby chocolate i s not yet saleable in the U.S., pending approval by the FDA.

TASTE DETERMINANTS

Pamila

The food and beverage industry now need to take a clear-cut decision replacing sugar in products. Experts stated that sugar was the new evil, adding that this was where sweeteners were poised to play a role in defining the taste, quality, texture and nutrition as they were embedded into food and beverages.

"Sweeteners are pivotal taste determinants. There is a high degree of appetite for sweet food, and therefore, it is time the industry opts for low no-calorie solutions (LNCS)," they added

Reduction of calorie consumption is key to reduce the incidence of non-communicable diseases. LNCS has gone through the same regulatory approvals like any other food additive or ingredient across the globe. A high level of safety evaluation, extensive toxicology studies have seen regulatory authorities, spanning from USFDA to the EU, Codex and FSSAI to endorse its safety and satiety. There are already about 822 sweetener-based foods that are launched globally. The way forward is that taste is the primary determinant

Shruti Bhargava, head, regulatory affairs, Cargill Starches, India, in her presentation titled Global safety assessment of low/non calorie sweeteners, pointed out that since the regulatory framework was in place and every data being backed by robust scientifically-validated studies to prove the safety and toxicity, there was no cause for concern. As a part of the FSSAI's Eat Right campaign mandating to reduce salt, sugar and fat intake, food companies in India have already infused fibre and making it healthy, " he added. He stated that consumers indicated that when sugar was replaced, there was a need to ensure that it did not mess with the taste of the product when LNCS was used. When industry comes under pressures to reduce sugar, regulators need to have an open mind to look the negative and positive aspects on the alternative forms of sugar or the LNCS, which are extensively tested and proved to be safe by global authorities," said the FIA policy director

SHAQ ATTACK

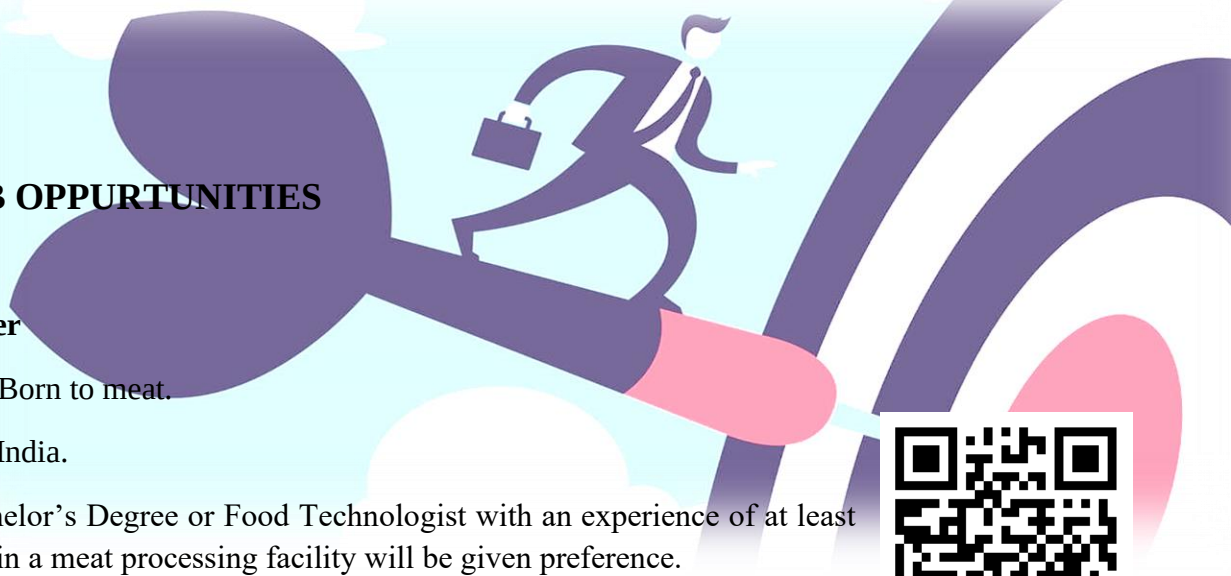
Bharath

Every one of us like to have hazardous free and healthy food. We are so conscious about what we eat, in present world we are moving towards to organic and healthy food. The one ingredient which threatens the most of the people who are conscious about what they eat is maida. Actually, maida is refines wheat flour, which doesn't consist any nutrient other than starchy endosperm. Mostly many biscuits and pasta manufacturers use maida for their product, as it gives good texture and basically maida is cheap than whole grain wheat flour.

Many food manufacturers print maida as refined wheat flour, which is a technical nomenclature and misunderstand it as whole of this technical nomenclature and misunderstand it as whole grain whet flour. So, to eradicate this issue FDA had brought a new regulation on labelling of products.

The statement by FDA is as follows," The food manufacturing companies have been told to comply with the order by April 30,2019. It means that every food item containing the ingredient needs to clearly mention 'maida' and 'atta' from May 1 onwards," said Suresh Deshmukh, joint commissioner, FDA. Dilip Sangat, assistant commissioner, FDA, Raiged, said, "This is aimed at bringing clarity in labelling as many packaged food companies use 'wheat flour' for both atta and maida on product labels".

The biscuit company claimed wheat flour on the label but in reality, it used refined wheat flour or maida to make the biscuits. Similar other raids across the country also revealed the same pattern wherein companies cashed in on the confusion between wheat flour and refined wheat flour. The FSSAI then issued the directive to use maida and atta with English words. The Food Safety and Standard Authority of India (FSSAI) issued the order on February 1 this year. The consumer can approach FSSAI regarding any issue on violation of this regulation



CURRENT JOB OPPURTUNITIES

Kamalesh

Production manager

Recruiter: Licious - Born to meat.

Location: Banglore,India.

Qualifications: Bachelor's Degree or Food Technologist with an experience of at least 5 years' experience in a meat processing facility will be given preference.

About the Recruiter:

Licious is an Indian meat and seafood company, headquartered in Bengaluru. The company operates on a farm-to-fork model owning the entire back-end supply chain and cold chain. It operates across Bengaluru, Hyderabad, Delhi, Gurugram, Faridabad, and Noida.

Quality Assurance Associate

Recruiter: APM Terminals India Pvt Ltd. is a part of the APM Terminals- a Global Port.

Location: Chennai, Tamil Nadu

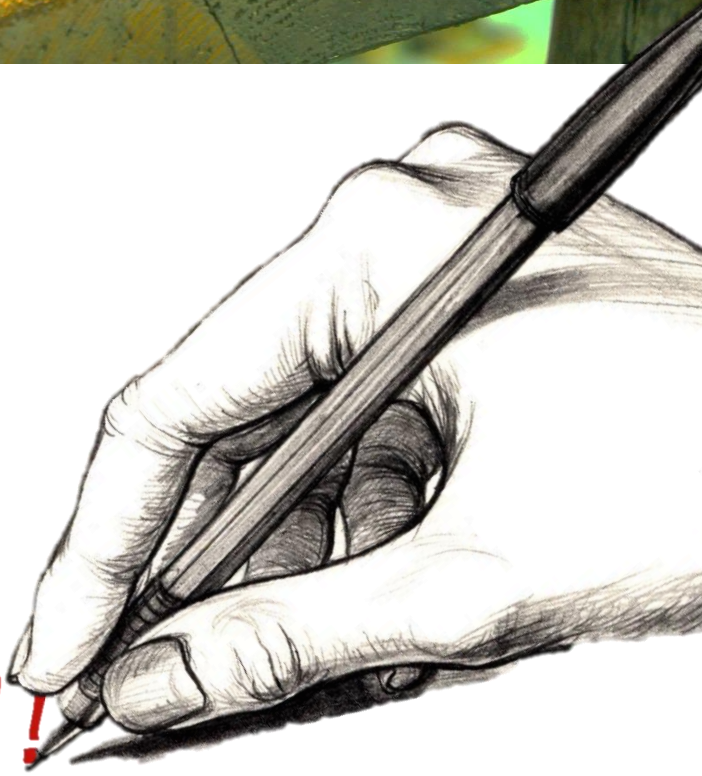
About the Recruiter:

APM Terminals India Pvt Ltd. is a part of the APM Terminals- a Global Port, Terminals and Inland Services operator. South Asia cluster is powered by a dedicated team of over 300 accomplished professionals who focus on providing best in class integrated solutions in the field of inland container logistics.

Qualifications: Graduate in food technology or equivalent with minimum of 3-4 years of experience in handling warehouse and processing operations.

Skills required:

- Strong understanding of food safety, product handling, pest control, equipment calibration, ISO standards, processing, ripening and repackaging
- Functional expertise and lead by example
- Strong in verbal and written communication
- Managing contract workforce
- Root cause analysis and decisive insight.



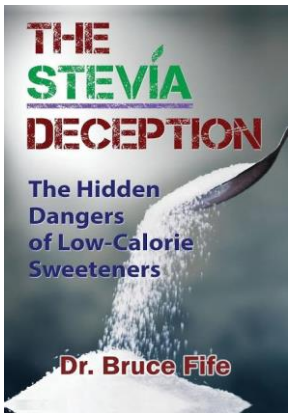
COMICS !!

Subashinidivya & Priyadharshini

Rajeswari K & Dhaarini Chandrasekar

BOOK ALERT

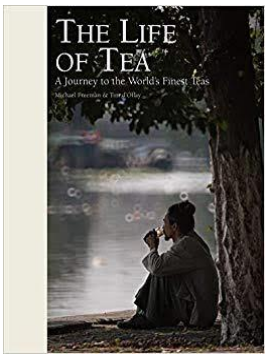
Madubala



1) Book name: The Stevia Deception -The Hidden Dangers of Low-Calorie Sweetener
Author's name: Dr.Bruce Fife.
Publisher: Piccadly Books, U.S.
Publication date: January 16,2017. Price: $15.95

Description:

In the book, you will learn why you should never use stevia if you want to lose excess weight or control diabetes. You will also learn why all low-calorie sweeteners are potentially dangerous, what options you have available. The information in this book comes directly from published studies, historical facts, and the author's personal experiences. Through the power of persuasive advertising and clever marketing, we've been sold on the idea that stevia is a natural sweetener that is not only harmless but even health-promoting. As such, it is promoted as a better choice over sugar or other low-calorie sweeteners. The author's observation of troubling adverse reactions associated with stevia led him on an investigation that uncovered disturbing facts hidden from the public.



2) Book name: The Life of Tea: A Journey to the World finest Teas.
Author's name: Michael Freeman & Timothy d'Offay

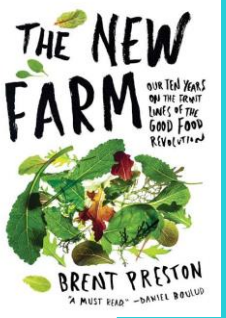
Publisher: Mitchell Baezley.

Publication date: September,2018.

Price: $27.19

Description:

This journey to the world's finest teas, captured in extraordinary photography, brings alive the aroma, taste and texture of the drink in all its many nuances, and will give connoisseurs and casual readers alike a much deeper understanding of how great tea is created. It includes sections on botany, cultivation, processing methods and the impact tea has had, and continues to have, on culture. The Life of Tea also follows Michael and Timothy's travels in China, Japan, India and Sri Lanka, featuring the producers of some of the world's finest teas and the characteristics that make these teas so sought after. This book is the ultimate guide for tea enthusiasts, following the journey from plantation to top.



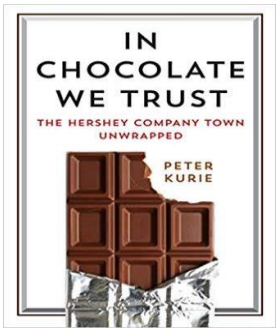
3) Book name: The New Farm: One Ten Years on the frontlines of the good food revolution
Author's name: Brent Preston
Publisher: Random House, Canada
Publication date: May 2, 2017.

Price: $32.95

Description:

After years of working at the ends of the earth in human rights and development, Brent Preston and his wife were die-hard city dwellers. But when their second child arrived, the shine came off urban living. In 2003 they bought a hundred acres and a rundown farmhouse and set out to build a real farm, one that would sustain their family, nourish their community, heal their environment, and turn a profit. *The New Farm* is Preston's memoir of a decade of grinding toil and preservance. Farming is a complex and precarious business, and they made plenty of mistakes along the way. But as they learned hoe to grow food, and to success at the business of farming, they also found that a small, sustainable, organic farm could be an engine for change, a path to a more just and sustainable food system. Today, *The New Farm* supplies top restaurants, supports community food banks, hosts

events with leading chefs, and grows extraordinary produce.



4) Book name: In Chocolate We Trust: Hershey Company Town Unwrapped
Author's name: Peter Kurie

Publisher: University of Pennsylvania

Publication date; March 5,2018

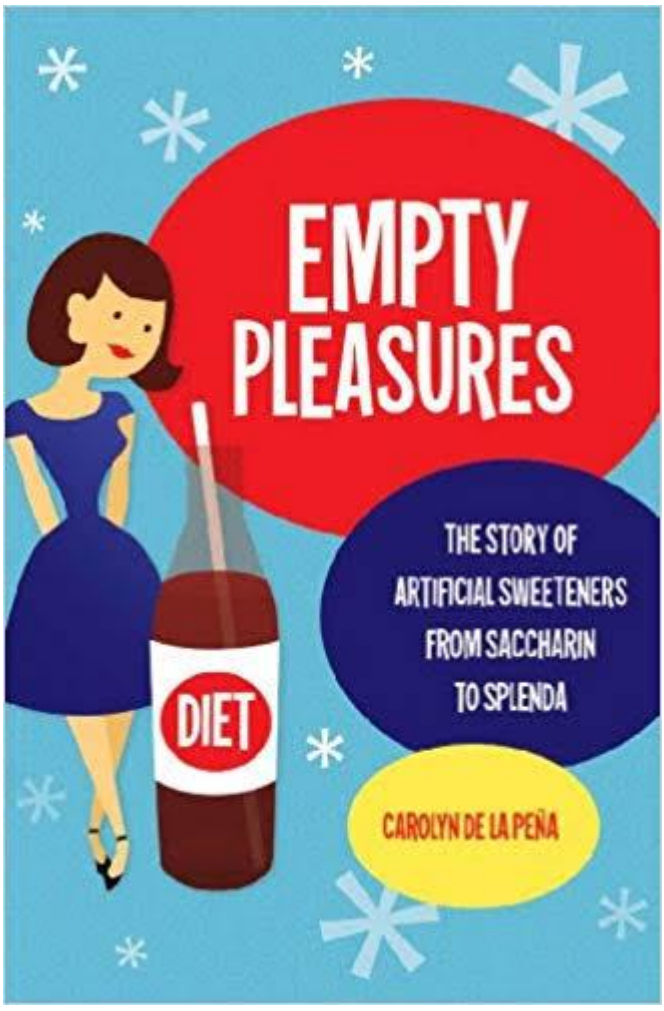
Price: $26.18

Description:

Using interviews in Hershey, Pennsylvania, headquarters of the iconic Hershey brand participant observation, and archival research, anthropologist Peter Kurie returns to his hometown to examine the legacy of the Hershey. He arrives just as a scandal erupts that raises questions about the outsized power of the private trust over the public life. In Chocolate the trust reveals the cultural significance of Hershey as a forerunner to socially conscious corporations and the cult of the entrepreneur-philanthropist.

REVIEW OF A BOOK

Hemaprabha



"EMPTY PLEASURES" written by CAROLYN DE LA PENA, the university of North Carolina press, published on August 1, 2012 speaks about the story of Artificial Sweeteners from Saccharin to Splenda. According to the Author available on the table of almost every Restaurant, those little pink, blue and yellow packets are far more than powder for sweetening coffee, they represent the Snapshot of American culture and History. Starting with the Introduction of Saccharin at the 1893 World's fair, Carolyn documents the History of sweeteners, weaving consumer viewpoints into account. In this book, the author conducts a thorough review of Artificial sweeteners and how their role and perception have changed over years. Warren bellasco, author of meals to come: A History of the Future of Food reviewed that Empty Pleasures comes along the Refreshing Historical perspective on Dieting practices, Commercial opportunism and Social construction of Expert Authority. Similarly, Jennifer Scanlon, author of Bad Girls Go Everywhere: The Life of Helen Gurley Brown reviewed that De La Pena's argument, that artificial sweeteners provide consumers with a way to exercise 'Indulgent restraint', will surely re-energize scholarly and policy discussions of the American diet. Like this, several other well-known books on Sweeteners have been taken as reference for this Article

DO DIET SODA MAKES US LOOSE WEIGHT:

Sowrna Rubini M S

In ttoday's world most people's problem is overweight. Diet soda is the popular drink all over the world. The presence of the word "diet" doesn't mean that it helps you lose weight. This diet soda contains a mixture of carbonated water, artificial or natural sweetener, colours and other additives. According to the Medical Indian Council, when artificial sweeteners in soda hits the brain, it automatically sends a signal to the pancreas. We think that counting calories indicates the weight loss, so that people seek the so called "Loss App- Loss It". But unfortunately diet soda carries zero calories. It makes us feel enlightened to eat more food. In this way diet soda has fooled your body into excepting sugar- which could lead you hungry and wanting more food. If the above all is not enough for you, it causes risk factors like Alzheimer's disease and stroke. Though Diet soda is sweet, yummy and bubbly, it doesn't worth it.

Reference: www.medicaldaily.com

SUGAR SECRETS

RAMYA SHREE R

SACCHARIN:

Saccharin is not metabolized; it just passes through the body and does not react with DNA.

ASPARTAME:

Aspartame is a nasty chemical that's sold as a zero-calorie sweetener but did you know that it's technically not calorie-free?

Not a lot, only about 4 calories per gram.

JAGGERY:

Low quality jaggery, mixed with the dust of tobacco, used as toothpaste in many parts of India.

SWEET TOOTH:

Dogs have a sweet tooth, but cats don't!!Dogs enjoy sweet foods while cats and other felines don't have sweetness receptors in their brain.

SUGAR:

Eating sugar gives you wrinkles as eating too much of sugar can affect the elasticity of your skin due to the glycation process in which the sugar in your bloodstream binds to proteins, forming molecules that make the collagen in your skin more brittle which in turn causes wrinkles.

COCOA:

Cigarettes often contain sugar, caramel and cocoa. Cocoa burned in a cigarette produces bromine gas which dilates the airways of the lungs and increases the ability to absorb nicotine.

HONEY:

Honey is the only edible food that never goes bad. Among 20,000 species of bees on earth only small fraction of them make honey. Unprocessed raw honey protects against tooth decay.

Reference: https://www.factrevier.com/sugar-facts

SWEETNERS NOT ONLY BELONGS TO CARBS!!

Halilur Rahman

Traditional methods to sweeten foodstuffs, feed, and other consumer products have relied on the use of low-molecular-weight sweetening agents, especially sucrose. In recent years, however, there has been an increasing demand for low-calorie sweeteners. Together with this trend, there is also an increase in the demand for healthy and natural eating products. Therefore, in order to address this need, there is an intense and ongoing search for alternative sweeteners. Finally, some intense sweeteners also have been found to be strong flavor enhancers, thus expanding their range of applications.

Currently, there are six alternative, high intensity sweeteners that have been approved by European Union regulatory bodies: aspartame, saccharin, cyclamate, neohesperidine DC, acesulfame-K, and thaumatin. The first five compounds in this list are low-molecular weight entities, obtained by traditional organic synthesis technology, although it should be pointed out that aspartame is a peptide (albeit an unnatural one). The last one, thaumatin, is a protein, i.e., a natural product. Besides thaumatin, several other sweet tasting proteins exist in nature. Some of them have been isolated, purified, and characterized. Their genes have been cloned, and in some cases recombinant versions of the natural protein have been obtained.

The sweet tasting proteins are Miraculin, Thaumatin, Monellin, Mabinlin, Pentadin, Curculin, Brazzein

Miraculin:

Miraculin is a taste modifying protein (**causing sour foods to taste sweet**) having **191 amino acid residues** with several disulphide bonds with molecular mass **98.4 kDa.** Miraculin itself is not sweet, but the human tongue, once exposed to miraculin, perceives ordinarily sour foods, such as citrus, as sweet for up to 2 h afterward. When heated over 100 °C, miraculin loses its taste-modifying property. Miraculin activity is inactivated at pH below 3 and pH above 12 at room temperature.It is isolated from ***Richadella dulcifica*** which is native to West Africa. The cDNA corresponding to Miraculin has been cloned and sequenced.A synthetic gene encoding miraculin was assembled and inserted into an E. Coli expression vector.Miraculin has a novel food status in the European Union. It is approved in Japan as a safe food additive, according to the List of Existing Food Additives published by the Ministry of Health and Welfare (published by JETRO).

Thaumatin:

Thaumatin, a flavour modifying protein have **207 amino acids with eight intramolecular disulphide bonds.** The two predominant forms, thaumatin I and II differ by the amino acid sequence at 46, 63, 67, 76, and 113, which suggests that the two proteins are 98% identical.Thaumatin is **1600**–**3000 times** sweeter than sucrose. Thaumatin is stable in freeze-dried form and is soluble in water and aqueous alcohol. The sweetness of thaumatin disappeared on heating at pH above 7 for 15 min, but the sweetness remained even after heating at 80 degrees C for 4 h at pH 2. It is isolated from ***Thaumatococcus danielli Benth***, which is native to West Africa by **Van der Wel and Loeve**. Thaumatin is a permitted sweetener and has been approved in all applications in the European Community as a '**flavor preparation**.' Similar approval exists in Switzerland, the USA, Canada, Israel, Mexico, Japan, Hong Kong, Korea, Taiwan, Vietnam, Australia, New Zealand, and South Africa, and further approval is being sought elsewhere.

Monellin:

Monellin has two non-covalently associated polypeptide chains: **chain A contains 44 amino acid residues** and **chain B has 50 residues** with molecular mass of **10.7kDa.** Monellin is **3000 times** sweeter than sucrose.Heat denatures monellin proteins; they lose their sweetness when heated over 50 °C at low pH. Monellin is a sweet protein that was isolated

from the fruit of ***Dioscoreophyllum cumminsii Diels***, which is known as the serendipity berry and is native to West Africa. The main issue regarding its use as a sweetener is that monellin has no legal status in the European Union or the United States.

Mabinlin:

Mabinlin II is a sweet protein composed of a **A-chain of 33 amino-acid residues and a B-chain of 72 amino-acid residues**. The **B chain** contains **two intramolecular disulfide bonds** and is connected to the **A chain** through **two intermolecular disulfide bridges.** Mabinlin II is **100 to 400 times** sweeter than sucrose. Other variants of Mabinlin have been isolated. They have been named **Mabinlin I-1, III, and IV.** Mabinlin-II with its high heat stability has the best chance to be used as a sweetener. Mabinlin is isolated from ***Capparis masakai Levl*** which is native to **China.** The sweet-tasting protein has been successfully synthesised by a stepwise solid-phase method in 1998, however the synthetic protein had an astringent-sweet taste.

Pentadin:

Pentadin is a sweet tasting protein having subunits coupled by **disulphide bonds** with a molecular mass of **12 kDa.** Pentadin is **500 times** sweeter than sucrose. Pentadin is isolated to ***Pentadiplandra brazzeana Baillon*** which is native to West Africa and is the **only species** assigned to the **genus Pentadiplandra** and has its own **family Pentadiplandraceae**. No further work has been reported towards the characterization of this sweet-tasting protein.

Curculin:

Curculin contains **114 amino acid residues,** with a calculated molecular mass of **24.9 kDa** and is a **dimer of two identical polypeptides**, which are assembled together through **two disulfide bridges.** It is **550 times** sweeter than sucrose. Like miraculin, Curculin exhibits taste-modifying activity; however, unlike miraculin, it also exhibits a sweet taste by itself. At a temperature of 50 °C (122 °F) the protein starts to degrade and lose its "sweet-tasting" and "taste-modifying" properties, so it is not a good candidate for use in hot or processed foods. Curculin is isolated from ***Curculingo latifolia*** referred to locally as **'Lumbah'** or **'Lemba'** which is native to Malaysia. Curculin currently has no legal status in European Union and United States. However, it is approved in Japan as a harmless additive, according to the List of Existing Food Additives established by the Ministry of Health and Welfare (English publication by JETRO).

Brazzein:

Brazzein, a sweet tasting protein having **54 amino acid residues with eight disulphide bonds** is the **smallest among the sweet proteins** with a molecular mass of 6.4 kDa. Brazzein is **500 to 2000 times** sweeter than **sucrose**. Brazzein is stable over a broad **pH range from 2.5 to 8** and is **heat stable at 80 °C for 4 h** and so it is suitable for **industrial processing.** Brazzein is isolated from ***Pentadiplandra brazzeana Baillon*** which is native to West Africa and is the **only species** assigned to the **genus Pentadiplandra** and has its own **family Pentadiplandraceae**. Brazzein may be useful as **a low-calorie sweetener,** but is not yet allowed as a food additive in the United States and the European Union.The gene encoding for brazzein has been transferred to the bacteria Escherichia coli and Lactococcus lactis and to maize.

STAT FOE SWEETNERS…

Keerthana A P

Sucralose is the most popular artificial sweetener and it is approved by FDA. Aspartame is another artificial sweetener which is the controversial one and reported to have caused 75% of negative reactions in humans. Saccharin is 300 times sweeter than sugar. It had carcinogenic effects on rats but its effect on humans are not yet proved. Neotame is a low-calorie sweetener and approved as safe by FDA but not used widely. Ace K (Acesulfame potassium) is also a low-calorie sweetener and approved as safe. They are used almost in every confectionary. Aspartame is used in high levels in most cases in spite of its consequences. Other artificial sweeteners are safe when consumed in little amounts.