ESSEN RIVESTA

Entwine world & nutrition

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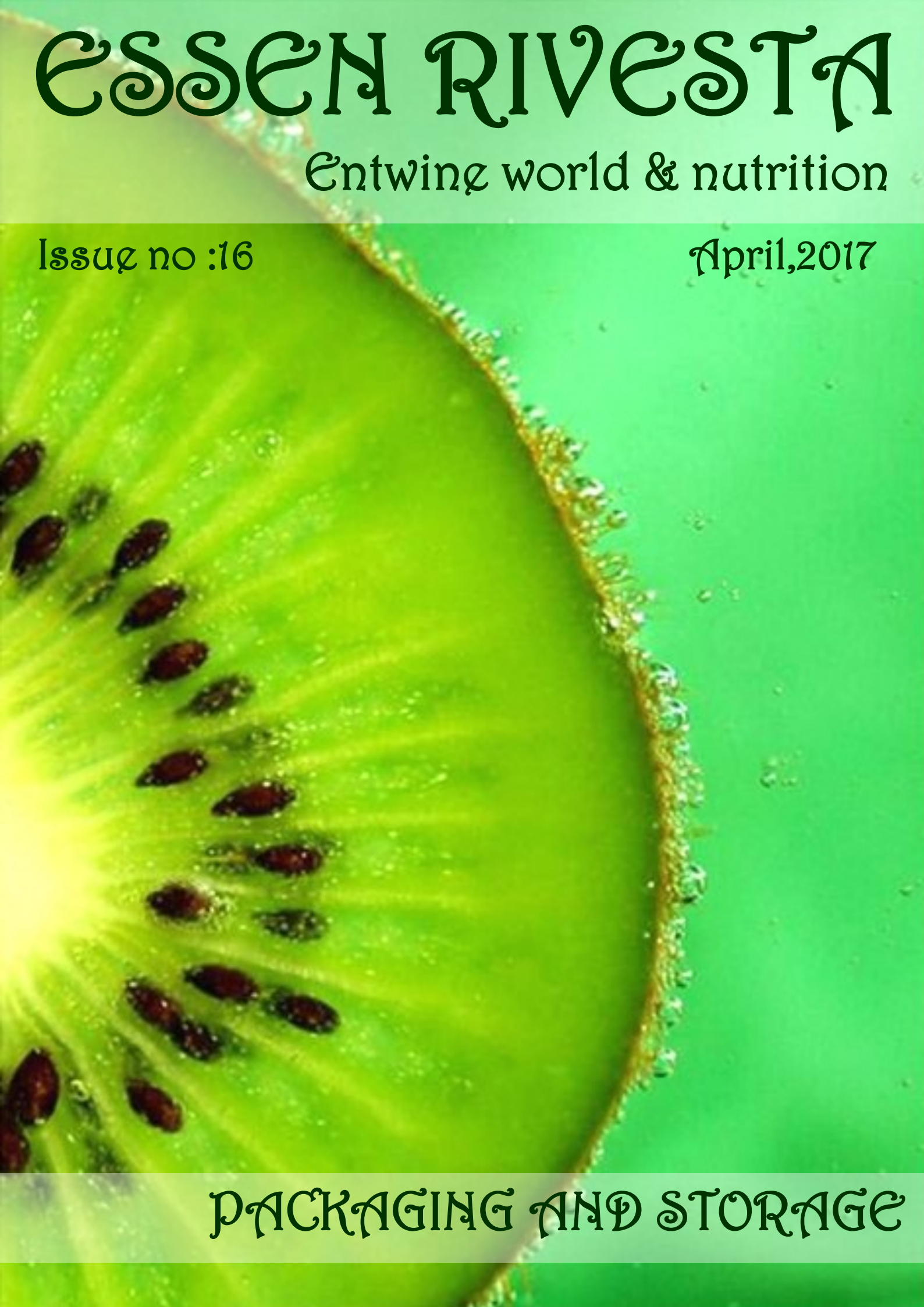


PACKAGING AND STORAGE

Contents

MODERNIZATION OF TRADITIONAL STORAGE

Geek glasses, polka dots, bullet, vespa, you name them- today's trend. But wait a minute, aren't these a fashion statement of the 70s and 80s? Seems like the proverb is indeed right- old is gold. But going according to the chronology, there was a bit of technical evolution in between, wasn't there?

Over the decades womenfolk of our country having gathered knowledge from their ancestors have continued to follow the same methods for so many years together in certain traditional practices including food storage. Of lately, modernization which has its impact on every aspect of life also seems to have made an at least noticeable change in these indigenous and traditional practices. Nature being human's best friend back then, easily and naturally available materials like bamboo and wood boxes, mud pots, gunny

Many other ultra storage structures existed such as **Kothu** which was a room constructed with an opening to pour in the grains such as jowar and paddy along with a small outlet to take them when needed. **Hagevu** was another underground structure which was lined with straw or stones along its walls while the top with an opening to pour grains, especially jowar was covered with a thick layer of jowar stalks. This had an advantage of not needing any fumigation.

Many more like Kuthla, Peru, Matka, Peti, Tunn, Kuthar also existed especially in the Himachal region.These storage structures though being reliable needed timely maintenance such as plastering with mud and cow dung from time to time with its life being worn out very soon and also for better protection of food grains. With time evolution is a key factor for sustainability, even in this case so as to adapt to the varying environmental conditions.

Some of the indoor storage containments-

Kanajal/ Galagi was a cylindrical bamboo container plastered with cow dung and mud to avoid spillage or pilferage of grains(especially paddy).

Sandaka/pettige are wooden boxes to store pulses and seeds with a capacity of 3-12 quintals installed at a certain height from the ground with a large lid and a suitable outlet to takeout grain.

Utrani- mud pots of varying sizes placedone on top of another while storing

IMPROVED STRUCTURES

For small-scale storage of grains the *PAU bin*, *Pusa bin* and *Hapurtekka* have been proposed. The **PAU bin** designed by Punjab Agricultural University is a galvanized metal iron structure. The capacity ranges from 1.5 to 15 quintals. **Pusabin** is a storage structure is made of mud or bricks with a polythene film embedded within the walls. While the **Hapurtekka** is a cylindrical rubberized4 cloth structure supported by bamboo poles on a metal tube base, and has a small hole in the bottom through which grain can be removed. In addition to small scale storage there are structures for large scale storage of grains. Large scale grain storage is done in CAP and silos. In addition to small scale storage there are structures for large scale storage of grains.

CAP Storage (Cover and Plinth) involves the construction of brick pillars to a height of 14" from the ground, with grooves into which wooden crates are fixed for the stacking of bags of food grains. The stacks are covered with 250 micron LDPE sheets from the top and all four sides. It is an economical way of storage on a large scale. The **Silos** are either metal or concrete. Metal silos are cheaper than the concrete ones. In silos the grains in bulk are unloaded on the conveyor belts and, through mechanical operations, are carried to the storage structure which is magnanimous.

The storage capacity of these silos is about 25,000 tonnes. Again when it comes to the preservation/ storage of food, naturally available materials were preferred such as common salt for red gram which proved to be abrasive to the pets, ash for sorghum at a ratio of 1:4, and also neem and thumbai leaves which were the cheapest means and were also organic which checked the safety in using them. Lime powder, camphor, neem oil, sweet flag and tamarind were some of the other repellants used.After mixing of these materials, they are tightly packed in gunny or jute bags leaving no way for infestation.

These seem to have been largely replaced by artificial preservatives like Benzoates (ssodium benzoate, benzoic acid), Nitrites (sodium nitrite), Sulphites (sulphur dioxide), Sorbates (sodium sorbate, potassium sorbate). They do come under the permissible classes of preservatives. Like Patanjali these days, going natural is a growing trend. But having a more complex nature of action which is also specific in its function, they are more efficient and preferred.

Finally to conclude, India is one of the largest producers, having the most suitable climatic conditions but fails at marketing. We incur huge losses every year, almost 50,000 crores just because of post-harvest losses. Indigenous and traditional methods do hold good even now, but their efficiency and shelf life is very short compared to the modern methods. One shouldn't completely change over to this modern methods for we could lose our precious culture and tradition and at the same time we should accept these changes for a better living without destroying our history- our identity.

- VIJAY S

DO YOU KNOW?

MPID : Meat & Poultry Inspection Division
NCA : National Confectioners Association
TSCA : Toxic Substance Control Act

Anticaking Agent A product which when added to a powder will assist in preventing the powder from caking or forming lumps. Many products have been used as anticaking agents, but they fall primarily into two categories: those that protect the powder from external moisture, and those that absorb moisture both internally or externally. Products which absorb water are silica gels, phosphates, etc. Products which protect the powder from external moisture by virtue of their fine particle size are phosphates, silicas, cellulosics, etc. See **Silica, Sodium Phosphate, Cellulose.** CFR Definitions **170.3 (*o*)** (1)
SOURCE: Dictionary of flavours by De Rovira

INDIGENOUS STORAGE TECHNIQUES

The trends of using hazardous chemicals for the improvement of grains and to prolong the shelf life of the produce has increased but at the same time ecological and biochemical pollution also increasing. Storage losses of grains in India is common problem so botanical seed is beneficial for sustainable agriculture. Day by day indigenous technique are lapsing so there is a need to generate awareness and dissemination of these techniques. Here are the some methods followed in rural areas to protect the various agricultural produces which is economical, eco friendly and efficient.

Paddy husk in managing storage pests: Farmers store the paddy grains in earthen pots and placed the paddy husk in top layer (5cm) above it. They found that storage pests has not preferred these earthen pots stored with paddy husk.

Wheat seeds stored with wheat straw: Here the wheat seeds are placed on wheat straw which are packed in gunny bags and the entire structure is covered around with pigeon pea .This structure is then sun dried.

Wheat seeds stored with onions: Here the sun dried onion is spread over the wheat seeds and these proportion is placed on the cylindrical containers. Farmers believe that odor of onion is repellant to insect .

Mud pots in grain storage: First farmers place a circular ring like structure called 'kothila' made of paddy straw on the floor. Above this the pots filled with grains are placed and the pots are arranged one by one and top most pot was closed with lid. The grains were safe and can be stored nearly 6 months.

Red gram seed storage with common salt: The red gram seeds are treated with common salt of needed grams and stored in jute gunny bags. As salat has abrasive action on insect skin prevent its movement inside red gram grain, for short term inside the storage container. It is believed that red grams can be stored up to 8 months.

Pungam leaves in Paddy storage: Fresh pungam leaves were placed as layers in between the gunny bags arranged one above other in store rooms. These leaves acts as the repellant for grain moth.

Ash seed treatment in sorghum: Ash was mixed with sorghum seeds in the proportion of 1:4 and after the ash treatment ,the seeds are stored in jut gunny bags that can be safe from pest attack up to 6 months.

Ragi storage with Neem leaves: The strong odour of the neem leaves keeps the storage pests like lesser grain borers, saw toothed and flat grain beetle away. This method is one of the cheapest and safe to use.

Storage of vegetable seeds with cow dung: Bottle gourd were embedded in cow dung and then dried in 2-3 days. After drying ,the seeds get stacked on varati. Varaties were then stored in open/inside wooden box stored seed in this method up to one year. Cow dung has immunostimulant properties that increases germination and viability of seeds considerably. Thus, insect infestation was often a less serious problem because farmers cultivated traditional varieties which although low yielding but resistance to insect attack. However the introduction of high yielding varieties has resulted in storage losses, as these are susceptible to insect damage. Indigenous practices have advantages over outside knowledge. It has little and no cost and is readily available.

- VINASS JAMALI P

REPOST FOR HONOR

I AM A FOOD PROCESS ENGINEER

Oh my pity world, how could I be so immoral,
Is it fair for me to make my pretty friends mortal?
My passion for drying and blanching may be divine,
But the love for my people is a grape in vine.
Think our absence for a while,
The world will be ruined with vile,
We experience moan to teach you boon,
Don't neglect and bind with bane.
We serve the preserved from Arctic to Atlantic,
Being the tonic for the world's panic,
Heat, cool and freeze may be my mantras,
Nevertheless my processing favour thanthras.
Irrespective of the mode, solid or liquid we will make it valid,
Updating the emerging techniques, wherever you abide,
Becoming a FP Engineer is an agreement but being, is an art,
We prove it by pumping good food to the world like the heart.

PALANI R

ORGANIC FARMING

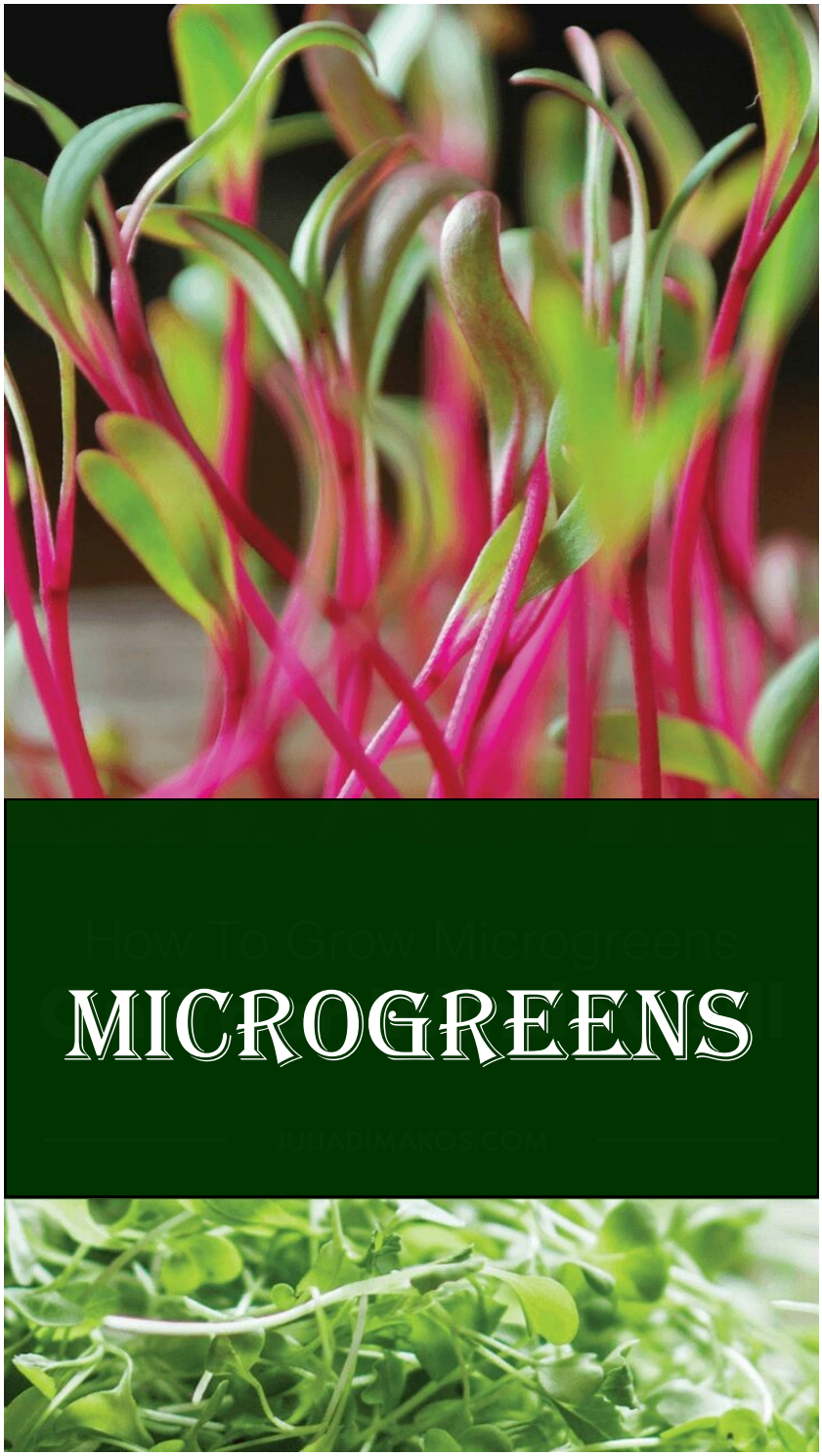
Hey, Hi-tech humans, I'm Organic farming
Hope you all know my name's meaning.
My father is said to be Sir Albert Howard,
As he first brought my principles forward.
I use only the primary ingredients of nature,
So as to sustain life now and for the future.
I follow crop rotation, green manure and inter-cropping,
And manage weeds by just tillage and mulching.
I do encourage the beneficial microbes a lot,
Keeping in control, the pests with my biological plot.
Only organic feed for my poultry is supplied,
And anything genetically modified is strongly denied.
Bringing down global warming and ground water pollution,
I give you tasty and nutritious food in addition.
My weakness is I need more time and labor,
And I'm said to be expensive by my neighbor (Conventional farming).
To the whole world I cannot supply they say
But its up to you to stand up and nay.
Spread throughout the world about my birth ,
To create a better and healthy 'ORGANIC EARTH'.

CELINE SNEHA I

DAY OUT TO HEAVEN

On a long straight road, I was struck in traffic,
In my busy schedule, the day started quite terrific;
The traffic seemed to deal a big questionnaire,
That made my little vehicle froze stationary;
My eyes had a glance at the roadside vendors,
That tempted me to think that it might be tenders;
"Oh it may not be", my sound heart revealed,
My mind pierced to find the facts concealed;
Parking my vehicle in the "NO PARKING" zone,
I neared one of the vendors with a humble tone;
The lickonomics of the crowd induced me to taste,
The hot idly and puri flickered that it will never go waste;
My curiosity raised its height with the first bite,
Making me to taste all the endowed items till night;
That busy day never appeared to be a vain,
Thinking that the whole eve had a huge gain;
Street foods made me tour India from north to south,
That the spice of dignity dwelled in my mouth;
Leaving the place, I decided that the heaven is on Earth,
And this day for street foods is sufficient for my birth;
I started glorifying my diary with the events pretty beautiful,
It's my time for me to be highly thankful.
Thank you God for my day with street foods.....

MEERA J



What are microgreens?

Microgreens are young seedlings of edible vegetables and herbs harvested less than 14 days after germination. Microgreens are aptly named micro because of their size, as the plants are harvested when they are one or two inches in height.

DIFFERENCE BETWEEN MICRO-GREENS AND SPROUTS

Sprouts are allowed to germinate only in water whereas the microgreens are grown in soil like the normal plant with water as a source therefore the nutrient content of the microgreens seems to be larger than that of the sprouts. Microgreens undergo more photosynthesis than sprouts and hence they develop higher nutrient content. Microgreens have more flavour and versatility than sprouts. The process of cultivation of sprouts gives a perfect condition for the cultivation of bacteria as they are allowed to germinate under minimal sunlight, within a warm ,humid environment for roughly 48-72 hours. For these reasons the FDA highly recommends against the consumption of the raw sprouts. In comparison microgreens are grown a few weeks past germination in nutrient rich soil with the aid of full sunlight. This growth process of microgreens ensures a far superior flavour and adds to their extraordinary nutritional value.

NUTRIONAL VALUES OF MICROGREENS AND THEIR HEALTH BENEFITS

Microgreens pack nutritional punch. Researchers evaluated four levels of vital nutrients including vitamin K, vitamin C , Lutein and beta carotene in the microgreens. All of these nutrients are extremely important for skin, eyes and they also have their own anti-cancerous properties. It found that leaves from almost all of the microgreens had four to forty times more nutrients than the mature leaves of the same plant. As they can be easily grown in our home they are not subjected to as many pollutants as commercially grown varieties. They are also the richest source of minerals ,trace minerals , enzymes, antioxidants, chlorophyll and protein and provide us with substantially greater health benefits than raw greens and vegetables.

Microgreens also deliver nutrients that are important for digestion, for reducing the risk of cardiovascular disease and for strengthening the immune system. Beta-carotene, lutein, zeaxanthin are the types of carotenoids found in the young plants. They act as an antioxidant preventing the body from the disease causing free radicals. They also protect our eyes from harmful wavelengths of light and may reduce our risk of developing chronic eye conditions, such as mascular degeneration and cataracts. The vitamin K from these microgreens increase the bone density and hence it reduces the risk of osteoporosis. Any leafy vegetable can be grown into microform such as basil, coriander, spinach, raddish, beetroot, spinach, carrot, broccoli, Brussels, cabbage, mustard etc., They are first mainly cultivated and used for garnishing for their strong flavour but later on when its nutritional value came to be exposed it has now become a major market of investing the shares in its commercial cultivation as it gives a good profit with lesser expenditure.

FITNESS OF THE BODY

The microgreens plays an very important role in diet in deciding the fitness and the wellness of our body. It is used in burning the calories of the body and in the weight reduction diet.

GROWING OF MICROGREENS

The seeds used for growing microgreens are untreated seeds, preferably organic, that are the same seeds used to grow full size plants. As these plants are grown much close together, therefore more number of seeds can be placed than the field growing crops. The water is just sprayed over the planted seeds and thus water requirement is also very less. It can be grown in a small tray filled with suitable soil and proper ventilation.

- MOHAN RAM S, NIRMAL S

PLASTICS EVERYWHERE

In the modern world the role and the use of the plastic is unavoidable one. In the food processing also the role of plastic is dominant, but we don't know more about whether it is boon or bane. We hope this article may let you recall something

HISTORY:

We may think that the packaging of any consumable materials are new to this world. But it's not so. In 1500 B.C itself the packaging of consumable material done in Egypt. The packaging material was prepared by mixing melted limestone, soda, sand, silicate and shaped into glass packaging pot. The packaging material get upgraded eventually and then we came into the plastic packaging materials. The first plastic was bio-based, It could be molded when heated and retained its shape when cooled.

There is a lot of advantages with the plastic packaging material. So let's see this in detail here.

- **Antioxidant coated plastic materials** for the packaging are available which may increase the shelf life of the food by keeping its better microbial stability.
- It **weigh much lesser** than the other commercial materials used for packaging. So, it reduce the effort for transportation.
- It is **more flexible** and it can mould into any form. So it is more preferable than any other materials used for packaging.
- It require **lesser quantity of raw material** than any others to manufacture the package. So the exploitation of other natural resources in huge is neglected by its role of packaging.
- **Durability** of the plastic package is excellent than any other. It can withstand maximum amount of impact in transport, handling and storage.
- It **costs cheaper** and it is affordable to the maximum industries and there by the product given by the company in the market is lesser cost than aluminium or glass packaged material.
- It **vanish the spoilage of the canned food products**. These spoilages are due to the reaction of the food material along with the packaging material. This problem is thrown out by plastics. Because, It is least reactive in the normal temperature.
- It is bio non degradable. But, **recyclable**. This minimize the wastage of the packaging materials and efforts in the production of that material.

Though there is a lot of advantages, like two sides of coin ,it has its remarkable disadvantages too.

- Does not degrade by nature. Remains in the land and it play adverse effect on environment. But this can be avoided by the recycling methods.
- Some of the compounds in the plastic material are causing health problems when we consume food contaminated with those chemicals.

The way of food get contaminated by this chemicals are

- The diffusion of the chemicals like BPA in food from the plastic pack, when we pack the food in hot condition.
- Improper selection of the grade plastic packaging material may cause the chemical diffusion into food item.

First artificial plastic was prepared by Alexander Parker in 1838 and was displayed at the Grand International Fair in London in 1862. This plastic was intended to replace natural materials such as ivory and was dubbed "parkesin". In 1849 Charles Goodyear and Thomas Hancock developed a procedure that destroyed the sticky property and added elasticity to natural rubber. In 1851 hard rubber or "ebonite" has become commercial. In 1870 New Yorker John Wesley Hyatt was given a patent for "celluloid" produced in high temperatures and pressure and has low nitrate content. This invention is the first commercialized plastic and has remained as the only plastic until 1907 when Leo Hendrik Baekeland produced "Bakelite". What exactly plastic was, was not know until 1920 when Hermann Staudinger's revolutionary idea was heard. All plastics, rubber and cellulose were claimed to be polymers or macro molecules. This assumption was first not accepted widely by many scientists, but Staudinger received the Nobel Prize in 1953 with this idea. Plastic packaging has begun to be used widely after 1950s. Towards the end of 1970s plastic packaging sector has begun to grow.

Effect of BPA:-	BPA is rapidly eliminated from the body, but because of continuous exposure most of us have detectable levels of BPA in our body tissue. Typical levels, however, are well below the daily upper limit of safe exposure set by the US Food and Drug Administration and the European Food Safety Authority. But many independent scientists have expressed concern that this limit is based on experiments done in the 1980s, rather than on the hundreds of more recent animal and laboratory studies suggesting we could be at risk from much lower doses. Such low dose effects now have enough scientific credibility for the American Medical Association (AMA) to call on the US government to enact new federal policies to decrease the public's exposure to endocrine-disrupting chemicals**.**
Effect of Phthalates:-	Phthalates are now used in so many products they are almost impossible to avoid. A Swiss study found people who eat healthily and try to avoid chemical additives in their food are exposed to much the same levels of phthalates as those who eat junk food and don't worry about their diet at all. Experiments with animals have consistently shown that some phthalates can be endocrine disruptors but, as with BPA, the evidence for adverse health effects from low-level exposure to phthalates is more limited. Again, though, there's too much of it to be ignored. Because of its low cost, **DEHP** is the phthalate most often used as a plasticizer for PVC. Experts now generally agree that low level exposure to DEHP can affect reproductive development, particularly in young boys, and a US study has found a link between exposure to phthalates and increased risk of diabetes and obesity in men.
Effect of ESBO:-	ESBO is one of the most frequently used additives to PVC when used for containers or packaging for food. It functions as a stabilizer as well as a plasticizer. Lid seals are formed at high temperatures, which causes the PVC in the seal to partially break down and release hydrogen chloride. ESBO reacts with the hydrogen chloride and prevents further breakdown of the plastic, but in doing so it forms compounds called chlorohydrins. Chlorohydrins make up, at most, five per cent of the ESBO but they can be toxic. Chlorohydrins have been detected in foods closed in glass screw-cap jars

Whatever the science offers it came with both useful and harmful actions to human race. It is our responsibility to appropriately fix it where ever its role is necessary. Government also take this issue as serious and take necessary actions. But it is our individual responsibility to reduce the usage and safeguard our future generation.

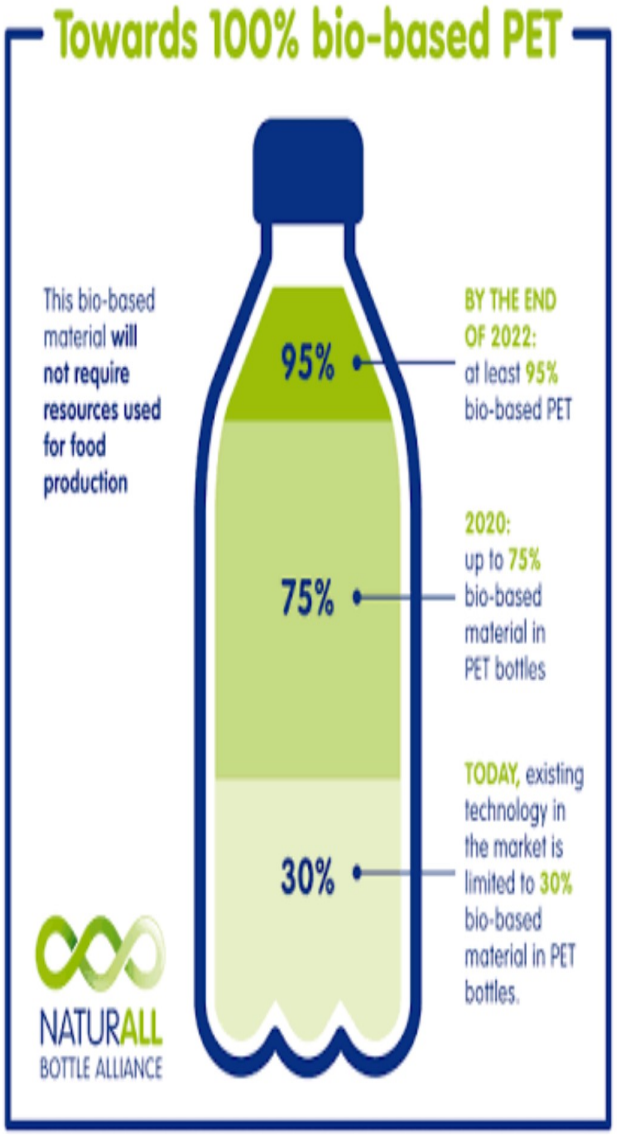
SOURCE:

https://www.choice.com.au/food-and-drink/food-warnings-and-safety/plastic/articles/plastics-and-food
http://www.custom-pak.com/news/top-5-benefits-plastic-packaging/
https://www.hunker.com/12003598/the-advantages-disadvantages-of-plastic-containers

- RAMANAN SJ

BIO PET BOTTLES

Commercial scale PET plastic bottle made from bio-based material, i.e. 100 percent sustainable and renewable resources is about to launch in the near future by the world's two largest bottled water companies DANONE and NESTLE'WATERS .These two key players of the sector have joined forces with Origin Materials, a startup based in Sacramento, Calif., to form the **NaturALL Bottle Alliance.** The project uses biomass feedstocks, such as previously used cardboard and sawdust, so it does not divert resources or land from food production for human or animal consumption. This next-generation PET will be as light in weight, transparent, recyclable and protective of the product as today's PET, while being better for the planet. The exclusive use of renewable feedstocks, which do not divert resources or land from food production, is the Alliance's main focus area. The R&D will focus initially on cardboard, sawdust and wood chips but other biomass materials, such as rice hulls, straw and agricultural residue could be explored.



Origin Materials has already produced samples of 80 percent bio-based PET in its pilot plant in Sacramento. Construction of a "pioneer plant" will begin in mid 2017, with production of the first samples of 60+ percent bio-based PET to start in 2018. The initial volume goal for this first step is to bring 5,000 metric tons of bio-based PET to the market. The NaturALL Bottle Alliance aims to develop the process for producing at least 75 percent bio-based PET plastic bottles at commercial scale as early as in 2020, scaling up to 95 percent in 2022. The partners will continue to conduct research to increase the level of bio-based content, with the objective of reaching 100 percent.

The technology represents a scientific breakthrough for the sector. "It's incredible to think that, in the near future, the industry will be able to use a renewably sourced packaging material, which does not compete with food production and contributes to a better planet" , isn't it ??.
Source: internet

-SRILAVANYAA K

BEYOND THE CUP

As soon as the sun was rising for another great day, we were all set for a new journey. Making our way to Mettupalayam, the green flavor welcomed us with its ever cool breeze. Stepping down at Coonoor one could see people engaged in their regular chores as early as possible inspite of the gloomy weather. With the help of few directions we set off to the Coonoor-Kothagiri road experiencing a clear cut bends on its way. Stepping few steps forward we could reach the HIGH FIELD TEA FACTORY. The factory combined with its estate made our eyes go green. The flavor of tea leaves paved us the way to reach the factory. Our guide moved forward while we followed him as if we were entering a treasure land. The plantation has a surrounding of 2000 acres with a well-established and equipped factory. Heading first to withering process. The leaves plucked were dried in air driers for 8 to 10 hours. Here approximately 80% moisture is been removed for grinding in the

next process. These air driers were seemed to be long with meshes at the top for placing the plucked leaves. Hot air is not applied to avoid the loss of flavor and other compounds in the leaves. Next leaves are cut in cutting machine. Then the tea travelers reach the CTC(crush turn curl) machine. The leaves graded based on sizes and those fit for different types of tea are qualified during the process. In CTC machine after crushing and turning in a continuous belt conveyor, it reaches a drum where granulation occurs. After this there is one hour oxygen fermentation process where the green color changes

The tea plantations are actually tall trees but are cut to 2 feet and maintained for once in 5 years. The life time of tea trees are 100 years while the one we saw was 45 years old. Tender leaves at the top are usually used. The plant does not need much of water so grows well in slopes. At the middle of the plantations silver oak trees are planted. It is mandatory as it absorbs water during rainy season and spreads off water during the summer season. In the top leaves there lies a bud which is separated manually and is used for green tea. This green tea is well known for its medicinal values. Within this lies another baby bud which is used for white tea, which costs Rs.10,000 per kg processed fully manually. 80% of tea manufactured is exported to South Africa and Kenya and rest sold out at the factory outlet. Then we moved on to the eucalyptus oil unit. A closed vessel containing 250 kg leaves and 250 kg water are heated well. The steam generated passes through a pipe and allowed to cool under a chill water bath. During this process the oil gets released by condensation. Similarly lemon grass oil and other oils used for various medicinal purposes are manufactured here. The recharging smell and the reviving fragrance in the place refreshed our minds and souls reinforcing our lives to some 100 years further.

-ABHIJITHA V

RESEARCH CORNER

PAPER I

STUDY ON EDIBLE PACKAGING

ABSTRACT:

The goal of this research is to use HPMC , chemically modified cellulose polymer in packaging of food produces. The thin biodegradable edible films were made with HPMC as the base and coated with milk protein (casein). The films were wrapped around food produce and tested for various parameters such as hardness , adhesiveness, springiness, cohesiveness, gumminess, chewiness, resilience. The results were compared and conclusion was framed accordingly.

INTRODUCTION:

Hydroxy propyl methyl cellulose(HPMC) is a water soluble cellulose ether hydrocolloid

- It is semi synthetic, inert, viscoelastic polymer(modification of cellulose) commercially used in pharmaceutical and food industries.
- It is odorless, tasteless, off-white, free flowing powder
- It gets dissolved in water and other soluble solvents such as ethanol.

IS IT EDIBLE?

- HPMC is considered to be safe for human consumption.
- The uses of HPMC in food is evaluated by JECFA(Joint expert committee on food additive)
- It has been approved by FDA (Food and Drugs Administration)as food additive.
- For humans , the consumption rate was limited to 0.047mg/kg wt/day.

IN FOOD INDUSTRY:

- HPMC is being used in the food industry as thickening agent , binding agent.
- It can also be consumed directly in food as an alternative for gluten and gelatin because of its gelling property.
-

METHODOLOGY:

Preparation of flim:

The biodegradable edible film was prepared with hydroxypropyl methyl cellulose (also known as hypromellose).

Around 3% of HPMC was taken in the conical flask.It was heated at 65 degree Celsius for 10 to 15 minutes. Then the mixture was poured into the petriplates.

It was set aside and allowed to dry for 5-6 hrs.

Then the film was separated from the plates.

With milk casein:

Casein was extracted from the milk by adding few drops of lemon juice in it. The extracted casein was added to the mixture at the rate of 2% before pouring it to the plates.then the mixture was mixed well and added to the petriplates. The edible films were made as mentioned above.

Flims tested with apple:

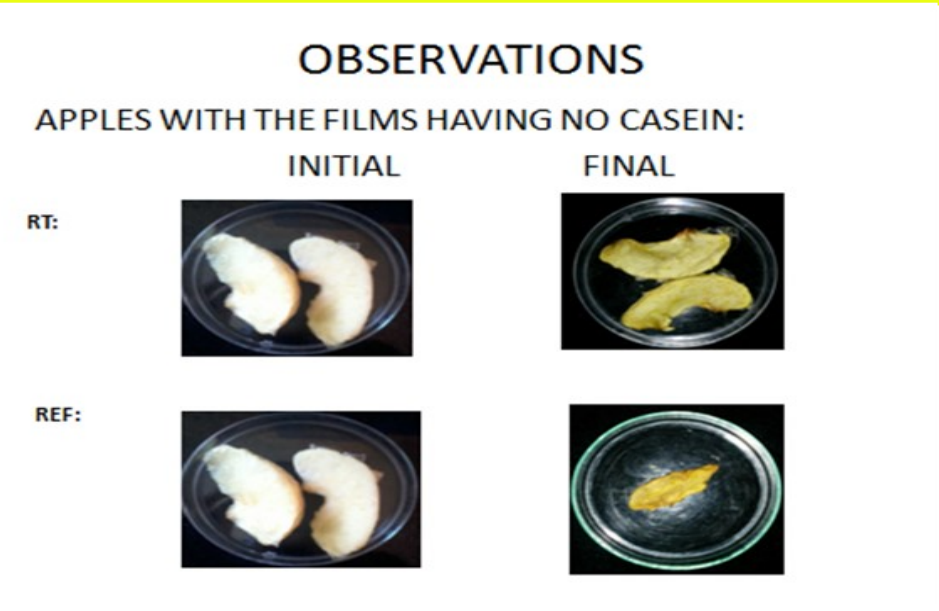
The films (with casein and without casein) made were wrapped around four apple slices. Two were kept at the room temperature and remaining were kept under refrigerated condition. Apple slices were kept as it as for control.

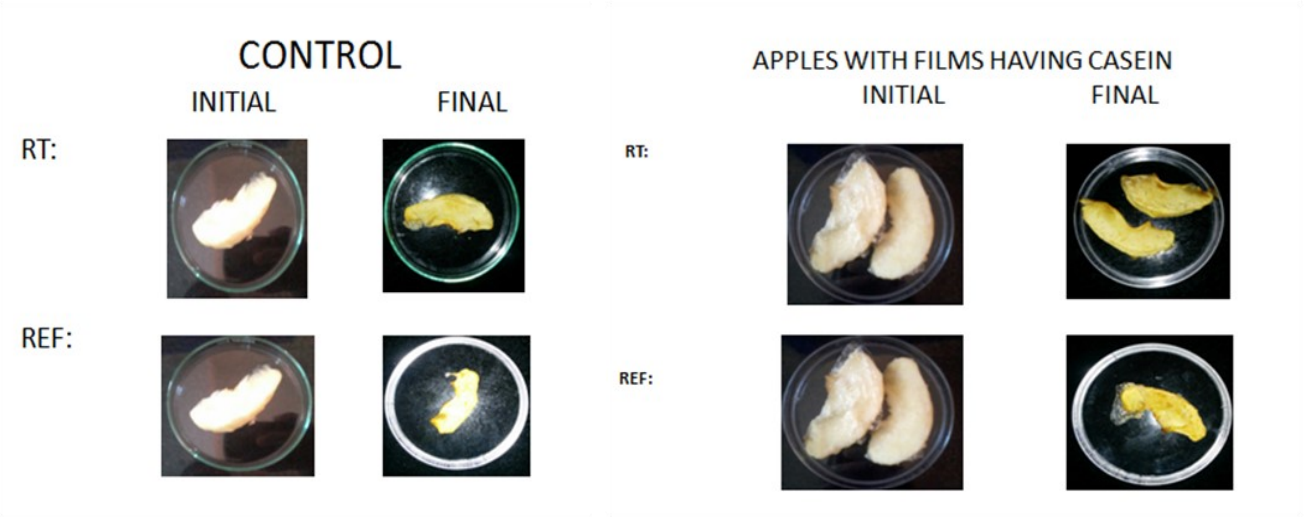
The initial weight of the slice were taken.

The apple slice were checked for its hardness, adhesiveness, springiness, cohesiveness, gumminess, chewiness with the help of texture analyzer.

Film without casein

Film with casein





Texture parameters	Fresh slice	Control		Edible coated slice without casein		Edible coated slice with casein	
		RT	REF	RT	REF	RT	REF
Hardness	219.67	1736.379	375.5591	1526.669	567.717	1273.308	373.781
Adhesiveness	-28.37	-43.934	-3.932	-96.589	-10.801	--	-18.399
Springiness	0.726	0.649	0.574	0.623	0.427	1.103	0.907
Cohesiveness	0.265	0.507	0.556	0.524	0.047	1.161	0.134
Gumminess	58.168	879.479	208.780	800.422	26.408	85.117	49.935
Chewiness	41.693	570.579	119.85	498.623	11.280	93.879	45.311
Resilience	0.0385	0.018	0.259	0.136	0.003	0.342	0.007

After 48hrs, the sample were tested for its texture in texture analyzer. The results were shown in the table above. The observations shows that apple coated with casein films have water loss less than the slices coated without casein. This is due to the fact that the casein protein has fats which are hydrophobic in nature. Hence the water loss is minimized. Invariably in all the samples there is an increase in hardness. The other parameters are in correlation with the hardness factor.

CONCLUSION:

- The edible films made are highly hydrophilic in nature due to hydroxy propyl methyl cellulose.
- There is loss in moisture content and increase in hardness.
- Hence an alternative should be found to increase the water retention capacity and mechanical property of these films.

- PRIYANKA K

PAPER II

MICROBIAL ANALYSIS OF FRUIT JUICE SHOPS

INTRODUCTION:

Good food hygiene is essential for us to make and sell food that is safe to eat. Food hygiene is not the first thing that comes to the minds of the people in India. Especially we don't think twice before going to a fruit shop and ordering a drink. This is not the case in other developed countries. There is a difference between processed fruit juices and fresh fruit juices prepared under aseptic condition. Wearing gloves and having a homogenizer is enough to establish good hygienic conditions. This technique is now slowly entering in India in some high level juice shops.

ABSTRACT:

Our report is on the microbial analysis of two regular fruit juice shops, one in the heart and the other in the outskirts of the city. We have chosen apple juice to carry out the analysis as it is the most preferred among the common masses.

TESTS:

The tests are done for the enumeration of

- Bacteria
- Fungi
- Yeast
- E.coli

SAMPLES:

1. Apple juice (with sugar)
2. Apple juice (without sugar)
3. `Tumbler
4. Blender
5. Knife
6. Hands of the vendors
7. Water

The samples have been collected by the following methods:

- Apple juice (with\without sugar) and water has been collected from the shops by using sterile screw cap tubes.
- Other samples have been collected by using swab test technique.

The collected samples were serial diluted up to the following limits:

- Apple juice (with/without sugar) were diluted up to 10^{-4}, the dilutions 10^{-3} and 10^{-4} were plated.
- Water was diluted up to 10^{-3} and MPN technique was carried out.
- Other samples were diluted up to 10^{-3}. The dilutions 10^{-2} and 10^{-3} were plated.

The samples were then plated using appropriate growth media.

- Bacteria – plate count agar
- Yeast – YGCA (Yeast extract chlorophenicol agar)
- Fungi – Rose Bengal agar
- E coli- LST broth

Then the plates were incubated at room temperature and counts have been taken after the appropriate incubation period [bacteria& ecoli -24 hrs; yeast and moulds -48 hrs]

SHOP : 1

SAMPLE	PCA	YGCA	RBA
With sugar	$181.81*10^3$	$213.63*10^3$	$168.18*10^3$
Without sugar	$172.72*10^3$	$263.63*10^3$	$285*10^3$
Tumbler	$813.63*10^2$	$95.45*10^2$	$10*10^2$
Blender	$327.27*10^2$	$50.54*10^2$	$222.7*10^2$
Hand	$131.81*10^2$	$504.54*10^2$	$445.45*10^2$
Knife	$868.18*10^2$	$90.90*10^2$	$100*10^2$

SHOP :

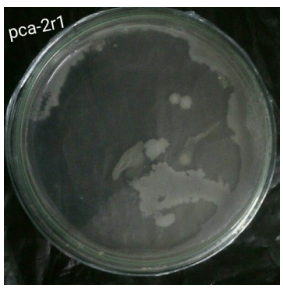
SAMPLE	PCA	YGCA	RBA
With sugar	$4.54*10^4$	$777.72*10^3$	$483.18*10^4$
Without sugar	$32.7*10^3$	$370*10^3$	$322.7*10^3$
Tumbler	$236.3*10^2$	$1.68*10^2$	$9*10^2$
Blender	$840.9*10^2$	$300*10^2$	$299.09*10^2$
Hand	$254.5*10^2$	$1.59*10^2$	$16.81*10^2$
Knife	$974.2*10^2$	$50.90*10^2$	$40*10^2$

INFERENCE:

HANDS OF A VENDOR

Based on the microbial analysis , PCA count shows that shop 1 has more bacterial activity than shop 2. This is because shop 1 being fast moving the vendor is more in contact with fruit juices and this enhances the bacterial growth.

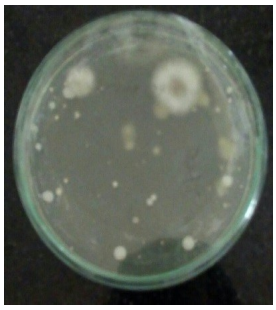
According to YGCA and RBA count shop2 has more fungal activity than shop 1 .We observed that there is a vast difference between the counts of two shops.This is because we observed some kind of infection in vendor 2 whose hand and this changes the whole outlook of a report. Hand being vital, it is necessary to wear gloves to maintain a aseptic condition.



KNIFE:

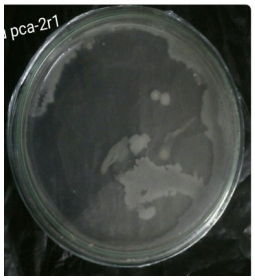
The PCA count in shop 1 is great than shop2 .this is because knife is more in contact with fruits and hence the result.

The YGCA and RBA count is greater in shop 2 and this is because the knife is in contact with the vendor's hand who has infection. This I sows that the vendor has some fungal infection.



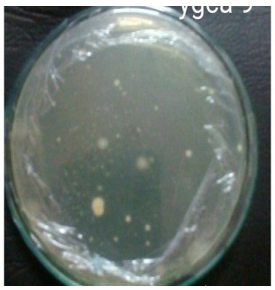
TUMBLER:

Based on the microbial analysis , PCA, YGCA,RBA counts shows that shop 2 has more CFU/ML than shop 1. This shows that shop 2 just like in the case of knife is in contact with the vendor's hand and hence the result. It can also be assumed that shop 1 has relatively cleaner glasses than shop 2 but it is inconclusive.




BLENDER:

The PCA,YGCA and RBA count is greater in shop 1 than in shop 2. This shows that since it is a fast moving shop, they don't clean their blenders regularly. We also saw some kind of rusting on shop 1 's blender. This enhanced the microbial growth. In shop 2,we observed that the vendor cleans the blender regularly.


APPLE JUICE:

All the above results will effect the microbial load of the apple juice. The inference based on all the above conclusions:

With sugar:

- The PCA count was greater in shop2 than in shop 1. It may seem like contradicting the above results. But the vendor said that the fruits were old as the shop has been closed for past 2 days. This proves that as days goes on microbial load increases. But in the case of fast moving shops, the fruits are more fresh.
- The YGCA and RBA count was greater in shop 1 than in shop 2. This shows that the above results affect the total count by a large amount.



Without sugar:

As in the case of juice with sugar, the PCA, YGCA and RBA results are same i.e. bacterial count is greater in shop 2 and fungal count is greater in shop 1. But the sample without sugar has comparatively less microbial population than the sample with sugar as adding of sugar acts as a nutrients for the microbes.



WATER:

Shop	0.1	0.01	0.001	MPN	CFU/ML
1	1	3	1	20	2000
2	0	1	1	6.1	610

According to MPN technique, shop 1 has greater coliforms and e. coli content than shop 2. This shows that the water quality also affect the final inference.

CONCLUSIONS:

The final conclusion after all considerations shows that shop 1 has more microbial activity than shop 2. Hence it can be concluded from our experiment that slow moving shops are more hygienic than fast moving shops. The only problem in shop2 is the hands of the vendor and this can be easily rectified by wearing gloves.

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DO FOODS SPEAK....??

The phrase may look quiet bizarre. But here are some common food items which are mis-pronounced by many of us. So let's have look into them.

- Raspberry (Ras'p'berry) : ras-be-ree
- Cocoa(Coco'a'): kho-kho
- Bruscheta: broos-ke-tta
- Onions: an-ion
- Parmeson: par-me-zon
- Pasta: pas-tuh
- Tortilla(Torti'll'a): toritia
- pizza: peet-zha
- Quinoa: kee-nuah
- Almond: ah-mond
- Salmon: sa-mon
- Hummus: hoo-mos
- Gnocchi: nyo-kee
- Croissants: kwa-son
- Star anise: star an-iss

From the team...

Hello readers, hope you gained some knowledge from this edition. This edition concerning packaging and storage is based on the fact that we have to keep improving our infrastructures and innovations in the sector of storage. India is a country with good grades in production and productivity and also in wastage. While the per capita availability ranks low. The main reason the experts say is poor storage facilities. Though there are lot of cold storages and warehouses available, the perception of the technology among the farmers is the declining factor. As food engineers and processors, our main objective should be decreasing the wastage instead of generating new ideas on productivity. As a part of this edition we want to appreciate and show our gratitude to our seniors B.Tech Food Process Engineering students batch (2013-17) for pioneering this magazine.

We are expecting feedbacks and suggestions on this edition. We are open to receive your articles on various technologies. You can also open up a comment in our facebook page and twitter page (address given below). In our next edition, we are concentrating on Adulterations in food stuffs and we are welcome your articles and ideas regarding the subject.

Yours,
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