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FOOD ADDITIVES-I



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GLIMPSE OF FOOD ADDITIVES

Food additives are the substances that are added to food to preserve its flavor, to enhance its taste, appearance and so many other qualities. This article is going to be a glimpse of what all are the food additives that were used and why they were used. The practice of using food additives spans several centuries. Back then people had their own land and they practiced farming to eat and live. The majority of the population existed in the same way up till the industrial revolution. The migration change from rural to urban life along with improvement in the way of living led to the discovery preservation of food. They had to find an alternate so they could skip farming every day. Here's when the idea of preserving came in giving rise to food additives. The first additive to preserve the food was salt. Especially in fish, salts were lavishly used as a preservative. Later then, sugar which emerged was also used as a preservative, possibly from India. Salt however is a simple inorganic chemical where as sugar is more complex organic molecule in honey and dry fruits sugar naturally occurs as a preservative. Fermentation was long used as an method of preservation. the production of lactic acid in cheese or yoghurt. also in sauerkraut, is another historical example of the formation of preservation in situ by fermentation. Romans used the acetic acid of vinegar as a preservative for fruits and vegetables. Later then the use of spices as flavoring was started as the western spice trade with the east. Before the factory production of food, only meant preservation and flavor more important than color. To showcase the best of their foods all the emperors worked keenly to find about new food additives that enhances the color of the food and the discovery led to saffron which was used as a food color by the ancient Egypt. In the seventieth century, cochineal and annatto reached Europe. Annatto obtained from the seeds of the shrub *Bixa orellana* was used to color butter during the 18th century. But later annatto was prohibited because of its harmful effects. In 1856 William Perkins accidental discovery of mauveine initiated dyes industry which by the beginning of the twentieth century made available a large number of synthetic colors. Their amazing properties were such as to require only very small concentration to obtain the desired result and thus they were perceived to be and were much safer than lead, copper. Also in late twentieth century, borates and salicylates fell into disuse as preservatives and were largely replaced with sulphites and benzoates. In many ways peoples demand for quality and convenient food stemmed the proliferation of food additives. In order to meet these demands and remain cost effective at the same time, many other food additives were discovered and used and so were banned due to their carcinogenic qualities. Science has always been a boon and also as a curse. this article will enlighten you with those.

REFERENCE: <https://www.worldhistory.biz/sundaries/37289-foodadditives-in-history>.

KAVYA.M



THE SCARIEST PRESERVATIVES IN PLATES

Preservatives are food additives that have been around since humans began preparing food. Perhaps the best-known preservative is salt. But while they are certainly useful to keep food safe by preventing mould forming, some modern-day chemical preservatives can have unintended side effects on our health. Some food additives are even listed as possible carcinogens by the World Health Organization, yet manufacturers continue to use them as they are more concerned with taste and shelf life than with what's good for the consumer. Here are a few of the main preservatives to avoid:

BHA and BHT

There is ongoing debate about the safety of BHA (Butylated hydroxyanisole) and BHT (Butylated hydroxytoluene), both petroleum-derived antioxidants commonly used to prevent rancidity in fats and oils. Although BHA, which is a heat-stable additive used in baked products, is a suspected carcinogen and banned in the UK (in instant foods), in parts of Europe and in Japan, the US Food and Drug administration categorizes it as GRAS (generally regarded as safe).

Found in: Vegetable oils, margarine, spreadable butter, biscuits, cakes, cereal, pastries, sweets, chewing gum, milk powder, frozen dinners, bread, wraps, frozen French fries.

Potential effects: Suspected carcinogen, gastrointestinal disturbances, aggression, hyperactivity, mood disturbances (depression, insomnia), asthma, eczema, dermatitis, hives, rashes.

Tips: Avoid products that contain vegetable oils.

Choose foods that say 'preservative free' on the pack or organic packaged foods as they contain little or no synthetic colors or preservatives. Look for products containing ascorbic acid. Products use ascorbic acid or vitamin C, a far safer antioxidant than the above-mentioned ones and you'll also find it in other products lining the supermarket shelves too. Another safer antioxidant option is citric acid although it may provoke mild symptoms in sensitive individuals.

SORBATES

Sorbic acid and its calcium, sodium and potassium salts (collectively referred to as sorbates) are another group of preservatives used to inhibit the growth of mould. Derived from petroleum they can provoke an allergic reaction in sensitive individuals and are on the Royal Prince Alfred Hospital's Elimination Diet's 'to avoid' list. Sorbates are banned in foods for infants and two studies have found them to have the potential to disrupt our DNA.

Found in: Orange juice, cheese, pickles, yoghurt, dips, dried meats, soft drinks, ice-cream, baked goods.

Potential effects: Headaches and migraines, asthma, allergic reactions (rhinitis, skin irritation), hyperactivity; gastrointestinal upset.

Tips: Prepare home-made fruit sorbets, ice-creams and chocolate

Make your own fresh squeezed orange juice. Choose natural yoghurts, which contain no additives, or make your own coconut yoghurt easily at home.

PROPIONATES

Derived from propionic acid, calcium propionate is most commonly known as the "bread preservative". It's often added to supermarket breads and other commercially baked goods to prevent mildew and bacterial growth (now you know why some loaves can last for up to 10 days outside the fridge). Australia has one of the highest permitted amounts of propionic acid. A report on a controlled trial co-authored by Sue Dengate in the Journal of Paediatrics and Child Health in 2002 stated that although calcium propionate may have little to no side effects for the average person, irritability, restlessness, inattention and sleep disturbance in some children can be attributed to this preservative being consumed daily in their diet.

Found in: Pre-packaged breads and wraps, cheese, pasta, bakery products, breadcrumbs.

Potential effects: As food intolerance expert Sue Dengate states, "If you wanted to create a nation of underperforming children, you could hardly do better than to add a preservative known to cause learning difficulties to an everyday staple food."

REFERENCE: <https://www.womenshealth.com.au/food-additives-to-avoid>

GREEN BANANA FLOUR

- a *gluten free*



Green Banana, a vegetable once restricted to just chips, Indian vegetable preparation and for purpose of religious fasting is now finding a renewed life in the form of Green Banana Flour. It has gained a lot of popularity these days as great **gluten-free** and healthy flour option. Green Raw Banana Flour (henceforth referred to as flour or GBF) is the main by product of green banana. The process of making banana flour traditionally includes peeling, cutting and drying followed by mechanical grinding process. Today in commercial setups, grinding -drying process are not manual but automated. Various studies report the carbohydrate content of flour ranges from 75.00% to 89.00% depending on

stage of maturity, variety and processing steps. Green banana flour contains 42-52.8 grams of resistant starch per cup. It is the only flour that contain highest amount of resistant starch. Resistant starch is a **fermentable fibre**, passing through the intestines undigested. Through fermentation process delivers short-chain fatty acids, butyrate and lowers the pH. Moreover, resistant starch can reduce the glycaemic load of foods making them easier on your blood sugar levels. It packs in a punch of essential minerals such as zinc, manganese, magnesium, phosphorous acid etc. Banana is mostly non-allergenic. When it comes to gluten-free and grain-free flour alternatives, it's a really solid choice. It doesn't contain the anti-nutrients and gut irritants found in wheat flour, and it's safe for coeliacs GBF in high-standard form, bakes incredibly well and is a very rare gluten-free flour which rises and holds well even when baked. Like other gluten-free flours, it will require a binding agent like gums or chia or egg in certain recipes but beyond that not much changes required. The industry is at an infancy stage but soon the nutritional benefits of green/raw banana starch would be appreciated and find wide acceptability as well as demand as the industry develops interest for creating new products with Raw Banana Flour and consumers become more aware of its benefits and applications.

Reference: <http://eatdrinkpaleo.com.au/green-banana-flour-benefits-uses/>

KOWSIKA.N

THE CROWNED ONE

a *tenderizer*

We all are aware of the quote "wear a crown look hard on out but stay sweet inside...just like a pineapple" here is an amazing information about pineapple. Pineapple is a tropical fruit belonging to the family Bromeliaceae . It is possibly flowering in five to ten months and it bears fruit in the next six months. Pineapple is a rich source of manganese and vitamin C. When we consume pineapple the fruit eats you back. Because pineapples are the carriers of bromelain. Bromelain is a mixture of proteolytic enzymes. These enzymes breaks down proteins. Since our body is made up of proteins the pineapple we eat will also try to digest us . This is the reason why a fresh pineapple can turn your tongue into a sore piece of sandpaper. Sufficient bromelain content or raw pineapple juice may be useful as a meat tenderizer. Caution: Bromelain may be unsafe for some users who undergo anticoagulant therapy or in gestation period.

KAVYA.M



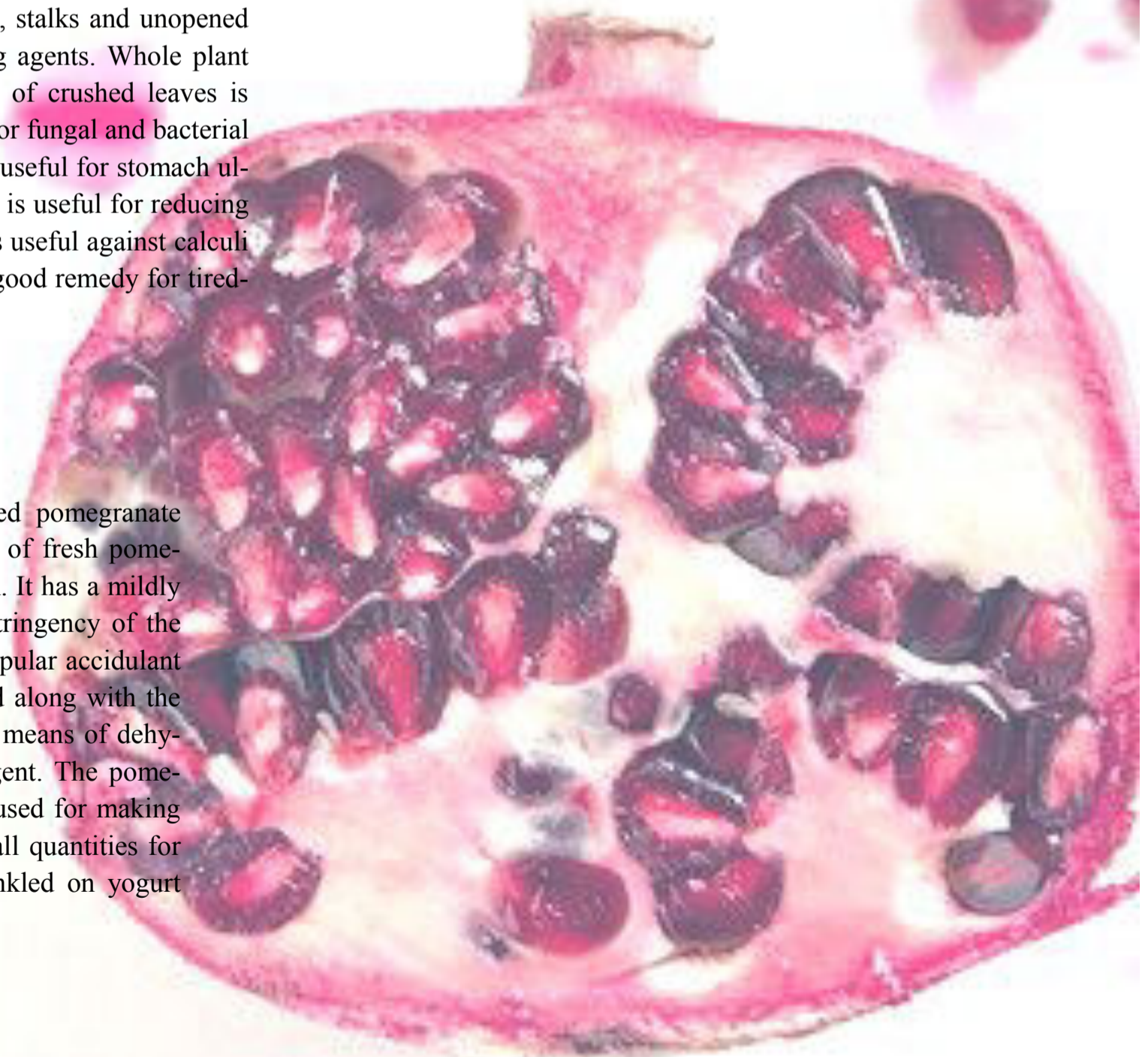
RARE INDIAN SPICES

KALONJI: Kalonji or Nigella seeds are tiny, triangular, jet black seeds that have a bitter taste with a touch of sweetness. This seeds taste like a combination of onions, black pepper and oregano. It is used in the variety of traditional dishes. It is one of the essential ingredients in the Bengali five spice known as Panch poran. It is used in the preparation of naan. It is packed with anti oxidants, lowers cholesterol, and protects the liver and stomach ulcers. It is an excellent home remedy to cure diabetes, absent mindedness, heart problems, constipation, skin problem and blood pressure. If we consume in large amounts, it causes low blood pressure and blood sugar.

ASIAN CHIVES: It looks like grass and it is a substitute for garlic and onion. It is also known as Maroi Nakupi. It contributes aroma, taste, color, flavor, seasoning and pungency to foods. It has essential vitamins like A, C and K. The flat leaves, stalks and unopened flower buds are used as flavoring agents. Whole plant part is used as spices. The juice of crushed leaves is used as traditional folk medicine for fungal and bacterial infection treatments. Leaf juice is useful for stomach ulcers. Consumption of fresh leaves is useful for reducing high blood pressure. Boiled leaf is useful against calculi formation inside the body. It is a good remedy for tiredness and fatigue.

ANARDANA: It is nothing but dried pomegranate seeds. It retains many of the qualities of fresh pomegranate and the juice surrounding them. It has a mildly sweet and tangy flavor. The sweet astringency of the dried seeds and flesh makes them a popular acidulant for Indian dishes. The seeds are dried along with the pulp, either by sun drying or by other means of dehydration. It is used as a thickening agent. The pomegranate variety called Daru is mostly used for making anardana. As a spice, it is used in small quantities for chutneys and some curries. It is sprinkled on yogurt raitas. It is good for heart.

GHOST CHILI: Ghost chili is a hybrid of *Capsicum Chinese* and *Capsicum frutescens*. It is popularly used in combination with pork or dried or fermented fish. In the year 2007, it was certified by Guinness world records as “the hottest chili pepper in the world”. Even a nibble will make tears run down your face. In 2010, the Indian military decided to use this chili in land grenades for crowd control. In north eastern India, the peppers are smeared on the fences or incorporated in smoke bombs as a safety precaution to keep wild elephants at a distance. If we consume it, the burning sensation generally intensifies over 10-15 minutes and subsides after 30-40minutes.



Curcumin –a natural food additive

Spices are one of the most important aspects of cooking, as they have the ability to improve the flavor and aroma of any food. In some countries, spices are a big part of their cuisine and are deeply ingrained in culture. One such example is turmeric, which is largely associated with Indian culture for thousands of years. Today, turmeric is utilized in cuisines all over the world. It's one of the core ingredients used to make curry dishes, and is the source of their distinctive yellow color and flavor. Turmeric has been used in ancient ayurvedic medicine. Indians used it as an antiseptic for cuts and burns, a remedy for gastrointestinal discomfort and respiratory conditions. Modern science has discovered that turmeric contains a special compound called curcumin, which is a naturally occurring antioxidant. Turmeric is the best natural source of curcumin. Traditionally called the "Indian saffron". Interestingly, curcumin may lower your risk of various types of cancers because of how it modulates genetic activity and expression. By inhibiting the synthesis of a protein believed to play a role in the formation of tumors. Lower the transformation of cells from normal to tumor. Destroy mutated cancer cells to prevent them from spreading throughout the body. Also



induces angiogenesis, which is the prevention of producing additional blood vessels necessary for cancer cell growth. Also curcumin keeps the brain healthy. Aside from keeping the brain healthy, curcumin may help promote the healthy functioning of various mental aspects, such as emotionally and psychologically. Apart from it curcumin has a positive effect on maintaining digestive health. The common applications curcumin are as ingredient in dietary supplement, in cosmetics and as flavoring for foods. It is well known for its medicinal values. It is also one of the well known natural food additive.

REFERENCE: <https://googleweblight.com/i?u=https://articles.mercola.com/vitamins-supplements/curcumin.aspx&hl=en-IN>

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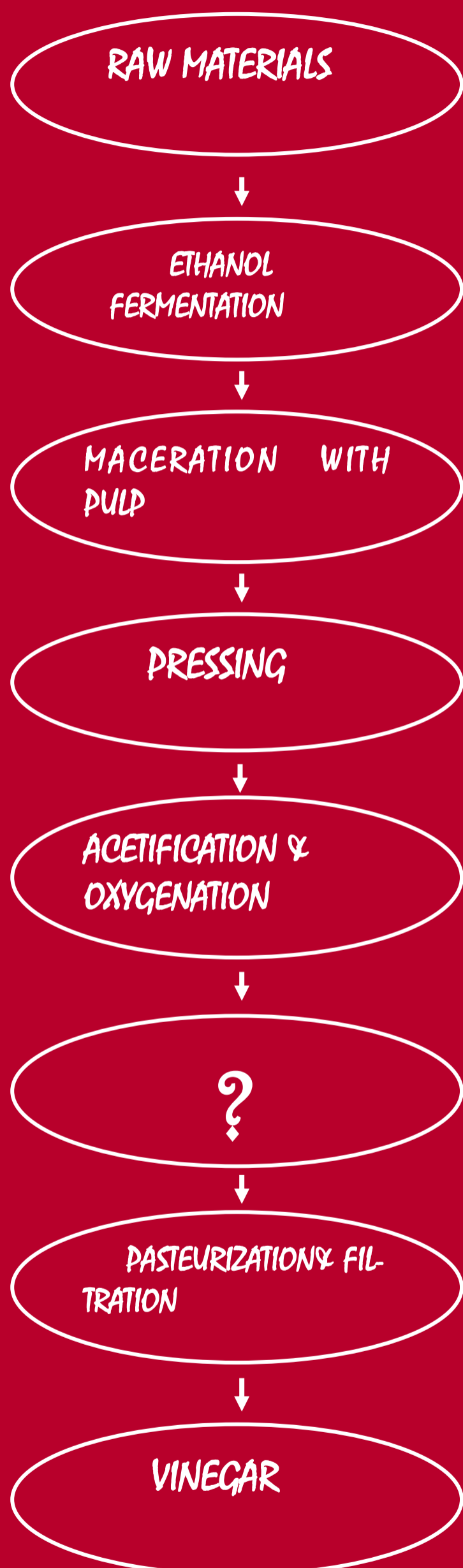
ACESULFAME POTASSIUM

People who are consciousness in weight often replace sugar with artificial sweeteners. One of the most commonly used is acesulfame potassium (Ace K). In Europe, it is referred as E950. It was accidentally discovered by German chemist Karl Clauss in 1967. It is the potassium salt of 6-methyl 1,2,3-oxathiazine-4(3H)-one 2,2-dioxide. Looks like a white crystalline powder and act as a calorie-free sweetener and a food additive that is 200 times sweeter than sugar, as sweet as aspartame, two-third as sweet as sucralose. At high concentration it has a slight bitter taste like saccharin. It enhances and intensifies flavors (except in meat and poultry) and good for baking application due to its thermo-stability. It's taste exactly patch up with the sugar. It is made from the organic intermediate and in combination with naturally occurring mineral potassium. The amount of potassium is extremely small. It is not metabolized or stored in the body. It often used in combination with other low calorie sweeteners because it enhances the sweet taste of foods and beverages. The U.S. Food and Drug Administration (FDA) and other leading health organizations like joint expert committee on food additives of WHO and Scientific committee for food of the European union have found the ingredients to be safer for all segments of the population. The ingredient is currently used in more than 4,000 foods and beverages in about 90 countries. It is

found in candies, tabletop sweeteners, chewing gums, beverages, desserts and dairy products mixes, baked goods, alcoholic beverages, syrups, refrigerated and frozen desserts, sweet sauces and toppings. Because of its high stability, it is used in baking, retaining its sweetness at normal baking temperature. Scientists and regulatory authorities have concluded that even under extreme acidity, temperature and storage conditions, it has been found to be safe for use in beverages. FDA sets an Acceptable Daily Intake (ADI) level for acesulfame potassium is 15 mg per kg of body weight. Acesulfame K does not contribute to tooth decay. Studies shows that bacteria in mouth do not metabolize acesulfame potassium and therefore unable to convert it into plaque or harmful acids that causes tooth decay or any other allergic reactions. This sweetener is also preferable for pregnant women on regarding the advice of their physician. The American Diabetes Association has said that non-nutritive sweeteners approved by the FDA are safe to consume by people with diabetes. Studies in test tubes and lab animals suggest that Acesulfame K does not cause cancer.

REFERENCE: <https://www.nutritionexpress.com>

MONALISHA.B



FARM TO FORK



Welcome back to the Farm to Fork session. This section delineates Vinegar production. Primarily it is used to flavour and preserve foods and also act as an ingredient in salad dressing and marinades. It also act as a cleaning agent. The word is from the French *Vin* (wine) and *aigre* (sour). They are three well known types in the production process and are: **Orleans Method; Trickling, Quick Process; Submerged Fermentation Method**. Among this Submerged fermentation is the fastest process practised in industries. As usual one process is left in column and try to find the left process, which will be in the following edition.

Production process:

Raw materials that are fruit juices or any other solution containing sugars are used for the production of vinegar. As the fruit juices has adequate amount of sugar and nutrients that supports the yeasts' growth. Those sugar are fermented by yeast enzymes, thus the fruit juice turns into ethanol (alcohol). This process is called Ethanol production. This followed by maceration process where the pulp is macerated for 7 days. After this pressing is done to separate the fruit juices from the pulp. Once ethanol is present in the food, acetobacter or submerged culture from mother vinegar is added to fasten the production process. A high speed motor is used to breaks down air into tiny bubbles and forced into the solution of alcoholic liquid and the bacteria for faster oxidation. After the vinegar production, to arrest further bacterial growth and enzymatic actions filtration and pasteurization is carried as the final step in the production. Actually this final process which is practised only in industries takes nearly one to two days. It is then bottled and labelled.

REFERENCE: <https://aceticacidvinegar.weebly.com>

KOWSIK.A.N

WHO AM I ?



I am a minor spice crop. I was discovered from the island of Pulau Ay about 3500 years ago. Banda islands also called under the name "Spice islands" was only my location until the mid nineteenth century. The essential oil obtained from me by steam distillation is used widely in perfumery and in pharmaceutical industries. My volatile compounds contains dozens of terpenes and phenylpropanoids. Usually I am used as a natural food flavoring in baked goods, meat, fish, vegetables, syrups, beverages, sweets also in preserving and in pickling. My oil is also is used in the manufacturing tooth paste and cough syrups. My products are derived from a tree containing dark-leaved evergreen from which two spices are derived. My very well known commercial resources include butter and essential oil. I do have a long history and can be used in both sweet and savory dishes. I have been used in desserts especially apple and pumpkin pie. Guess who I am?.

ANSWER : *Mace*

IMAGE SOURCE: PINTEREST

OLESTRA -A RAVAGER

Olestra, whose trade name is Olean is a fat substitute that adds no fat, calories or cholesterol to products. It was discovered by Procter & Gamble (an American multinational consumer goods corporation) researchers F.MATTSON and R.VOLPENHEIN in 1968. It is synthesized from sucrose, that can bond with six, seven or eight fatty acids. The Food and Drug administration (FDA) approved olestra for use as a replacement for fats and oils in prepackaged ready-to-eat snacks in 1996. Though it is approved, the products containing olestra has a red warning label. In 1998, the first year olestra products were marketed nationally after the approval by FDA's Food Advisory Committee. In the late 1990's, olestra lost its popularity due to many side effects. The olestra containing products are potato chips, corn chips, cheese puffs, crackers, doughnuts, pastries, pies, cakes, cookies, ice cream, french fries, fried chicken, fried fish, onion rings, margarines and cheese. Its disadvantages are more than the advantages. It can cause diarrhea, loose stools, abdominal cramps and flatulence. It reduces the body's ability to absorb fat-soluble carotenoids (alpha and beta carotene, lycopene, lutein and canthoxanthin) from fruits and vegetables. Olestra has same taste and mouth feel as fat, but it passes through the gastrointestinal tract, it is undigested without contributing calories or nutritive value to the diet. Fat soluble vitamins like A, D, E and K binds with olestra and makes you more prone to cancer. Fat soluble nutrients consumed with olestra products are excreted with undigested olestra molecules. These symptoms, normally occurring only by excessive consumption in a short period of time, are known as steatorrhea and caused by an excess of fat in stool. To counteract this loss of nutrients, products made of olestra are fortified with oil soluble vitamins. It also reduces blood cholesterol level. Even at low dosages, olestra causes anal leakage and other gastrointestinal problems. In a four week study conducted in Holland, 3gm/day or just 6 potato chips containing olestra caused a 20% decline in beta carotene levels and 38% decrease in lycopene. Because of all of these side effects, many countries banned the usage of olestra. Though It was used in potato chips in many countries but is banned in UK, Canada, and European Union. It is still in use in India, particularly in chips and French fries. But we can get olestra commercially in India.

REFERENCE: <https://en.m.wikipedia.org>

RANJANI PRIYA.S

NEW PRODUCTS

Quaker oats to launch vegan milk

Food conglomerate Quaker Oats will be joining the non-dairy milk industry with the launch of an oat-based beverage in January 2019. Quaker Oat Beverage, which is expected to be available nationwide by March, will come in three flavors: Original, Original Unsweetened, and Vanilla. According to research firm Mintel, sales of non-dairy milk products in the United States rose to more than \$2 billion last year—up 61 percent from five years earlier. Quaker hopes to capitalize on the popularity of the dairy-free industry and distinguish its new product line by promoting the health benefits of oat-bran fiber. “Oats are good for you,” Robbert Rietbroek, Quaker Foods North America general manager, told The New York Times. “They’re good for your heart. They reduce cholesterol. They’re good for your gut, and they give you long-lasting energy.” Quaker’s main oat-based competitor is Swedish brand Oatly, a well-known vegan brand in Europe that sells its oat milk in the US at Wegmans, Whole Foods Market, ShopRite, and select cafés. Oatly recently began construction on its first US production facility, which will allow the company to maintain a constant supply of its products to retailers and coffee shops in North America.

<https://vegnews.com/2018/10/quaker-oats-to-launch-vegan-milk-line>

Veeba launches fortified peanut butter in creamy and crunchy variants

Veeba, one of India’s leading sauce, dip and dressing companies, has expanded their range with the launch of fortified Veeba Peanut Butter in two mouth-watering variants - Creamy and Crunchy. While Creamy is smooth and melts in the mouth, Crunchy has the bite of peanuts. They are made from roasted peanuts and are rich in calcium, iron and Vitamins A and D and are a rich source of fibre and protein.

They are available in 340g and 1kg PET jars, priced at Rs 154 and Rs 299, respectively, at retail outlets pan-India. Viraj Bahl, founder and managing director, Veeba Food Services Private Ltd, said, “Today consumers are looking for healthier alternatives.”

He added, “We, at Veeba, feel that it doesn’t necessarily have to compromise on the taste.” “Living up to our promise of tasty, better-for-you products, we’ve developed Veeba Peanut Butter - deliciously creamy and crunchy and fortified with calcium, iron and Vitamins A and D,” Bahl said.

<http://www.fnbnews.com/Ingredients-and-Flavours/veeba-launches-fortified-peanut-butter-in-creamy-and-crunchy-variants-41277>

Coca-Cola launches Minute Maid Smoothie, with fruits, milk & nutrients

Coca-Cola India has launched Minute Maid Smoothie, combining the power of three ingredients (viz fruits, milk and nutrients). It is a continuation of the cola major’s efforts to expand its portfolio, including the health and wellness range. Made from locally-sourced fruits, the product has been designed to suit the Indian palate and cater to the increasing needs of mothers looking for a combination of nutritious goodness and taste. Minute Maid Smoothie is available in 250ml packs in two variants (mango and banana), priced at Rs 30. “Minute Maid Smoothie is an ideal choice for mothers looking for a snack that is tasty, filling and nutritious. We specifically developed this product after listening to mothers and understanding their needs. Children are picky eaters and are always look for something tasty, mothers often find it tough to balance between nutrition and taste,” said Vijay Parasuraman, vice-president, Coca-Cola India and South-West Asia. “MM Smoothie is topped with nutrients such as Vitamin B3, B6, Vitamin E, zinc and calcium, that play a key role in metabolism and building strength and stamina,” he added.

In the first phase of the launch, the product will be available in Tamil Nadu, Karnataka, Telangana and Andhra Pradesh, followed by other states. In the coming months, Coca-Cola India will also expand the smoothie range by introducing other popular flavours.

<http://www.fnbnews.com/New-Launches/cocacola-launches-minute-maid-smoothie-with-fruits-milk-nutrients-43682>

FARM TO FORK (Answer of the last edition):

Washing is considered as one of the fundamental operation in meat and poultry industry. Washing the carcasses with cold water is to remove contaminants such as blood, tissue fragments, hair or bone particles. It helps to remove food borne pathogens such as *Escherichia coli* 0157.H7 and *Salmonella*. The reduction in microbial load is increased by addition of sanitizer .

ANSWER: WASHING

HIGHLY PRICED CAVIAR IN THE WORLD



A delicacy which is lightly salted and needs no further cooking derived from the mature sturgeon fish's eggs. Its an ideal pairing to vodka in Russian tradition. Smells like the fragrance of fresh sea breeze. The rarest and most expensive form of caviar comes from the critically endangered beluga sturgeon in Caspian sea

Its considered the "black gold" is regularly sold for €20000 (₹ 1.67 lakhs)

Wanna buy? fly off then. It is sold only in **Caviar House and Prunier** in London's Piccadilly.

READER'S COLUMN:

The topic of this edition is "**FOOD ADDITIVES**". As the food additives have a enormous applications in the food industry, this edition descant mainly on food preservatives and will cover other categories in our upcoming editions. This edition delineates about the scariest preservatives. It also includes the green banana flour, a new gluten free product. And tells the process of preparing Vinegar in a step by step manner in the Farm to Fork column. It also expatiate curcumin that has occupied a irreplaceable position in our kitchen shelves. To make the readers more curious, many columns are included.

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