

# ESSEN RIVESTA

Entwine World & Nutrition

How to test the quality of oil?

Glimpse of Mega Food parks in India

Vacuum sealing

Farm to fork

Into the world of functional foods

EMAP - Emerging technique in India

Crushy cold pressed juice



Exclusive on  
**ADULTERATION**

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# AN ANECDOTE ON ADULTERATION

Adulteration is a common term prevailing everywhere. It was first recognised in 1870s, but now it's a threatening one. The food we eat, the water we drink has become adulterated now and the fact that even we know that it's adulterated we don't have a proper method to detect some products. What is adulteration? It is the addition or subtraction to or from food, so that the natural composition and quality of food substance is affected as defined by FSSAI. For example: addition of water in milk to increase quantity, starch in paneer to make it fluffer and thicker, anatta in butter to give it a dark rich yellow colour, metanil yellow in turmeric powder, adding copper salts to colour the vegetables etc., such stories shake us up and make the question what we are eating. The adulterant may be from natural sources or chemically manufactured one. Food adulteration is of two types intentional and the other one is incidental. In intentional substances are intentionally added by the adulter to increase the margin of profit. While in incidental adulterants are found in food due to ignorance and not a willful act. It may be due to lack of provision for packing and the place of production may not be hygienic.

The reason why this unwanted technique came into use is:

- To improve the quantity of product and reduce the quality, thereby getting more profit by selling more goods.
- When the demand for a particular product is more than the supply.
- To come at par with the market competitors by reducing the cost
- Lack of trained manpower with outdated food processing techniques.
- No idea about the disease outbreaks due to adulterated food products

The catastrophic effect to humans, are the risk of diseases and damage in health. There are many cases found by food security authorities one such thing was the death of 23 children at Bihar in 2013 after eating a meal covered under the midway meal scheme, there was a mix of cooking oil and pesticides in the meal. Another case is the addition of melamine to milk in infant foods by a factory in China. Melamine is a protein resembled like milk and was able to pass the inspection, yet it also proved to be toxic causing a number of deaths. To prevent these kind of activities our government has passed a bill on "Prevention of food adulteration", 1954 by both houses of the parliament and came into force on 1<sup>st</sup> June, 1955.

The norm's are:

- Contains any substance which affects the nature, substance or quality.
- If inferior or cheaper substances has been substituted.
- If the article is prepared or packed or kept under insanitary conditions whereby it has become contaminated or injurious to health.
- Parts from diseased animal or decomposed vegetables.
- Any poisonous or other ingredient which renders it injurious to health.
- If the container in which the food is packed contains poisonous substances.

Recently the FSSAI has made it mandatory for hotels and restaurants to have at least one person trained in food safety in order to check adulteration. A two-month training module has been conceived to impart the knowledge essential for maintaining hygienic standards in hotels and restaurants in compliance with Food Safety Standards Authority of India. Many techniques have been adopted to test the adulterated foods products. The common adulterated food items are milk, coffee powder, chilli powder, turmeric powder, mustard seeds and oil, ice cream, green chillies, ghee. Now-a-days rice and egg are adulterated with plastic substances. This edition encompasses the best methods to eradicate adulteration and will give an overview of several adulterated products, their identification and testing.

Bhavadharani



Adulteration of food-stuffs was so rampant, widespread and persistent that nothing short of a somewhat drastic remedy in the form of a comprehensive legislation became the need of the hour. To check this kind of anti-social evil a concerted and determined onslaught was launched by the Government by introduction of the Prevention of Food Adulteration Bill in the Parliament to herald an era of much needed hope and relief for the consumers at large. So the government took enormous initiatives to control food adulteration, explains **Nirmal Thirunavookarasu S**

Food is one of the basic necessities for sustenance of life. Pure, fresh and healthy diet is most essential for the health of the people. It is no wonder to say that community health is national wealth. The Prevention of Food Adulteration Bill was passed by both the house of Parliament and received the assent of the President on 29th September, 1954. It came into force on 1st June, 1955 as THE PREVENTION OF FOOD ADULTERATION ACT, 1954. Later on it had been amended many times. The act clearly explains the terms adulterant, adulterated foods, etc and also it paves way for the formation of central food laboratories to test the food samples. The act was replaced by the Food standards and Safety Act of 2006 (FSSA). According to this a national regulatory body Food Standards and Safety Authority of India (FSSAI) was established to develop, monitor and regulate food production in the country.

### Laws governing the food industry:

The Indian food processing industry is regulated by several laws which govern the aspects of sanitation, licensing and other necessary permits that are required to start up and run a food business. The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act, 1954 (hereinafter referred to as "PFA"). The PFA had been in place for over five decades and there was a need for change due to varied reasons which include the changing requirements of our food industry

“The Prevention of Food Adulteration Bill was passed by both the house of Parliament and received the assent of the President on 29th September, 1954. It came into force on 1st June, 1955 as THE PREVENTION OF FOOD ADULTERATION ACT, 1954”

The act brought into force in place of the PFA is the Food Safety and Standards Act, 2006 (hereinafter referred to as "FSSA") that overrides all other food related laws. It specifically repealed eight laws which were in operation prior to the enforcement of FSSA:

- The Prevention of Food Adulteration Act, 1954
- The Fruit Products Order, 1955
- The Meat Food Products Order, 1973
- The Vegetable Oil Products (Control) Order, 1947
- The Edible Oils Packaging (Regulation) Order, 1998
- The Solvent Extracted Oil, De oiled Meal, and Edible Flour (Control) Order, 1967
- The Milk and Milk Products Order, 1992
- Essential Commodities Act, 1955 (in relation to food)

In India adulteration of food products is a crime and sections 272 and 273 of Indian Penal Code deals with the Adulteration of food and drink intended for sale it empowers the government to take legal actions up to capital imprisonment against the producers and sellers of adulterated food products in the country. The Food safety officer has powers to raid, seize any adulterated food items whichever comes to his notice.

Acknowledgement:  
www.FSSAI.org  
Ministry of law and justice

# GET RID OF ADULTERATION

A bitter fact is that fraudsters are always a step ahead of safety agencies. Detection of adulteration is becoming more complicated with time. Here are some tips to get rid of adulteration, says Sarojini R

- Asafoedita adulterated with resin and colour can be identified by dissolving the sample in water. Pure asafoedita forms milky white colour with water whereas the adulterated one turns the mixture to be coloured.
- Black pepper adulterated with papaya seeds can be identified by visual examination. Also papaya seeds do not have any characteristic smell.
- Saw dust mixed with coriander powder, cumin powder can be found by sprinkle the sample in water. Spice powder gets sedimented at the bottom and saw-dust floats on the surface.
- Dry red chilly, sweet potato enhanced with Rhodamine B colour can be identified by rubbing the outer surface with a piece of cotton soaked in liquid paraffin. The sample is adulterated if the sample becomes red.
- Dry turmeric root enhanced with metanil yellow colour can be identified by rubbing the outer surface with a piece of cotton soaked in liquid paraffin.
- Use of colouring agents such as Malachite green to enhance the colour of green vegetables can be identified by placing the sample on a moistened white blotting paper. Malachite green usage will be confirmed if the impression of the colour is obtained on the paper.
- Use of metanil yellow to enhance the colour of jaggery, turmeric powder, pigeon pea, processed food, sweet meat or syrup can be detected by mixing little amount of sample with 3ml of alcohol and then adding of 10 drops of hydrochloric acid. A pink colouration indicates the presence of metanil yellow colour.

- Coal tar dye in tea leaves can be detected by scattering a little amount of sample on a moistened blotting paper. Presence of coloured spots on the paper after removing the sample indicates adulteration.
- Leather flakes in tea leaves can be detected by burning of sample. A odour of burnt leather is the indication.
- Sodium bicarbonate in jaggery can be identified by adding muratic acid to the sample. The presence of sodium bicarbonate will effect effervescence.



# THE CRUSHY COLD PRESSED JUICE

Have you ever noticed in supermarkets a bottle containing fruits or vegetable juices and wondered how it is prepared and stored in bottle or ever heard nutritionist suggesting juices in bottle? It is the cold pressed juice, the latest in-vogue way of juicing in which the vegetables or fruits are pressed to get maximum yield, explains **Sivaranjany**

The reason why people go for cold press juice is as they are free from any pathogens, preservatives or sugars. The cold press equipment is different from our conventional household centrifugal juicer, which consists of a blade and the juice is extracted due to crushing by the action of centrifugal force. The extracted juice is served in a glass and is open to atmosphere. The major disadvantage of the centrifugal juicer is that some amount of heat is produced by continuous rotation of blades. We take juice to gain vitamin C which is sensitive to heat and light. This vitamin gets lost due to heat. To avoid this cold press juice comes into its action. It uses hydraulic press that squeezes the juice from fruits and vegetables.



Our home made juices cannot be stored for a long time. But if it is cold pressed it can be stored for five days or even more. In this process, the fruits and vegetables are cut into small pieces and fed into the feed hopper. The juice is extracted first and then it is preserved by high pressure processing method where high pressure destroys the microbes present in the juice. These juices help the system to detoxify, hikes immunity and are nutritionally fabulous. The flaw in this process is that it consumes more time. In India, these juices are the hot new trend. The old pioneers of the cold press juices are Antidode, relish nutrition, fresh pressery, juice up and raw pressery. In recent times, people pay more attention to health. So this satisfies their demand for these kind of juices than carbonated drinks.

# M

Mega Food park is an inclusive concept and a scheme of the Ministry of Food Processing of the government of India, aimed at establishing a “direct linkage from farm to processing and then to consumer markets” through a network collection centers and primary processing centers. The main feature of this scheme is **cluster based approach**. Its purpose was to increase processing of perishables from 6% to 20% and to increase India’s share in global food trade by at least 3% up to year 2015. According to an estimate, the Indian food industry was to grow from \$200 million USD to \$310 million USD in 2015 by this scheme, explains **Priyanka K.**

Mega food parks aims to link farmers, processors , wholesalers , retailers, customers .ministry of food processing industry plans to set up modern food processing units along with well established supply chain. Mega food park consists of supply chain infrastructures including collection centre, primary processing centers, cold chains and around 30-35 fully developed plots for entrepreneurs to set up food processing units. A sanction of 42 food parks has been planned, out of which 25 in various states have already been sanctioned. As of now , 9 mega food parks have become operational and 42 would be operational in next 2 years.

The 9 food parks which are functional now are listed below:

1. Patanjali food and herbal park, Haridwar
2. Srimi food park, Chittoor
3. North East mega food park, Nalbari
4. International Mega food park, Fazilka
5. Integrated food park, Tumkur,
6. Jharkhand mega food park, Ranchi
7. Indus Mega food park, Khargoan
8. Jangipur Bengal Mega Food park, Murshidabad
9. MITS Mega Food park pvt,ltd, Rayagada

The government provides financial assistance up to Rs 50 crores to set up modern infrastructure facilities for food processing called mega food parks. The objectives of the schemes are to reduce wastage of perishables. A mega food park is a hub consisting Collection Centres(CC) and Primary Processing Centres (PPCs).

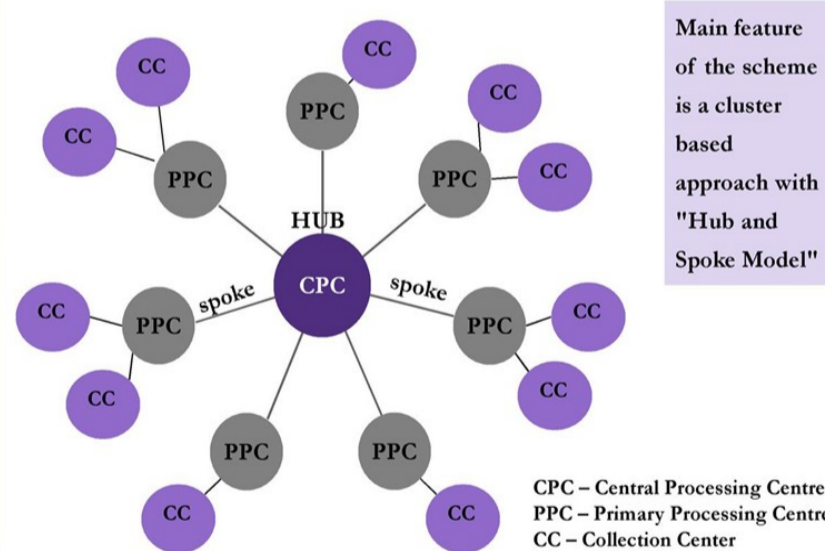
### Collection Centres (CCs):

Collection centre is a place where the produces from the farmers are collected and aggregated. It was managed by local entrepreneurs and feed the raw materials to PPCs. It operates around the radius of 10 kilometers.

### Primary Processing Centres (PPCs):

It is a key component to facilitate the strong backward linkages for sustainable supply for adequate raw materials to ensure year round operation. It works as primary handling centres which use the raw materials to be processed in CPC. It have facilities for pulping, juicing. It also provide refrigerated vans, trucks for transportation purpose.

Primary objective of the MFPS is to provide adequate / excellent infrastructure facilities for food processing along the value chain from the farm to market.



### Central Processing Centre (CPC):

The Central Processing centers is an industrial park in an area of around 50 acres and houses a number of processing units owned by different business houses. The developed plots of lands were provided to large and midsize units and factory sheds were provided to small scale units. The park was provided with common facilities such as water, electricity.

Thus the cornerstone of a mega food park’s success is efficient logistics that connects the CCs,PPCs,CPC.

Acknowledgement:

[www.mofpi.nic.in/schemes/mega-food-parks](http://www.mofpi.nic.in/schemes/mega-food-parks)

# INTO THE WORLD OF FUNCTIONAL FOODS

Functional food are broadly classified as prebiotics and probiotics. Prebiotics are **“the food ingredients that stimulates the growth or activity of beneficial microorganisms”**. These are non-digestible fibre compounds which passes through the upper gastrointestinal tract without getting digested and becomes substrate for the advantageous microbes in the large bowel. This selectively modifies the concentration of microbiota and stimulates the saccharolytic fermentation which results in the increase of short chain fatty acid(SCFA) production. The SCFA plays a vital role in improving health. These are intermediate between foods and drugs. Prebiotics which are most common are *transgalacto-oligosaccharide*, fructo-oligosaccharide and *inulin*. Other compounds that also suits the principle are resistant starch, pectin, glucans and xylo-oligosaccharides.

Probiotics are **“live microbes that should be taken only in adequate amounts in order to regain or improve the health condition of the host”**. The extent to which the probiotic is effective, is assessed by the activity of the microbiome in the host. They are administered alive! Though these microorganisms are beneficial, they have to be tested for antibiotic resistance, side effects and especially for finding whether they would produce any toxin after administration and hemolytic activity. They can be used in the stimulation of immune system, stimulation of endocrine system treatment of diarrhoea, salmonellosis, shigellosis, colon cancer and in the reduction of serum cholesterol levels. The microorganisms can be inoculated into both fermented and unfermented foods and also before fermentation and after fermentation. The efficiency of the probiotic microbiome depends upon the dosage, air availability, type of food, temperature.

Microorganisms that play a major role in probiotic world are *Bifidobacterium* and *Lactobacillus*. *Bifidobacteria* naturally inhabits in the gastrointestinal tract. *Henry Tissier*, who worked at Pasteur institute isolated bifidobacterium for the first time from a breast fed baby. He found that bifidobacteria are the dominant flora in the gut of a breast baby. These bifidobacteria can be used in the treatment of diarrhoea since they displace the proteolytic bacteria that are the cause for the disease. Colon cancer which is caused by the procarcinogenic enzymes produced by the harmful bacteria can be controlled by the administration of *Lactobacillus* or *bifidobacterium*. These, by stimulating the intestinal peristaltic activity, help in the removal of feces thus reducing the concentration of the procarcinogenic enzymes.



Do you agree with that microbes enriched foods are beneficial to human? Obviously, the answer is yes! Food ingredients added to the diet for additional function in the host such as health promotion and ailments are termed as functional foods. They are consumed as a part of regular diet. They are getting attention from people who are concerned about their health, says **Sarojini R**



“Care should be taken to note that prebiotics and probiotics cannot be considered as the cure for all the disorders and diseases. Also, not all strains are beneficial for all the disorders, since the effect is strain dependent. In some cases, probiotics may be detrimental to some patients, which may add to the disease. Similarly, prebiotics may sometimes stimulate the growth of undesirable microorganisms in some individuals, thus aggravating the disease.”

Probiotics can be prescribed for the reduction of serum cholesterol level. They are capable of reducing the serum cholesterol level either by their deconjugating or metabolizing activity. These microbiome metabolizes the cholesterol and thus reduces its absorption in the blood. Also, by deconjugating the bile salts, they prevent the reabsorption of bile in the liver. Therefore, liver has to utilize more of serum cholesterol for the further synthesis of bile, which is an indirect mode of reduction. But, not all the probiotic organisms are capable of reducing the serum cholesterol level...!

A research team, led by Dr. Pinaki Panigrahi and his colleagues, at the university of Nebraska Medical Center College of public health has found that a special mixture of Lactobacterium plantarum and Fructo-oligosaccharide (FOS) can reduce the incidence of sepsis in infants in India by 40%. The findings were reported on Aug. 16, 2017. The development of probiotic food is a costly process and hence the cost of the products in the market is reasonable and there is a need to create awareness among consumers about the benefits of probiotic food as people hesitate to accept the term “bacterial inoculation in foods”.

Acknowledgement:

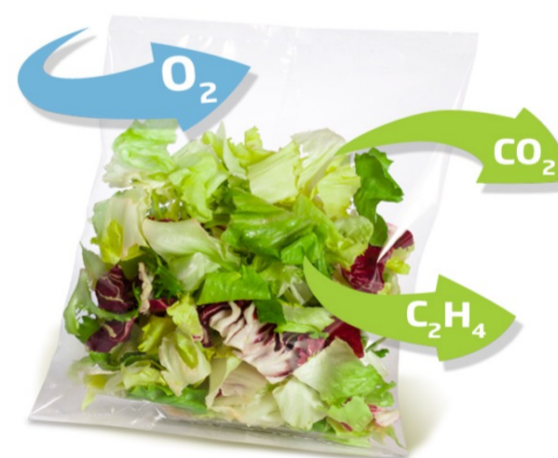
[https://en.m.wikipedia.org/wiki/prebiotic\(nutrition\)](https://en.m.wikipedia.org/wiki/prebiotic(nutrition))

<https://en.m.wikipedia.org/wiki/probiotic>

The Indian fresh produce industry faces a lot of problems when they decided to extend the shelf life. They felt that traditional polymers like MAP (Modified Atmospheric Packaging) being used for shelf life extension of fresh produce may not work. In fact all the fresh produce industry grappled with the problem of water condensation inside the bag. With the help of foreign technology, they came out with an idea of EMAP package, says **Kowsika N**

Let's see first MAP which is actually modifying the internal atmosphere of packaging to improve the shelf life of produce like fresh fruits & vegetables. In this technique, level of oxygen is reduced by increasing the higher carbon dioxide or Nitrogen level inside the package that helps in prevention of oxidation and slows down the process of aerobes. They were usually made of polymers like Polyethylene or Polyvinylchloride which are permeable only to particular gases like oxygen, water vapor only. Due to carbon dioxide, it maintains the low pH of produce and also inhibits bacterial growth. But, when the limit gets crossed inside the package, organoleptic character of produce changes this can be the major drawback for the fresh food industry. Also, during the transpiration process, humidity gets released and condenses inside the package which leads to fungal and bacterial infection. In order to maintain a consistent oxygen and carbon dioxide inside the food bag during the shelf life, an alternate solution is EQUILIBRIUM MODIFIED AT-

## EMAP: AN EMERGING TECHNIQUE



Perforated plastic films (Oriented polypropylene) which is permeable to gases like O<sub>2</sub> and CO<sub>2</sub>, water vapor etc. This technique entails maintaining the humidity inside the bag at 98% that helps the product absolutely dry without condensation of humidity. As we know, film provides Carbon dioxide (CO<sub>2</sub>) releasing character that ensured the produce could be protected from diseases like Botrytis and Gray Mold etc.. the film used for packaging is biodegradable by composting. With the help of EMAP package, it can be exported to leading super markets with excellent quality.

Acknowledgement:

[www.pfonline.com](http://www.pfonline.com)



# TECHNICAL INNOVATION

## SENSORS DETECTING ADULTERATION

High performance liquid chromatography, solid phase micro extraction gas chromatography- mass spectrometry, time of flight mass spectrometry, Raman spectroscopy near infrared spectroscopy, fluorescence, nuclear magnetic resonance, inductively coupled plasma optical emission spectroscopy are some of the most common methods for the detection of adulteration in foods substance. But these methods are costly and time consuming. So sensors are widely used in detecting the adulterated products. Adulteration in food materials can be detected using electronic sensors. The combination of volt ammetric e-tongue and an e-nose based on metal oxide semiconductor sensors and pattern recognition techniques were used to detect adulteration in Argan oil. Data analysis is performed by

- Principal component analysis
- Discriminant factor analysis
- Support vector machines

### E Nose setup:

It consists of 3 parts. It include sampling system, sensor chamber, data acquisition system. The sensor has 5 arrays of different tin oxide gas sensors: TGX8XX, a temperature sensors (LM335Z) and relative humidity sensor(H1H4000-01). Data acquisition system was accomplished using PIC16F877 micro controller and lab view software program running on laptop.

### Working:

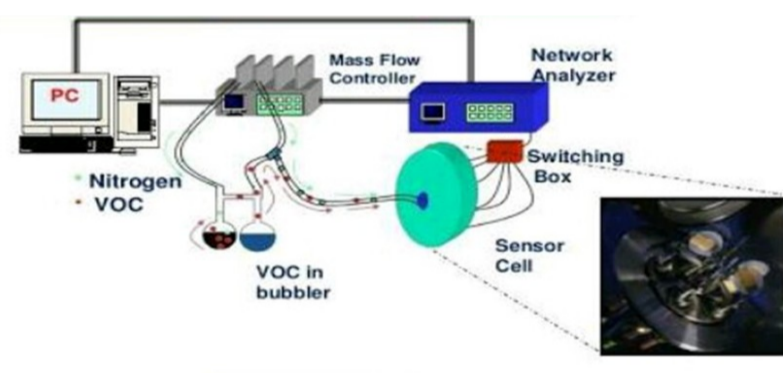
Volatile compounds generated from the argon oil were pumped at 1000 sccmin headspace through the measurement chamber containing array of 5 gas sensors. The sensor responses decrease with increase in percentage of sunflower oil. A flushing time of 5 min was enough to desorb the volatiles from sensors and enable the signal to return to the base line.

## MELAMINE DETECTOR

The common crisis all over the world is mainly due to deficit of milk. To meet the deficit of milk synthetic milk is prepared by mixing urea, caustic soda, refined oil and common detergents. One of such compound used in the adulteration of milk is MELAMINE. It is a kind of triazine analogue together with three amino groups tends to hydrolyze under strong alkali conditions resulting in the formation of cyanuric acid, ammeline and ammelide, explains **Revathy M**

### VE Tongue Setup:

In this technique cyclic voltammetry (CV) is the measurement principle. It has an Ag or AgCl reference electrode, platinum auxiliary electrode and are arranged in standard 3 electrode configuration. It also has 7 working electrodes made of platinum, gold, glassy carbon, silver, nickel, palladium and copper and were embedded in composite materials placed around auxiliary electrode. The wires from the electrodes are connected to portable potentiostat via relay box. In CV, the potential of working electrode varies with time and reference electrode potential remains constant. The output current developed between the working and reference electrode is considered for the analysis.



### Working:

CV gives the qualitative information generated by the electrochemical process. The voltage supplied between -0.6 to 1 volt with the scan rate of 0.021 V/s. It results in various anionic and cationic peaks. The presence of poor and clear redox peaks reveals the changes in the voltammogram and indicates that different redox species can be present in the argan oil matrix.

**GOKUL ARTHI B**

Melamine is highly rich in mass of 66% nitrogen content. When it is illegally added into dairy products by highly apparent protein content in it. It seek the public attention in North America when they analyzed that pet foods was adulterated with melamine was the main cause for the death of animals. Consequently infants fed with melamine adulterat-

-ed milk powder paved the way for them suffering from severe chronic kidney and urinary tract failure and lead to death. High concentration ingestion of melamine has proven to be toxic for humans and found in the formation of insoluble melamine cyanurate crystals in kidneys causing renal failure. Several techniques were implied to detect the adulteration of melamine in

milk but they were not succeeded due to its tedious processes & longer time duration. One such advanced method is detection of melamine by ELECTRO-CHEMICAL BIOSENSOR METHOD based on modification of gold electrode

with chitosan, calcium oxide nanoparticles and an ionic liquid for the determination in the presence of melamine in milk products. The milk sample was bought from local supermarket and the sample was pretreated according to CaO (calcium oxide nanoparticles) procedure. In the falcon tube 5g milk sample was mixed with 5 ml of 0.4M trichloroacetic acid and 40 ml me-



-thanol solution. The mixture was sonicated for 15 min and shaken for 10 min and the supernatant was filtrated using filter paper. Later on, filtrate was condensed to reach a total volume of 5ml and filtered through a 0.45 micrometer filter membrane & analyzed. The amount of melamine in the tested fresh milk sample met the standard requirement and enhanced the detec-

tion sensitivity level. This developed MELAMINE BIOSENSOR can be applied for the determination of melamine in various dairy products. Thus, this method has a potential application in food

inspection. The developed melamine biosensor offers a simple, fast, good selectivity, high sensitivity and convenient method for applying in food research laboratories. This is a cheap, time consuming and highly convenient & advanced method adopted for recognizing the adulteration in milk.

Concerning the over increased instances of food adulteration, there are numerous food testing laboratories in to test the quality of food and to detect the type of adulterants added in the food. Among this, one of the unique concept is Mobile Food Testing Labs, wherein various tests evaluating the quality of food and the attributes affecting food safety are conducted in an effective and time efficient manner., says **Devisri E**

“ The Food Safety and Standards Authority of India (FSSAI) has rolled out a major scheme for strengthening of food testing infrastructure in the country at an estimated cost of Rs 482 crore. The empowered committee constituted for implementing this scheme held at its first meeting on November 2, which was chaired by FSSAI chairperson. The representatives from various ministries such as Ministry of Health and Family Welfare, Ministry of Food Processing Industries, Export Inspection Council, NABL and 7 states /UTs were present. “Proposals from 7 states / UTs namely, Goa , Delhi, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu and Punjab were considered for strengthening their food testing infrastructure. Two proposals from Chandigarh (Punjab) and Calicut (kerala), were approved in principle,” FSSAI said.

## MOBILE FOOD TESTING LABS



The other states were requested to revise and resubmit their proposals according to the scheme guidelines with mentorship support from FSSAI. The committee also approved the proposal for strengthening the referral food laboratory at Central Food Technology Research Institute (CFTRI) through provision of equipment and facilities. Introduction of these equipment facilities would enhance the testing capability of CFTRI for adulteration of honey and pesticide and antibiotic residues in food samples. Under this scheme 45 state / UT food testing labs and 14 referral food testing labs will be upgraded to enable them to obtain NABL accreditation FSSAI said. As many as 62 mobile testing labs will also be established across all states /UTs. There are currently 4 mobile food testing labs in Punjab, Gujarat ,kerala and Tamil Nadu, which will serve as a model for these Mobile testing labs.



Triglycerides in frying oil undergo primary oxidation to unstable hydro peroxides which again undergoes secondary oxidation to give volatile and non volatile compounds. These compounds may again undergo tertiary oxidation, gets polymerized which increases the viscosity, causes browning and darkens the oil. High temperature produces high molecular cyclic fatty acid monomers, triglyceride dimers, oligomers. So, the fried foods may absorb these compounds and thus deteriorate the quality of the oil. It depends on length of time of frying, because increase in time of frying accelerates the deterioration of quality of oil. Once the oil changes in its color due to browning, it has to be discarded. Otherwise, it would lead to harmful effect on human.

So, obviously here arises the question when to discard the oil. We can't frequently discard the oil because it is expensive. At the same time we can't offer human health. So, it's quiet a tough job to examine the quality of oil. There are many instruments in the markets to measure the quality of oil. One among them is testo 270. It is a digital cooking oil tester which has a sensor, so it is easy for handling and protected from heat since the readings has to be taken from oil at around 200°C. It indicates TPM (Total Polar Molecules) or TPC (Total Polar Compounds) and expresses it in percentage. The oil is safe to use if the TPM/TPC ranges between 14-20%. If it exceeds this range the oil should be discarded. Similarly, if it lies below this range the oil can be reused. So, with help of this testo270, both of our needs are satisfied. It prevents early replacement of oil and reduces the oil consumption by 20%.

Acknowledgement:

[https://www.researchgate.net/publication/282701462\\_OXIDATION\\_OF\\_COOKING\\_OILS\\_DUE\\_TO\\_REPEATED\\_FRYING\\_AND\\_HUMAN\\_HEALTH](https://www.researchgate.net/publication/282701462_OXIDATION_OF_COOKING_OILS_DUE_TO_REPEATED_FRYING_AND_HUMAN_HEALTH)

## OIL TESTER

Do you reuse the deep fried oil for cooking? Its quiet usual thing happening in most of our Indian kitchens. In our kitchens, we most probably reuse the oil for making dosas, chappathi. We won't use the same oil for frying again. So , it may not have considerable effect in human body. If consider it in an industrial level, for example company which produces potato chips and market it all over the country. In this case there is a chance of reusing the same oil for more number of times. In this article, a brief idea was given on biochemical changes occurring in oil during frying and equipment used to check quality of oil, writes **Priyanka K**

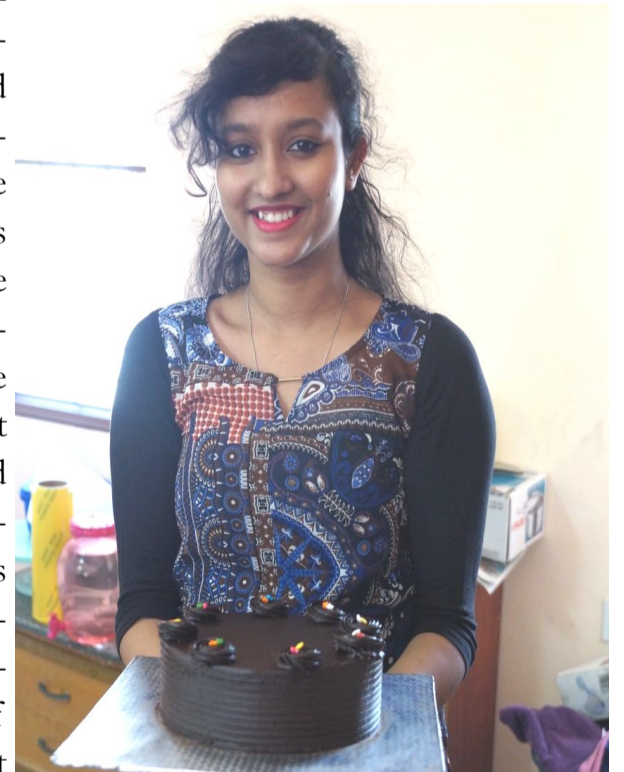
This causes harmful effect on human health which may result in cardiovascular disease, stroke, Parkinson's disease, Alzheimer's disease, Huntington's disease, various liver disorders and cancer. So what to do with these oils?

Frying involves cooking the food at 170°C by dipping in heating oil. It makes the food more crispy and adds flavor to the food and make it even more palatable. The oil is reused repeatedly and it is discarded and replaced with fresh oil, only when it becomes foamy, highly viscous, emits bad odor and become dark viscous, emits bad odor and become dark colored. Now let's see the physiochemical changes taking place in the oil , when it is exposed to such high temperature. Firstly, the moisture from the food gets evaporated so that making it crispier. The evaporated water hydrolyses triglycerides in the oil to free fatty acids, diglycerides, monoglycerides and glycerol.



# Artistic Entrepreneur

Ms Niranjana Ashok, an young entrepreneur, welcomed us with bright smile on her face. She is holding home baking unit **“CakeO’Clock”**. She pursued her B.Sc Computer Science degree from PSG College of Technology. Her interest towards making cakes made her to take up home baking, though it was not connected to her degree. She says, she doesn’t go to any classes to learn baking. By her own interest, she learned the art of baking by surfing through internet, which is one of most interesting part. She took up three days decorative class. She was initially funded by her parents. Within a year, she could see her earnings more than the investment. Her most favourite and best work as she considers is the ‘Bharathanatiyam’ cake, for which she took 3 days to arrive at. In the beginning, she struggled a lot to arrive at a perfect texture which she overcame by her practice, she does not take more number of orders with business motive. She selectively takes orders and concentrates in presenting the cake in a more pleasing way. This shows that she took up home baking for her satisfaction in doing things. She uses only natural fruit extracts for flavours and does not use any shortenings. Her work area is a clean and hygienic environment. She concentrates more in hygiene of cakes. “I start from first



even if a small imperfection occurs in a cake”, says Niranjana. So far, she has made more than 500 cakes. She also makes macarons. She has received compliments from Baker’s council for the ‘Bharathanatiyam’ cake, for which she did not use any molds. She is not much interested in taking classes about home baking. But she takes classes if people approach her with interest. To enjoy your celebrations in more artistic way contact Niranjana Ashok, Cake O’Clock, RS Puram, Coimbatore. Ph:9894645016

“My working area is clean and hygienic and I concentrate more on hygiene of cakes. I start from first even if a small imperfection occurs in a cake”, says Niranjana.



# WHO AM I..?

I was born in America, by the divine of Jesus and brought up by the principle of vegetarianism, which I also govern in my foods; joining hands with my brother, in 1906, I ended up as an industrialist in food manufacturing! I focused on producing and endorsing a form of toasted cereals as a wholesome breakfast. The people recognized my service and took my company off to heights and made me to nurture them with countless varieties of cereals, snack bars, beverages, waffles, crackers, etc. Mine is one of the first companies to put a nutrition label on the package and also the first to put a toy for kids in the cereal boxes. Being a philanthropist, I also started a foundation in my name and helped the needy during "The Great Depression" and continued it till my last breath. My products play a good dietary role even in today's life and it's available worldwide.

ANS: Will Keith Kellogg (or) W.K.Kellogg , founder of Kellogg Company whose products are very predominant in the market as well as nutritious such as Kellogg's chocos, Kellogg's cornflakes, etc.

\*Done by NEVETHA R



Lipid oxidation is one of the main causes of food spoilage. It can be delayed by the addition of antioxidants to food or by using vacuum or modified atmospheric packaging. A recent approach is the application of antioxidants in active packaging. Natural antioxidants can replace the chemical additives and are preferably accepted by the consumers, says **Nirmal Thirunavookarasu S**

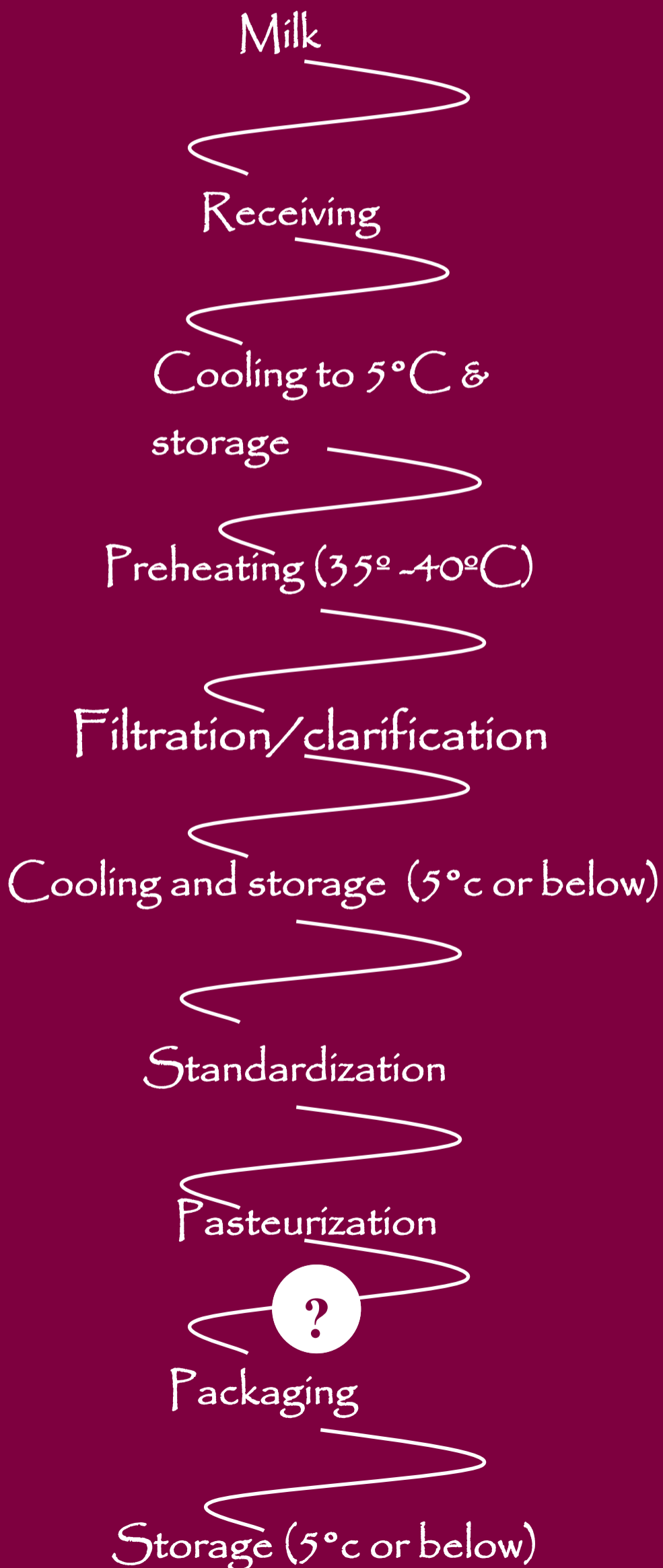
## Edible and Active Film Coating

They can be made as an edible and active films and coating. The antioxidants may be chitosan or cellulose derivatives, etc. Herbal essential oils and extracts were used in this. Green tea, oregano and rosemary extracts will be the most effective. The water or ethanol extracts the total phenolic content and antiradical activity of films and proved in the delaying in the oxidation of fish and meat products. It extends the shelf life of the products by enhancing the oxidative and microbial stability.

Some essential oils either in alone are combinations can be used to preserve the fish and meat products. It will be a good method as there is need for providing a safe and high quality sea food products is constantly growing worldwide since lipid oxidation is the main reason for the quality deterioration of fish and meat products. This method can be opted since it is free from chemicals and also it may lead to the growth of consumption of these products.

# Flow chart For The Preparation of Pasteurized Milk

Find out the missing process



## Farm to fork

Farm to fork is an elite arena of the magazine that elucidates various processes involved in food processing from fetching the raw material from the farm to presenting the product to the consumer's fork. To make this province more interesting, one of the processes will be missing in the flowchart which will be cracked in the next edition...

### Milk processing:

Milk contains lot of nutrients like minerals (calcium and phosphorous), vitamins like vit -A, B2, B1, D, niacin and macronutrients like carbohydrate (lactose), fat and protein. Raw milk as produces on the farm and transported to the collection centre or a dairy plant generally contains amount of impurities. To make a milk safer, more appealing or healthier by some processing.



### Processing Methods:

Filtration refers to making the milk pass through a filter cloth or filter pad. The filtering medium has a pore size (25-100mm) that permits most of the foreign matter (includes straw, dust particles, hair pieces, insects) to be retained on it.

Clarification is a process of subjecting milk to a centrifugal force to eliminate heavier particles from milk. A centrifugal machine called clarifier. Standardization refers to the process by which the milk composition is adjusted to the desire level.

Pasteurization is the process involves killing most of bacteria within the raw milk to increase its shelf life. This is done by rapidly heating the incoming milk to the pasteurization temperature 72°C, held for 25seconds to destroy the bacteria. As the milk is heated and cooled within a few seconds.

Hint: This process is a mechanical treatment to prevent a layer of cream from separating out in finished milk. milk is pumped at high pressure through the narrow tubes, breaking up the fat into small particles which do not recombine, so that the resulting milk has a consistent texture and taste. Find the process???

Transition of milk packaging from steel containers to glass bottles to pouch to high density polyethylene (HDPC) to tetra packs.



**“One of the best aspects of this storage method is that it is extremely economical. Sealed foods last 3-5 times longer compared to conventional storage methods. As a result, foods maintain their texture and appearance longer. Further, because this vacuum sealing food can last longer, food can be purchased in bulk and divided into individualized or smaller servings”.**

## Vacuum Sealing

is a revolutionary way to create a food pantry. We know that food cannot stay fresh forever, but with the right tools, we can most certainly prolong it. This sealing method was introduced as a new way to extend your existing food sources explains, Uma S

Vacuum sealing is a type of packaging called Reduced Oxygen Packaging, also known as ROP. This type of packaging process greatly slows down the deterioration of food sources by reducing the atmospheric oxygen, and creates an anaerobic environment limiting the growth of aerobic bacteria or fungi, and prevents the evaporation of volatile components. Through this storage method storage times of refrigerated foods, dried foods and frozen foods are extended by creating a hermetic seal similar to the seal that occurs during the canning process. Vacuum sealing is often used in combination with other packaging and food processing techniques. There are two types of vacuum food sealers: counter top models, handheld ones. Processing of home canned foods, nor is it a substitution for the refrigeration or freezing and storing of foods that would otherwise require it.

One of the best aspects of this storage

method is that it is extremely economical. Sealed foods last 3-5 times longer compared to conventional storage methods. As a result, foods maintain their texture and appearance longer. Further, because this vacuum sealing food can last longer, food can be purchased in bulk and divided into individualized or smaller servings.

Vacuum sealing conserves space for food storage. Moist foods won't dry out, because there's no air to absorb the moisture from the food. Dry, solid foods, such as brown sugar, won't become hard, because they don't come in contact with air and, therefore, can't absorb moisture from the air. Foods that are high in fats and oils won't become rancid, because there's no oxygen coming in contact with the fats, which causes the rancid taste and smell. Insect infestation is eliminated due to a low oxygen environment. Because as air is being removed from the canister, the pores of the meat or fish open up and allow the marinade to penetrate.

As effective as this food storage method is, it is not without its downside. The most serious mark against this storage method is that if you are storing perishable items, there are dangerous bacteria associated with vacuum sealing perishable goods. Another downside to vacuum sealing is the bags are not completely impervious to air, so after a couple years, they begin to leak. When leaks occur, the opened seals allow oxygen, insects and other enemies of your food to enter. However, if you plan to use the barrier method when storing your food, then you are taking added precautions to prevent this from occurring.

Further, if you are storing bulky food items, or foods that have sharp corners,

during the oxygen removing process, these sharp corners can puncture the bags. Therefore, special care must be used when packaging certain foods. Although some believe this to be unnecessary, adding oxygen absorbers in the vacuum sealed bag along with the food before sealing will increase the long term storage time. The reason why many do this is when you vacuum seal, there can still be some air caught between grains of softer foods that you can't pull as strong of a vacuum on. Adding oxygen absorbers to long term dry goods, and dehydrated foods remedies the trapped air in between food items and guards against natural elements. Like all food storage methods, eat what you store and store what you eat. You want to have the foods on hand that your family normally eats. When freezing packages of liquid foods, many have run into the problem of liquid getting sucked back into the vacuum contraption. You can avoid this in one of two ways: One is to fill the vacuum bags and freeze them without sealing. Seal once the contents are solid and they won't leak into the guts of the sealer. Another way is to refrigerate the dish until it is thickened – some sauces will almost gel when cold – then you can fill bags and vacuum pack. And finally, you can freeze in temporary containers and then slip the blocks of food out and repackage and seal. I've tried all of these things at various times.

To conclude, vacuum sealing your food and non-food preps is an economical and extremely effective way to save money, maintain a varied food pantry and protect your supplies. Further, it can be used in conjunction with other food storage methods, thus creating a multi-barrier system for added protection from natural elements. If you plan to use this method, be sure that you follow the suggested ways to protect your food.

Acknowledgement:

[http://readynutrition.com/resources/vacuum-sealing-for-long-term-food-storage\\_13022013/](http://readynutrition.com/resources/vacuum-sealing-for-long-term-food-storage_13022013/)





# INDUSTRIAL UPDATES

## Hyper food island unveiled at Mumbai 's hyperCITY:

An exclusive food and cuisine section has been unveiled at hyperCITY in Mumbai at their flagship store in Malad. The Hyper Food Island conceptualizes around bringing 'something fresh everything' to the consumers, it aims to provide a range of carefully-handpicked products to suit the needs of the contemporary customers, though hypercity's large and modern format store. The island is specially curated to embark on the tantalizing culinary journey of the consumers. They have created platforms such as Hyper Budding Chef and Hyper Food Island to encourage food entrepreneurs and boost – up their business skills. It has been a constant endeavour to enhance customer experience in their stores. Hypercity retail India Ltd is a part of K Raheja Corp. since its inception, it has opened 19 stores, and has marked its presence in such cities as Mumbai, Navi Mumbai, Thane, Delhi, Noida, Hyderabad, Bengaluru, Pune, Ahmedabad and Vadodara. It offers over 55,000 products sourced from both local and global markets. The stores have a footfall of over 20 lakh customers every month.

## Hatsun partners GEA to set up milk plant in TN at Rs 120 crore:

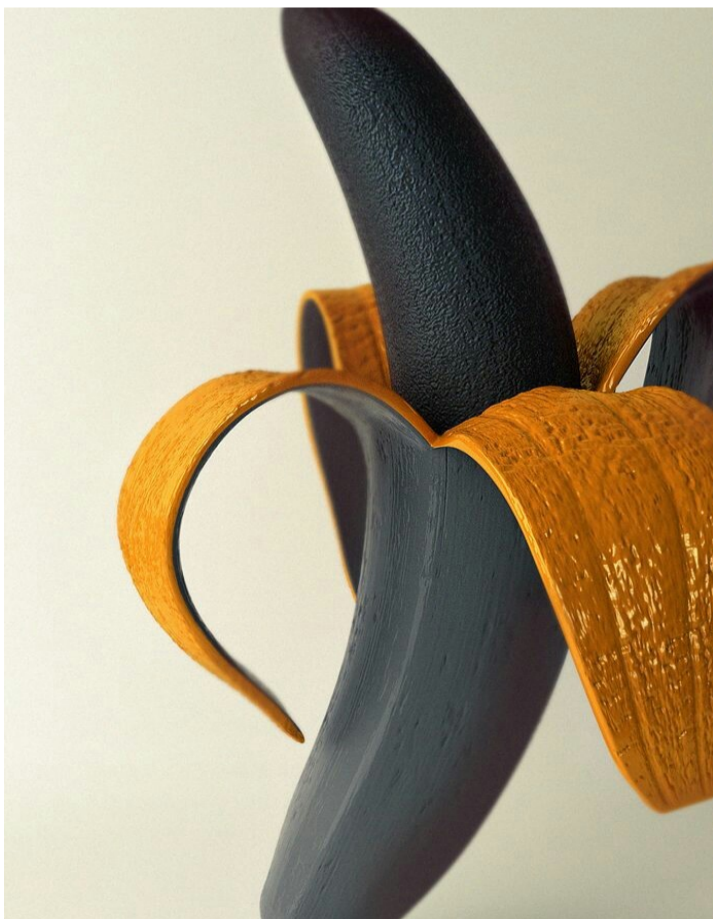
India's largest private dairy player, Hatsun Agro, has tied up with Germany-based GEA to set up a 6.5 lakh litre capacity plant at Dharapuram in Tamilnadu at an investment of Rs. 120 crore. GEA is a leading supplier of equipments to dairy and processing industry and has helped companies like Amul to setup their largest processing plants in India. It is currently working with the Karnataka Milk Federation to setup a milk powder plant. The plant is designed to handle 6.5 lakh liters of milk per day to produce 3 lakh liters per day market milk in pouches and 1.5 liters per day of curd. It is expected to be the fourth largest plant and their sixteenth manufacturing unit. The plant is expected to be fully operational by early 2018. Abhay Chaudhari, country managing director, GEA\* India cluster said, "The plant is fully automated processing and packaging of liquid milk and curd. MIS report can be generated to capture data regarding process parameters, production and packaging making it highly responsive and efficient."

## New codex standard will "spark permeate market into life" says Arla foods ingredients:

The final approval of Codex Alimentarius international standard for dairy permeate powder has been given a warm welcome by Arla Foods Ingredients, one of the world's leading permeate producers. Permeate is a byproduct of whey manufacturing it is of low cost, carbohydrate ingredient often used as the bulk sweetener in snacks, confectionary, ice cream, desserts, beverages and bakery products. At the Codex annual meeting in summer 2015, dairy companies agreed to develop a new standard for permeate within two years. The standard was finalized and approved and come into effect immediately. Creating and approving the standard was a joint effort by dairy industry over the past two years, and we look forward to watching the market grow in India. Arla foods ingredients has invested significantly in the manufacturing high quality food grade permeate as a free-flowing powder with the pleasant and stable taste profile.

# DID YOU KNOW..?

- **Active packaging:** Contains active component allowing a controlled interaction between the food, package and internal gaseous environment, thus extends shelf life, improves fruit and vegetable safety or provides superior sensory quality.
- **Assembly-serve foodservice system:** Foodservice system in which food is purchased at the middle to complete end of the food processing continuum, stored either frozen or chilled, portioned, and heated before serving to customers.
- **Conventional foodservice system:** Foodservice system in which food is purchased all along the food processing continuum, prepared, and served to customers on site.
- **Airlock (fermentation lock):** Device that attaches to the top of a fermentation barrel or carboy that allows CO<sub>2</sub> to escape out of an airtight connection but prevents bacteria from entering.
- **Brix:** Measure of the density of a solution, expressed in degrees Brix. The ° Brix of a solution = the % Sucrose of the solution at room temperature.



## Reader's column

This edition sets forth the adulteration and food safety. It includes various adulterations, the ways to prevent and the laws on food safety. It also explores the areas of sensors detecting adulterants, equipment to test the age of oil. It also delineates about various techniques of packaging such as edible coating, EMAP, vacuum sealing. Facts on functional foods are also expounded in this edition. To make the magazine more and more interesting, some new areas are included to add spices to the reader's satisfaction.

ER TEAM

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