



**CHAMBER FOR ADVANCEMENT
OF SMALL & MEDIUM BUSINESSES**



PURNABRAHMA

**Special Issue
Jan-March 2022**



NOVEL TECHNOLOGIES IN AGRO-FOOD PROCESSING SECTOR



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Samunnati
Sustainable Rural Economy

FUNDING OPPORTUNITY IN AGRICULTURE & FOOD VALUE CHAIN BY SAMUNNATI

Friday August 3th

Time : 4 to 5 pm

Attendance by invitation only..

Mr. Nilesh Lele;

Email : president@casmb.org.in

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CSAMB WOMEN CELL

DEMYSTIFYING ROLE OF INCUBATION CENTRE FOR STARTUPS



zoom



DATE: Monday September 6th 2021

TIME: 4pm to 5pm

YASH PANDYA
Incubation Manager,
iHub, Gujarat.
(Health care and Life sciences)

REGISTRATION IS COMPULSORY

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Ms. Trupti Bhat
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**CHAMBER FOR ADVANCEMENT
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Women's Day

Monday March 8th 2021



**12.15 – 1.00 PM
SESSION 1**

**SUCCESS STORY OF DR. DEEPA BHAJEKAR
"A SERIAL ENTREPRENEUR"**
FOUNDER OF CYCLOLOGY



**1.00 – 1.45 PM
SESSION 2**

**SUCCESS STORY OF "MISSION MERAMOBILE
MERAMARKETING VIA MARKETMOH.COM"**
SPEAKER MS. PRAGATI GOKHALE
Founder Marketmo.com, Chief Mentor Mission Meramobile HackMarketing
National Rural Sanitary Service & Technology Convergence
National Resource Person Ministry of Rural Development, Govt. of India

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Shri. Umesh Kamble
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Meeting with
Shri. Vinod Tawde,
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Of Bhartiya Janta Party
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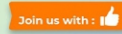
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On December 10th 2021, Chamber for Advancement of Small and Medium Businesses (CASMB) signed an MOU with Industries Secretary Shri PK Goyal and Minister of Industries, Tripura Govt. CASMB was represented by Advisory Board member Dr. Prakash Kondekar.

As part of MOU the Chamber will assist Food Processing units to be setup in the state of Tripura.



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CHAMBER OF SMALL & MEDIUM BUSINESS

Weekly Knowledge Series

Factories of the Future



Speaker :

Christian Falkenstein (Germany)

Wednesday | 26th May 2021

Time: 9 pm to 7 pm

Zoom: Meeting ID: 813 3043 6800 | Passcode: 552375

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President's Desk



Dear Readers

We are about to celebrate our First Foundation Day, and the year 2021 was exciting and very busy for the Chamber for Advancement of Small and Medium Businesses (CASMB). We launched various initiatives to meet the needs of empowering the MSME entrepreneurs. Particularly, the PurnaBrahma magazine has sparked an interest in the MSME fraternity pertaining to the food sector. A lot of time and energy has been invested to ensure we are able to provide our stakeholders in the food sector with an extra edge required to excel in their business.

Since the launch of the Chamber on 1st March 2021, a number of exciting projects were undertaken by the entire team. These included weekly webinars on Success Stories of Entrepreneurs, Weekly Knowledge Series, Buyer-Seller Meets, Chamber Investment Platform and Technology Transfer Cell. We have a special cell dedicated to help Women Entrepreneurs, and I am happy to share that we have already conducted many trainings programs for Women.

The first edition of Purnabrahma magazine was launched on the occasion of Guru Purnima on 23rd July, 2021, and second was launched on October 16th, 2021 on the occasion of World Food Day. Egged by our success, we have decided to come out with a special New Year issue of the PurnaBrahma magazine as we understand the value it holds for the MSMEs in the food sector. In addition to the success stories of entrepreneurs, it is also set to encourage them to adopt sustainable technologies to meet the over rising consumer demands. Hope it will try to help and enlighten the food fraternity to keep their heads above

the water, especially in the post-pandemic environment. We would also like to announce the great news of our signing of MOU with Industries Secretary Shri P.K. Goyal and Minister of Industries, Tripura Govt, where the Chamber will handhold Food startups in Tripura. Dr. Prakash Kondekar, Advisory Board Member had represented CASMB at Tripura. The Chamber has also launched 2 more initiatives its E-learning portal called Food Tech Pathshala (<https://foodtechpathshala.com/>) and the Food & Agri Job Portal (<https://thefoodagrijob.com/job-openings/>) in order to upskill the employees and to find the right candidates for the employer.

As we kick off the New Year with new aspirations, I look forward to hearing from all of you! We will shortly be announcing the launch of our Angel Network and Chamber's Incubation Center. We are also partnering with Annapurna and FI-HI exhibition, and our members can take advantage of showcasing their products to thousands of visitors.

We are so exhilarated that you have a passion for making a mark in the food business and want to grow by also learning through the stories published in this current issue of our magazine. Wishing you all a happy and a healthy New Year with newer opportunities and newer dreams to achieve!

Thank you!

Regards

Nilesh Lele

January 2022

Greetings from Advisors....

Dr Prakash Kondekar

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Ratna BTER(UK),
Fellow of Royal Society of Health
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Small And Medium Scale Enterprises in Indian economy.

The manufacturing industry holds an important key position in Indian economy. It contributes to the gross domestic product of the country. It also offers employment opportunities for the countrymen. India has made significant progress across various areas of science and technology and now takes pride in having a secure network of trained human resources and innovative knowledge. The current status of technology, development initiatives were made by the government and its impact in future has propelled Indian Manufacturing Industry to achieve high growth rates.

As per the provision of Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 - the Micro, Small and Medium Enterprises (MSME) are classified into two categories namely. 1. Manufacturing Enterprises - The enterprises engaged in manufacture or production of goods relating to any industry specified in the first schedule to the industries (Development and Regulation) Act of 1951) or Employing plant and machinery in the process of value addition to the final product having a distinct name or character or use. The manufacturing enterprise is defined in terms of investment in plant and machinery. 2. Service Enterprises - Enterprises engaged in providing or rendering of services are defined in terms of investment in equipment.

Schemes For MSMEs

The Government of India has taken several initiatives for promoting, development and revival of micro, small and medium enterprises in the country. The government has introduced several schemes like: Prime Minister Employment Generation Programme and Other Credit Support Schemes Development of Khadi, Village and Coir Industries Technology Upgradation and Quality Certification Marketing Promotion Schemes Entrepreneurship and Skill Development Programme Infrastructure Development Programme In earlier years, implementation of many reforms helped the MSMEs to flourish. These include re-implementation of Public Procurement Policy,

Pradhan Mantri MUDRA Yojana, Make in India, Startup India, and Skill India.

Role of MSMEs in Indian Economy MSMEs employ 40% of India's workforce, which is estimated to be around 80 million people, which give an opportunity for employment and livelihood through low skilled jobs. Approximately 1.3 million MSMEs contribute to 45 percent of manufacturing output in India and 40 percent of total export.

India has a second largest number of MSMEs in the world, next to China. MSMEs contribute to about 17 percent of GDP in India. If this sector is provided the right support, it has the potential to spread the industrial growth throughout the country. The government is aimed to increase the growth of manufacturing sector by 12 percent to 14 percent per annum and to increase its share of GDP to 25 percent by 2025.

Key Takeaways From RBI Governor's Measures Announced On May 5, 2021

Most Covid 19 cases and the threat continues unabated, the RBI has come forth and extended relief for the various stakeholders.

As the health care system that is working relentlessly on a war footing needs to be strengthened in such trying times, the RBI has offered an on tap window of Rs. 50000 crore and this is a lending facility which will be extended to various health care entities.

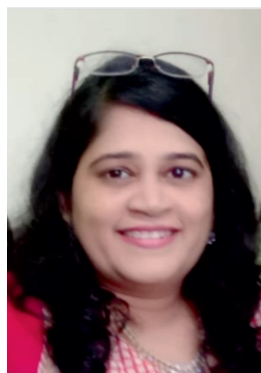
For borrowers who had not availed of earlier restructuring facilities with loan exposure amounting to Rs. 25 crore and loan being standard as on March 31, 2021, they are allowed to get their loans restructured amid the second Covid 19 wave. The restructured proposed under the scheme can be invoked or availed up to September 30, 2021. The moratorium under restructuring 1.0 can now be extended up to 2 years.

Relief extended to small businesses and MSMEs:- Lenders can review the working capital limits of small businesses and MSMEs as a one time measure. Those who availed earlier window of restructuring can be given additional two years of moratorium.

Limited KYC use proposed until December 1, 2021:- In view the COVID related restrictions in various parts of the country, Regulated Entities are being advised that for the customer accounts where periodic KYC updating is due/pending, no punitive restriction on operations of customer account(s) shall be imposed till December 31, 2021 unless warranted due to any other reason or under instructions of any regulator/enforcement agency/court of law, etc. Account holders are requested to update their KYC during this period.

Thus MSMEs will have to take benefits of the facilities provided by the Government and scale up their businesses through innovative ideas for enhancement of profits. ❑

Editor's desk



Hello folks!

Thanks to all of you who responded and continue to read Purnabrahma issue after issue in print and frequently visit us online for the latest headlines. You make our efforts so rewarding. So here we have brought this special New Year issue of Purnabrahma to make you all extra aware and determined about the food processing technology recipe obtained by mixing the ingredients of food and technology together.

Technology is the last thing that can strike one's mind while thinking about food! With the changing environment, food choices are becoming more personalized. People want to shift towards sustainable food habits such as alternative protein sources, nutraceuticals, personalized nutrition and the list is ever evolving! The concern over environmental impacts is driving food start-ups and brands to embrace waste reduction practices as well as zero-waste workflows. Further, the pandemic has fuelled a proliferation in the adoption of technologies throughout the food value chain along with an eco-friendly approach. Food producers are digitizing their production floors with robotics, e-commerce, and digital food-management tools. Restaurants are also employing robots for hospitality, cooking and for promoting ecommerce. By employing the above tools, only the food fraternity with the entrepreneur mind-set have been and will be able to respond quickly to thrive the continuing impact of covid-19 situation.



In the current issue, we're giving you some real and inspiring stories about the technologies (viz., retort technology, blast freezing, radiation technology, air frying, and use of electric trucks) in practice by eminent food business fraternities. To name a few, article by Yashang Gokani will deepen your knowledge on and benefits of digital marketing. We got to learn from the success stories of Ms. Deepa Pai (Hangyo ice cream), Chandubhai Virani (Balaji Wafers) and Kisan Dharambir, to understand that everybody can push their boundaries, if they want to stand out from the crowd. Above all some tips, tricks, suggestions and learnings in the lead article by the Padma awardee Dr. Raghunath A. Mashelkar will be an icing on the cake for all our readers!

I hope the contents of this special issue will give our readers some ideas for how their food brand can transcend. When we have the convergence of food and health rising so quickly, that means you have to participate by changing rapidly by investing and embracing digital technologies.

Wishing you all a happy, healthy, safe and a prosperous new year 2022!

Thank you!



Mrs Rupa Kanvinde
Chief editor

Dr. Ritika Joshi
Sub editor

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Radical yet sustainable transformation of SMEs



Dr. Raghunath Mashelkar, FRS

Dr. Raghunath Mashelkar, FRS, is National Research Professor. He was the former Director General of Council of Scientific & Industrial Research, President of Indian National Science Academy, Chairman of National Innovation Foundation & President of Global Research Alliance. His sixty plus honors include the prestigious Lenovo Science Prize, the highest honor given by The World Academy of Science, JRD Tata Corporate Leadership Award, he being the only scientist so far to receive it. There are 44 universities around the world who have bestowed honorary doctorates on him. He has many achievements to his credit. The transformation of CSIR under his leadership is ranked among the top 10 achievements of Indian science and technology in the 20th century. He brought awareness of the importance of intellectual property rights in the academia, research laboratories and also industry. He fought and won the wrong patents given on turmeric and Basmati Rice giving recognition to the importance of traditional knowledge globally. He proposed and promoted the concept of Gandhian engineering, making high-technology work for the poor. He was a member of Science Advisory Council to the Prime Minister for over 30 years. He has received the Star of Asia Award at the hands of George Bush Sr, former President of USA. Also he is awardee of Padma Shri, Padma Bhushan and Padma Vibhushan at the hands of President of India. His advice has been sought by many SMEs for scaling up their businesses. One of his books, Reinventing India, captures the fascinating evolution of India's Science, Technology and Innovation (STI) landscape through some of Dr. Mashelkar most inspiring and insightful lectures and essays. His book 'Leap frogging to Pole Vaulting: Creating the Magic of Radical yet Sustainable Transformation' won the best business book of the year 2019 in Tata Lit Festival. Dr. Mashelkar also talks about Atma nirbhar Bharat which translates to 'self-reliant India', is a phrase used and popularized by the Prime Minister of India Shri Narendra Modi and the Government of India in relation to the economic vision and economic

development in the country.

For Small and Medium Businesses/Startups who have been making significant contributions and are pillars of Indian economy, Dr. Mashelkar has shared his perspectives with our CASMB Advisor and member of Editorial team of Purnabrahma Magazine **Dr. Prakash Kondekar**.

Dr. PK: Prof, can you tell us about your winner of Business book award at 2019, Leap frogging to Pole-vaulting?

Prof RM: Creating the Magic of Radical and Sustainable Transformation is the theme of this book. An exhilarating manifesto for the future, this book convinces readers to make the shift from reactive leapfrogging to proactive pole-vaulting through radical transformation. The unique '3-4-7 framework' demonstrates how a paralysing mass of problems can be brought down to a formidable formula. Thus making every problem solvable, no matter how big and complex. The book is dotted with inspiring case studies which can be useful for MSMEs those can instil confidence. Me and Mr Ravi Pandit tried to see that as an interplay of global issues constantly raise the bar for innovation today, there has never been a better time to use our learnings to pole-vault over those bars into a new future!

Dr. PK: What is your opinion about Gandhian Principles?

Prof. RM: Good question. Mahatma Gandhi's principles, wisdom and values are relevant in today's challenging times also. This I have depicted in my book, **Timeless Inspirator: Reliving Gandhi**. These 45 essays that emanate straight from the heart and bring Bapu's timeless inspiration alive! I am also a firm believer of 'Gandhian Engineering'-'More from less for more people' - catering to the needs of the poor. Because I have studied under streetlights and understood the pains of poverty. Mahatma Gandhi once said, "Earth provides enough to satisfy

every man's need but not every man's greed." He further said, "I would prize every invention of science made for the benefit for all."

Dr. PK: What is successful innovation?

Prof. RM: Innovation should be Affordable, Scalable, Sustainable, Universal, Rapid, Excellent and Distinctive.

Dr. PK: We shall be happy to know more about, Anjani Mashelkar Foundation and Award.

Prof. RM: My mother, Anjani Mashelkar, brought me up facing all the odds. She did with courage and dignity. Her own circumstances never brought her down - she always expressed concern about the underprivileged people around her and wanted me to do something about it. Thus Anjani Mashelkar Foundation was created. It is inclusive Innovation annual award of Rs 1,00,000 given to an individual or an organization for a prototype innovation or a commercialized product or service. The innovation must address the problems faced by the disadvantaged resource-poor people in India and offer an original and implementable solution.

Very inspirational Life sketch of Dr Mashelkar

Dr. Raghunath Anant Mashelkar is one of India's most eminent scientists. He is known for his contributions to India's National Chemical Laboratory and Council of Scientific & Industrial Research (CSIR), multiple 'Mashelkar Committees', and a successful campaign against foreign patents on Indian traditional knowledge. His mantras of 'Inclusive Innovation', 'More from Less for More', and 'Gandhian Engineering' have been a constant source of inspiration for corporates and youth alike. Born on 1st January 1943 in Mashel, Goa, Ramesh (as he is known to his near and dear) lost his father at the tender age of six. However, his mother Late Mrs. Anjani Mashelkar was committed to doing the best she could for him. It was her determination and foresight that pushed them to move to Mumbai in search of a better livelihood and education.

Here they lived in a chawl (a type of shared tenement) and often struggled to make ends meet. He went barefoot to a municipal school and would sometimes be unable to afford a notebook to write his answers in. However, he demonstrated excellence even amidst adversity. He was the brightest student in the school and continuously excelled in his academics.

After successfully completing 7th grade, he was set to take admission at Union High School, Mumbai. However, his mother had a difficult time arranging for 21 rupees for the admission. The obstacle was overcome by borrowing from a friend of his mother, who was serving as a maid. She believed in his potential so much that she lent her entire savings so that he could

continue to excel academically! At Union High School, young Raghunath's teacher Mr. Bhavé recognized his talent and motivated him to stay focused in life, using the example of a convex lens which can concentrate the sun's rays and even spark a fire. It was this striking example that inspired Raghunath to become a scientist. He cleared his board examinations with flying colours - ranking 11th in Maharashtra among 1,35,000 students, despite having studied by the light of a street lamp!

Young Raghunath had a curiosity so insatiable that he would often sit outside the Majestic Bookstall in Girgaon, reading new books and quickly returning them because he had no money to buy them. After his board exam, he contemplated giving up on further education due to financial constraints. However, the encouragement by his mother and financial support from the Sir Dorabji Tata Trust helped him secure a seat in the prestigious Jai Hind College. As always, he worked hard and stood 2nd in the inter-state examinations. In fact, Jai Hind College awarded him the honour of its most distinguished alumnus in 2003.

Motivated by the bright future for the chemical industry in India, he joined UDCT (Now Institute of Chemical Technology), Mumbai to pursue his bachelor's degree in Chemical Engineering. After earning his degree, he had the option to go abroad to pursue his master's degree with a generous scholarship. Instead, he decided to continue his work at UDCT as a postgraduate under the mentorship of Prof. M. M. Sharma in the area of mass transfer in chemical reactions. He went on to complete his PhD under the guidance Prof. Sharma, finishing his thesis in just three years. His outstanding work earned him a fellowship at Salford University. Here, his guide encouraged him to work in an unrelated field - rheology. Dr. Mashelkar took up the challenge and over time, he made a name for himself as a distinguished Indian researcher.

In 1975, he was asked by Dr. B. D. Tilak (the then director of National Chemical Laboratory, NCL) to meet Dr. Nayudamma (the then director general of CSIR) at London. In this meeting, Dr. Nayudamma spoke to him about India's untapped potential for excellence in science and technology and the scarcity of talent in this area. His words inspired Dr. Mashelkar to work in the science, technology and innovation sector of India. He put aside his personal gains - India was considered a 'dead end' back in those days by most - and returned to his homeland.

After establishing himself at the NCL in Pune, he became its director in 1989. Under his leadership, research at NCL shifted focus to cater to the requirements of the industry. This was a revolution in itself! After India's economy was liberalised in 1991, he oversaw the collaboration of NCL with companies in India and abroad, setting a trend which many others followed. He also played a pivotal role in transforming CSIR after he

became its Director General in 1995. He strived to unify the efforts of the 40 diverse laboratories, establishing a one-team culture and improving internal collaboration and took CSIR to new heights. Dr. Mashelkar is probably best known to the common man through his crusade against the US patents on turmeric, neem and basmati rice. Arguing that the healing properties of turmeric are well known as traditional knowledge in India, Dr. Mashelkar fought a 14 month long legal battle to revoke the patent and emerged victorious. This victory was so significant that it changed the way patents were classified, and earned him the moniker of 'The Warrior of Haldighati'.

Throughout his career, he has written 25 books, 284 research papers and has been awarded honorary doctorates by 44 universities from India and abroad. He has also actively served the Government of India by chairing 12 highly empowered 'Mashelkar Committees', and has been a member of the Scientific Advisory Council to the Prime Minister. His contributions to the nation and to science at large have been

honoured by a plethora of awards, the most significant being the Padma Vibhushan, the Padma Bhushan, the Padma Shri, the Business Week Star of Asia Award, and the Shanti Swarup Bhatnagar Prize for Science and Technology. He is the third Indian engineer to be inducted as a Fellow of the Royal Society, UK and the first Indian to be elected as a fellow of National Academy of Inventors, US.

Dr. Mashelkar was the President of the Global Research Alliance, which is the world's largest network of publicly funded R&D institutes that work together to achieve millennium development goals. For 18 years, he was also the Chairperson of the National Innovation Foundation of India, which aims at promoting grassroots innovations to solve some of society's biggest problems. He is an ambassador and evangelist for innovation and R&D across the world and serves on the boards of many leading companies. He lives in Pune, India with his family. Dr. Mashelkar says he will ask for one day on earth again in 2050 to see for himself his dream coming true - India is a leading advanced nation. ☐

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Email : wigs@rediffmail.com • Website : www.wighealthproducts.in

Retort processing technology for Ready to Eat Foods

Sagar Gokhale

Co-founder & Partner,
Ojman Foodbio



1. Introduction

Thermal processing for preservation of foods is one of the most widely used preservation technique in food industry. The objective of intense thermal processing is to achieve shelf stable food by reducing population of all micro-organisms in the product, in cans or multilayer pouches and similar containers. It is in-container sterilization, i.e. half cooked or raw food is packed in a container and then sterilized. The shelf life that one can get is between 6-18 months depending on the product. The technology is limited to liquid or gravy or slurry kind of products as it is necessary for heat transfer. E.g. Soups, curries, rice varieties, dal, sambar, etc., RTC gravies, pav bhaji, gajar halva, etc. The products which cannot be preserved using retort technology are: chapatti or roti, dosa, idli, vada, dhokala, etc. which don't have any liquid component. Cost, convenience and consumer perception are the driving factors for this sector.

2. Opportunities

As per the reports, RTE and RTC is the fastest growing sector of the food industry. During Covid-19 pandemic, although many sectors had significant impact, RTE food segment saw

a surge in demand. With countries in lockdown and many people working from home, RTE food products were flying off the shelf. Increase in food delivery apps also played an important role in the increased sales. As per one of the reports, online sales of RTE products saw increase by 170%, ready meals by 31% and frozen products by 41%. Fast lifestyle, increasing number of working women, high disposable income and increase in food delivery apps are significantly affecting factors towards increase in RTE food product sales. The challenges for this sector are: negative perception towards processed food, specially canned food, increased health concerns etc. Hence food industry has to keep balance between convenience, nutrition and cost. Another important opportunity area is export of RTE foods. With Indians all around the globe, there is significant export market for processed Indian foods.

3. Commercial sterilization

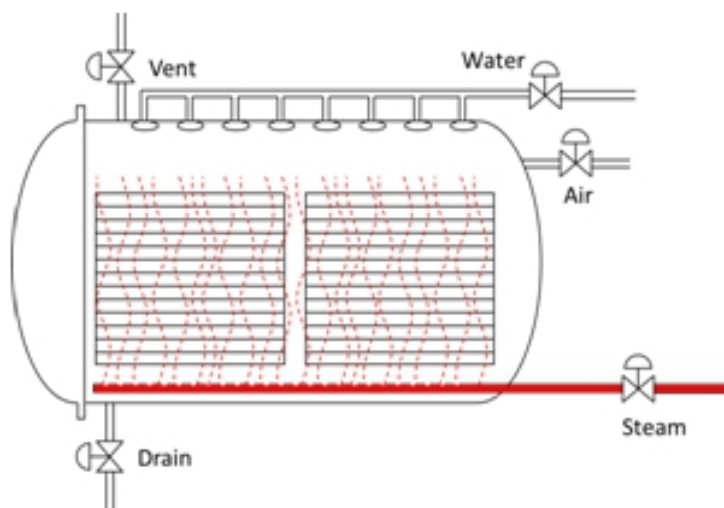
Commercial sterilization is an operation in which product is packed in a hermetic container (can/ pouch), heated at a sufficiently high temperature for a sufficient length of time to destroy all microbial and enzyme activity. The severe thermal treatment may result in significant nutritional and sensory changes in the product. The temperature sensitive nutrients like vitamins etc. may have significant impact. Also texture retention through the process as well as throughout the shelf life is one of the important challenges. Optimization of time-temperature combination and additives like calcium salts may help in texture retention.

Figure 1 shows the typical work flow for retort processing. The raw material is prepared. Blanching is done if needed (depends on product). Then food is prepared. It can be raw or half cooked, depending on the ingredients and method of food preparation. It is then filled in the container and hermetically sealed. Sealed containers are then processed in retort (described in Figure 2). After retorting, containers are incubated for 15 days for quality checks and for confirming the sterility of product. Then they are packed and dispatched.

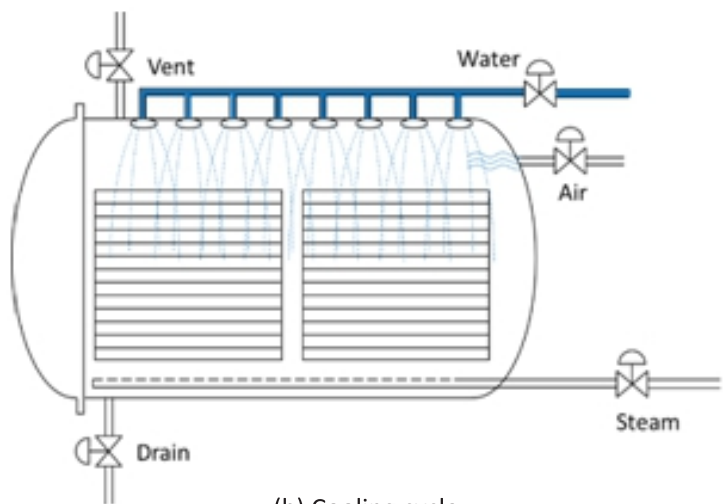


Figure 1: Typical work flow

Figure 2 illustrates a retort unit. Containers are stacked in a basket and loaded in the retort. The retort can be horizontal or vertical; also baskets can be still or rotating depending on design. At first, steam is injected in the retort vessel. Vent valve is open to vent out the air in retort vessel. Once entire air is replaced by steam, vent valve is closed which increases the pressure and hence temperature inside retort vessel.



(a) Heating cycle



(b) Cooling cycle

Figure 2: Schematic of retort processing unit

Figure 3 shows the typical time-temperature combination that retort vessel and a product pouch follows during the process. Once required F0 value is achieved, the heating cycle is stopped and product is immediately cooled to avoid overcooking of the product.

The heating medium used in retort can be steam or high pressure heated water. Different modes of heating can be used like high pressure hot water spray, water immersion, etc. depending on scale and mode of operation of retort. The length of heat treatment depends on: microbial load in product, heat resistant microorganisms present in product, heating conditions, pH, composition of food, packaging material, size

and shape of container, physical properties of food and the cooking rate of food to be processed. The process is optimized considering F0 value for the respective product.

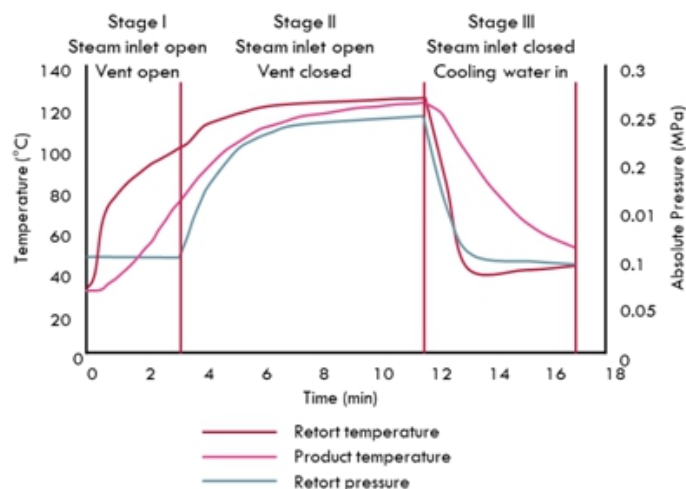


Figure 3: Time-temperature profile of retort vessel and product pouch in vessel

4. Packaging options

Canning is the typical process used since the beginning of retort technology. Over the period, flexible laminated pouches, bottles, cups, trays are also being used. Consumers have some negative perception about canned food but pouch is the widely accepted format. The pouches used in retort are 4 layer/ 5 layer pouches specially made to withstand high temperature and pressure. They have multiple layers of different polymers along with the aluminium layer which acts as a barrier to oxygen, microbes, light etc. Depending on the product, one can select the suitable packaging format. For instance, for gulab jamun or rasagulla, one cannot use pouch as they will be deformed, hence cans is the suitable form. For curries, rice etc. one can use pouches or trays. Fruit pulps are packed in cans, cups or pouches depending on target customer, end use and pack size. Glass bottles are used for beverages or fruit pulps, concentrates etc.

5. Summary

To summarize, retort vessel is like a big pressure cooker with steam, pressurized air, and water inlets. Sterilization is done in retort with half cooked or raw food is packed in a container and heated. Cooking and sterilization simultaneously happens in container. Time-temperature combination is optimized based on required F0 value which is product specific. Retort technology is limited to liquid or curry or slurry type products and the shelf life which one can be achieved is between 6-18 months depending on product type. The nutrients may be destructed because of high temperature processing which needs to be optimized and texture retention till end of shelf life is a challenge which is addressed through use of additives. □

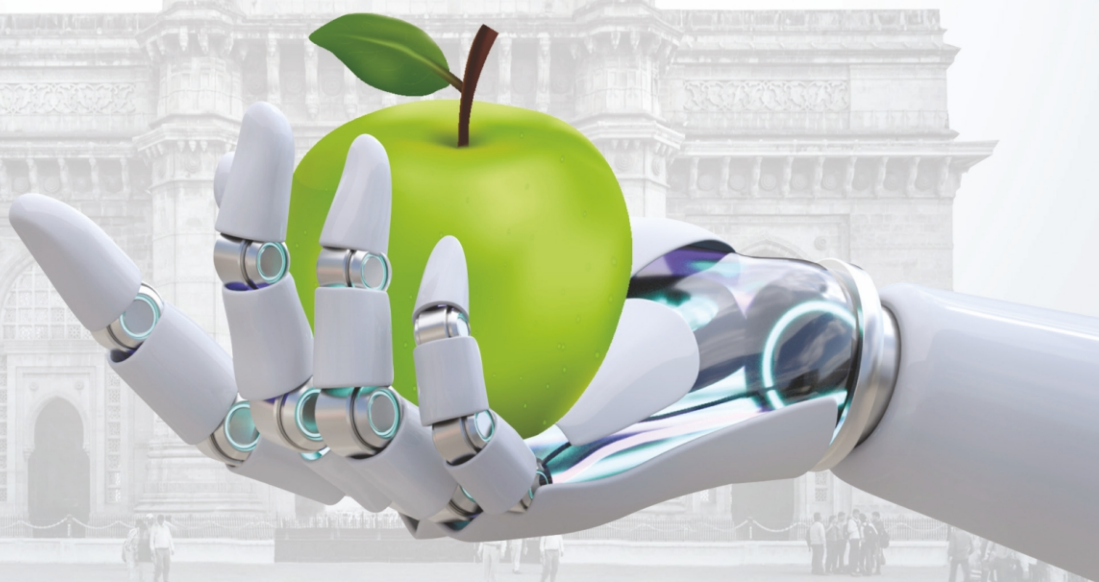
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Consultants in Frozen & Snack
Foods Represent 6 Sigma Foodtech
& Advent Foodtech



Experience: 43 plus years in Food Processing in various application in fruit, vegetables, meat, sea food, poultry, convenience, diary, snacks, bakery, ice cream, material handling industries in various countries.

Types of Freezers:

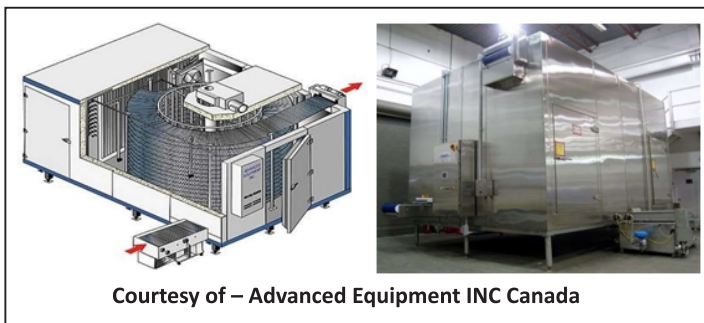
1. **Air blast freezers:** This type of freezers use air to create the heat transfer. This method of heat transfer has the largest range of designs (Spiral Freezer, IQF Freezer, Impingement freezer).
2. **Contact freezers:** In this type of freezer, the heat transfer occurs through conduction. A refrigerated surface is in direct contact with the product or package to remove the heat (Contact Freezer, Plate Freezer)
3. **Cryogenic freezers:** This type of freezers use liquid gases, such as liquid nitrogen or liquid carbon dioxide. The refrigerated liquid is evaporated and thus freezes the product. The secret lies in the speed of temperature reduction from positive values to less than -18 °C.

The factors affecting the quality of the freezing process on food can be explained as follows: Fish contains up to 80% liquids. During freezing liquid turns to ice crystals which expands & grows into solid ice. The slower the freeze rate, the larger the ice crystals grow & larger is the dehydration loss. As the ice crystals expand fine flesh fibres are damaged. Upon thawing these fibres become weak & are unable to retain fluids & nutrients (hence there is fluid loss during thawing). Faster freezing rate really helps the product to remain fresher than fresh.

By using powerful commercial Heat Exchanger - Individually Quick Frozen (IQF) freezer, the critical time of -3 to -10 °C minimises the damage to tissue. As the temperature is lowered to the freezing point of water (0°C), ice crystals begin to form. Formation of ice crystals concentrates the solutes which further depresses the freezing point.

Types of Freezers:

A. SPIRAL FREEZER: The IQF Spiral Freezer is a continuous in-line-belt freezer designed to minimize product weight loss and assure quality gentle handling during the freezing process. Products are evenly fed from the production line directly onto the loading freezer belt. It quickly transports the product into the low temperature-freezing zone. The belt spirals up or down along the rotating drum until it reaches the top or bottom where the frozen product is gently discharged from the freezer discharge port. Due to the large belt surface available, products can be frozen in single layers or individually for IQF quality. Because products can maintain their original load-in position throughout the freezing process, sorting the simultaneously frozen mixed products is simplified.



Courtesy of – Advanced Equipment INC Canada

Spiral Freezer is widely used for continuous line formed product & convenience food like:

Poultry Industry- Chicken parts, Chicken patties, Chicken nuggets, Marinated chicken chunk, Breaded chicken parts

Red Meat Industry- Meat patties, Meatballs, Raw hamburger, Breaded fried cuts

Sea Food Industry- Breaded fish sticks or patties, Raw shrimp, Fish fillets, Scallops, Whole fish

Bakery Products- Pizza crust, Pie, Cookie, Pasta, Bread dough, Tortilla

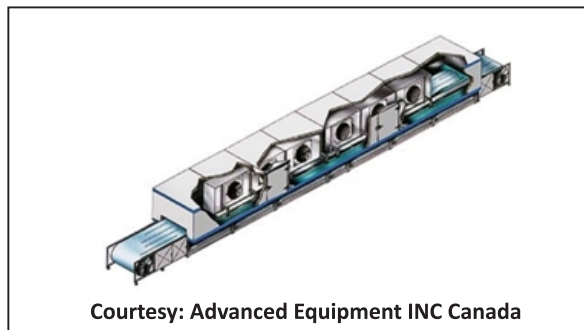
Prepared Or Convenience Foods- Packaged food in trays, Shrimp in trays, Ice cream cups, Products requiring a long retention time, Samosa, Idli, Paratha, Dosa, All Indian ethnic food

Benefits

- Continuous inline food freezing
- Gentle smooth handling of products
- High efficiency impingement horizontal airflow allows fast freezing
- Minimum product weight loss by exposure to coldest air temperature at all times for each tiers directly from evaporator.

Low Operation Cost

Spiral Freezers have low operation cost compared to CO₂, nitrogen and other freezers. This is achieved by utilizing the most efficient mechanical refrigeration method, combined with our new unique low pressure, high velocity, impingement horizontal airflow recirculation system. The horizontal airflow assures the coldest air continuously removes heat from all surfaces of the product. Each tier of product directly receives the recirculated coldest air off refrigerated -40 °C evaporator.



Courtesy: Advanced Equipment INC Canada

B. IMPINGEMENT FREEZER: The Impingement Steel or Poly belt Tunnel Freezer utilizes a solid flat top belt, which allows for gentle handling of the product and leaves no surface marks. High efficiency evaporators and fans, with a combination of concentrated air jets, are used to achieve fast freezing time with minimum dehydration of the product. The entire system is enclosed with a stainless-steel finish high efficiency insulated enclosure. Seal welded Modular Impingement Tunnel Freezers features a flat top conveyor belt. Specially designed impingement plates allows for multiple jet stream of cold air that penetrate the products boundary layer while offering the most efficient freezing from both the top and underside of the product, generating high product yield.

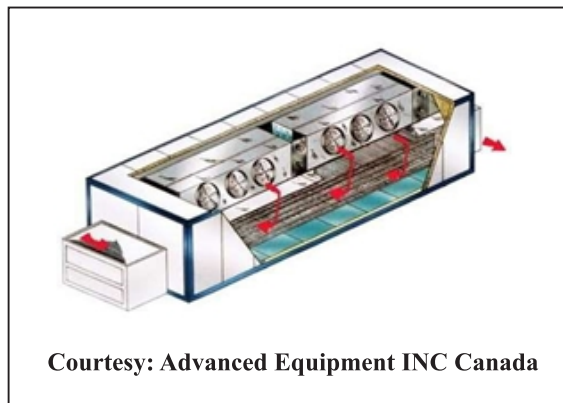
Used for IQF, wet, fluid or soft high moisture products or soft extruded products. Also cooked or fried products requiring no marking on product such as fish fillets.

Red Meat Industry- Raw meat, Hamburger patties

Sea Food Industry- Raw scallops, Fish fillets, Rawshrimp

Other - Products in trays at reduced capacity, Products in slush or extruded forms.

C. MODULAR IQF FLUIDIZED TUNNEL FREEZER: This freezer is a continuous, cascade, inline, positive conveyed freezer that assures accurate freezing time and high freezing quality. The product is mechanically agitated in a thin layer on the first belt. The product skin is crust frozen with frigid air to seal in the moisture and assure product separation. The product is then transferred to the second belt where it is accumulated



Courtesy: Advanced Equipment INC Canada

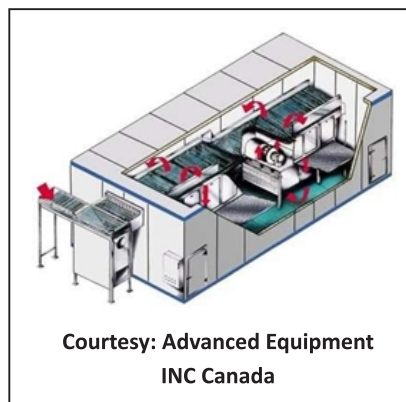
to a deeper depth. At this stage, the product is further subjected to an upward balanced floatation air, where individual product is fluidized and frozen completely.

This freezer is generally used for IQF. Small product particle ranges from 3/16 to 2-inch diameter.

Vegetable Industry - Peas, Green beans, Cut corn, Mushrooms, Vegetables, French fries, Cob corn, Diced carrots, Diced onion, Cut cauliflower, Broccoli, Asparagus, Brussels sprouts, Rice

Fruits Industry - Blueberries, Cranberries, Strawberries, Cherries, Gooseberries, Raspberries, Diced pineapples, Sliced apple, Mango, Papaya etc.

Sea Food Industry - Cooked shrimp, Skin on shrimp, Scallops.



Courtesy: Advanced Equipment
INC Canada

D. MULTIPASS BELT TUNNEL FREEZER: This freezer is a continuous in-line-belt freezer designed to minimize product weight loss and assure quality gentle handling during the freezing process. Completely factory assembled and designed to minimize site installation time. Products are evenly fed from the production line directly onto the loading freezer belt. It quickly transports the product into the low temperature-freezing zone. The product goes through the Multi pass of belts before it is discharged at the same end or opposite end. IQF Multi-pass Tunnel Freezer is designed to freeze or chill any product. Product larger than 1/2-inch

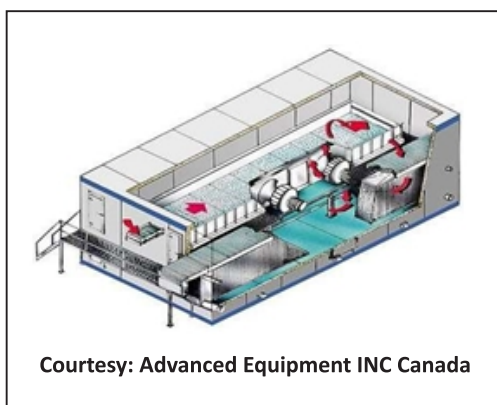
round or thick without any surface moisture such as Italian Pasta product fried breaded/battered product.

Poultry Industry - Chicken parts, Chicken nuggets

Red Meat Industry - Meatballs

Sea Food Industry - Fish sticks, Raw shrimp, Fish fillets, Mackerel, Cuttlefish

E. TRAY IQF FLUIDIZED TUNNEL FREEZER: It is designed for small & medium capacity. The perforated tray tunnel system utilizes a combination of horizontal and vertical pulsating air, continuously turning the product in the fluidization form. The tray tunnel are sectioned with different air flow to allow more air in the precool section for fast crust freezing, then it flows



Courtesy: Advanced Equipment INC Canada

towards freeze section for gentler and less air buoyant action to remove product latent heat. The products are then fed onto the tray by shaker or in-feed conveyor, and then poured onto the built-up fluidized product about two to six inches deep depending on the product size. The product line continuously meets an upward high velocity air stream, where the product is levitated in the mid-air stream until it is crust frozen. Then it flows and settles down the tunnel in fluidized state. As the product is continuously fed into the tunnel tray, the product travels on air in fluidization form (like water) down the tunnel until it stops at the adjustable discharge gate. As the product is backed up to adjust depth, it overflows the discharge gate. The gate height is adjusted according to the various product sizes and shape. Usually, higher depth for a larger product and a lower depth for smaller product. This tray tunnel freezer is designed to freeze a wide variety of delicate products.

Poultry Industry - diced chicken chunk

Red Meat Industry - meatballs

Vegetable Industry - peas, cut corn, diced carrots, diced mushrooms, diced Spanish cooked rice, pasta product, all vegetables.

Sea Food Industry - cooked shrimp, scallops

F. ROLL IN BLAST FREEZER : Suited for crust freezing or chilling of tray packaged parts on a continual basis or to deep freeze the bulk parts and low grades overnight. Chills or freezes wide varieties of packaged products such as Poultry, Red Meat, Vegetable, Sea Foods, and Specially Prepared Foods.

This roll in blast freezer is designed to freeze a wide variety of delicate products from small to big size. Additional advantage along with freezing can also chill, incubate, defrost & thaw the product. Temperature of product is continuously monitored & recorded during operations.



Courtesy: Advanced Equipment INC Canada

Poultry Industry - chill packs

Red Meat Industry - ideally adaptable to chill primal, sub-primal, chubs, and offal or freeze all types of packaged items.

Vegetable Industry - freezes packaged asparagus, broccoli, Brussels sprouts, etc.

Sea Food Industry - freezes large fish such as salmon

Dairy products - Paneer slice, Cubes, Yogurts, Cheese

Prepared Foods - Packaged food in trays, Shrimp in trays, Ice cream cups, Products requiring a long retention time such as Samosa, Idli, Paratha, Biryani, Nugget, Dosa and various Indian foods. □

Radiation processing of food: A sustainable and green technology to ensure national food security



Dr. S. Gautam

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Bhabha Atomic Research Centre,
Mumbai
Email: sgautam@barc.gov.in



The radiation processing of food is more than 100 years old technology as the first related patent was granted in 1905 in the United Kingdom. This technology was primarily deployed to improve the condition of foodstuffs and in general their keeping quality. However, the technical limitations worked as hindrance in its rapid growth. Subsequently Joint FAO/IAEA/WHO Expert Committee on the Wholesomeness of Irradiated Food as well as the Codex General Standard for Irradiated Foods approved following four radiation sources for treating foods.

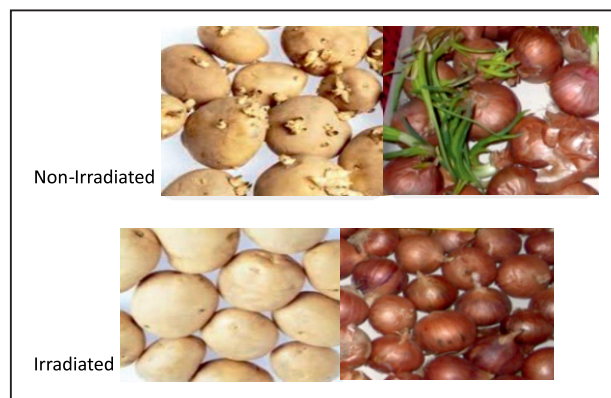
- **Radioisotopes based sources:** (a) Cobalt-60 radioisotope (Gamma Energy 1.17/ 1.33 MeV); (b) Cesium-137 radioisotope (Gamma Energy 0.66 MeV)
- **Machine based radiation sources:** (c) X-rays (Energy not exceeding 5 MeV); and (d) Electrons (Energy not exceeding 10 MeV)

The main components of a radiation processing facility are radiation source, irradiation cell (as a biological shield) and a conveyor system to move the product inside the irradiation cell and bring it back outside after the irradiation.

Applications in food preservation: On the basis of radiation dose, food applications are classified into low dose (< 1 kGy), medium dose (1-10 kGy) and high dose (> 10 kGy). Radiation dose is the measure of radiation energy absorbed per unit mass of the material under consideration. The unit of absorbed dose is Gray (Gy). 1 Gray is the energy absorption of 1 Joule per kilogram.

Low Dose Applications

Sprout inhibition in bulbs and tubers: Irradiation in the range of 0.06 to 0.15 kGy inhibits sprouting in tubers (e.g. potato), bulbs (e.g. onion), rhizomes (e.g. ginger) and corms (e.g. taro).



Potato and onion needs to be cured for two weeks just after harvest followed by radiation treatment. For better shelf life, radiation treated potato and onion are recommended to be stored at low temperature. For potato, post-irradiation storage temperature of 14-15°C and relative humidity 93-95% are considered effective in yielding better shelf life whereas for onion temperature of 0.2-0.5°C and relative humidity 65-68% is considered to be highly effective. It gives advantage to the manufacturers of chips as the low sugar potato give desired lighter color to fries and chips.

The use of chemical sprout inhibitors like maleic hydrazide (MH) and isopropyl-N (3-chlorophenyl) carbamate (CIPC) have not found to be very effective under subtropical or temperate climates. CIPC has also recently banned by many countries.

Delayed ripening of climacteric fruits (e.g. Mango)

Irradiation of mangoes or banana at hard mature pre-climacteric stage at 0.75 kGy delays the ripening process up to 2-3 weeks if stored at low temperature.



Mango (Shelf life 30 days in cold storage)

Phytosanitary treatment to overcome quarantine barrier of trade: Indian mangoes had been officially banned in the USA since 1989 because of the concern of pests that might spread to American crops. When Krishi Utapdan Sanrakshan Kendra

(KRUSHAK) irradiation facility, Lasalagaon, Nashik got approval of the United States Department of Agriculture (USDA), export of Indian Mangoes to USA started in 2007 and is still continuing. At present, mangoes after radiation treatment are exported to USA by air freight that has quite high transportation cost. A technology has been developed at BARC for delayed ripening of Indian 'Kesar' mangoes which will enable its sea-route

shipment to USA. The SOP of the technology has been recently approved by USDA.

Radiation processing to control insect infestation in grains:

Grains including cereals and pulses are often infested with insect pests leading to huge post-harvest losses during storage. Current existing practices of using fumigants such as ethylene dibromide (EDB), methyl bromide (MB), ethylene oxide (ETO), malathion,



aluminum phosphide etc. are deleterious to the health as well as environment. Therefore, use of such chemicals has been recommended to be phased out by the statutory bodies including WHO. Therefore, radiation treatment of such commodities provide a green and safe technology to control their losses.

Medium Dose Applications

Shelf-life extension of sea-foods, meat and meat products:

Fresh catch of fish is prone to rapid spoilage due to improper storage conditions, and contamination with pathogens under usual handling and processing practices. This poses serious health risk to consumers. Under ice, fish like Bombay duck, Pomfret, Indian Salmon, Mackerel, and Shrimp can be stored for about 7-10 days. Studies have demonstrated that irradiation at 1-3 kGy followed by storage at melting ice temperatures increases its shelf-life nearly threefold. Meat and meat products including poultry have a shelf-life of about a week at 0-3°C, which could be extended up to four weeks by applying a dose of 2-5 kGy, which inactivates spoilage bacteria. Radiation treatment has been employed to enhance the shelf-life of intermediate moisture fish and meat products.

High Dose Applications

Hygienization of spices: Due to inadequate handling and processing conditions, spices often get contaminated with insect



eggs and microbial pathogens. Many of the spices develop insect infestation during storage. An average absorbed dose of 10 kGy brings about commercial sterility while retaining the natural characteristics of spices. Irradiation at higher doses can also be used for total sterilization of diets for immune compromised patients, adventure sports, military as well as astronauts. Besides, it can also ensure safety of Ready to Eat (RTE) foods for calamity affected people. A nutritious and safe RTE product 'Stuffed Baked Food (SBF)' locally called as 'Litti' was developed which upon radiation treatment can be stored for 8 months at ambient temperature. The product was supplied by Department of Atomic Energy (DAE) as a good will gesture for flood and land slide affected people of Himachal Pradesh in the year 2018.

Wholesomeness of Irradiated Foods: In context of irradiated food, wholesomeness has been thoroughly studied for parameters such as Induced radioactivity, Microbiological safety, Safety of chemical changes, and Nutritional adequacy in laboratories around the world for more than past five decades. At the energies employed no induction of radioactivity is possible in atoms constituting food. Besides, in an irradiation facility the food while subjected to radiation treatment never comes into direct contact with the source of radiation. The microbiological analyses have indicated that foods preserved by radiation do not pose any special problems in relation to microflora. Radiation processing of food has not found to have any effect on the nutritive value of food as it does not affect important macronutrient as well as micronutrients. Recent study conducted in BARC has too affirmed the genotoxic safety of radiation treated foods when used for prolonged generations in various model systems. More than 60 countries all over the globe including India have approved radiation processing of food.

Regulatory approval: First of all, in 1994 Government of India amended Prevention of Food Adulteration Act (1954) and approved irradiation of onion, potato and spices for domestic market. Recently 'Class-based approval of radiation processing

of food under Radiation processing of food and Allied Products Rules, 2012 has been granted which has been endorsed by the Food Safety and Standard Authority of India (FSSAI) through Gazette notification in 2016 (Table1& 2).

Table 1: Classes of Food Products and Dose Limits for Radiation Processing (Schedule – I)

Class	Food	Purpose	Dose limit (kilo Gray) Minimum	Dose limit (kilo Gray) Maximum
1	Bulbs, stem and root tubers, and rhizomes	Inhibit sprouting	0.02	0.2
2	Fresh fruits and vegetables (other than Class 1)	Delay ripening	0.2	1.0
		Insect disinfestation	0.2	1.0
		Shelf-life extension	1.0	2.5
		Quarantine application	0.1	1.0
3	Cereals and their milled products, pulses and their milled products, nuts, oil seeds, dried fruits and their products	Insect disinfestation	0.25	1.0
		Reduction of microbial load	1.5	5.0
4	Fish, aquaculture, seafood and their products (fresh or frozen) and crustaceans	Elimination of pathogenic microorganisms	1.0	7.0
		Shelf-life extension	1.0	3.0
		Control of human parasites	0.3	2.0
5	Meat and meat products including poultry (fresh and frozen) and eggs	Elimination of pathogenic microorganisms	1.0	7.0
		Shelf-life extension	1.0	3.0
		Control of human parasites	0.3	2.0
6	Dry vegetables, seasonings, spices, condiments, dry herbs and their products, tea, coffee, cocoa and plant products	Microbial decontamination	6.0	14.0
		Insect disinfestation	0.3	1.0
7	Dried foods of animal origin and their products	Insect disinfestation	0.3	1.0
		Control of moulds	1.0	3.0
		Elimination of pathogenic microorganisms	2.0	7.0
8	Ethnic foods, military rations, space foods, ready-to-eat, ready-to-cook/ minimally processed foods	Quarantine application	0.25	1
		Reduction of microorganisms	2	10
		Sterilization	5	25

Table 2: Dose Limits for Radiation Processing of Allied Products (Schedule – II)

Sr. No.	Allied Product	Purpose	Dose limit (kilo Gray) Minimum	Dose limit (kilo Gray) Maximum
1	Animal food and feed	Insect disinfestations	0.25	1.0
		Microbial decontamination	5.0	10.0
2	Ayurvedic herbs and their products, and medicines	Insect disinfestations	0.25	1.0
		Microbial decontamination	5.0	10.0
		Sterilization	10.0	25.0
3	Packaging materials for food/allied products	Microbial decontamination	5.0	10.0
		Sterilization	10.0	25.0
4	Food additives	Insect disinfestations	0.25	1.0
		Microbial decontamination	5.0	10.0
		Sterilization	10.0	25.0
5	Health foods, dietary supplements and Nutraceuticals	Insect disinfestations	0.25	1.0
		Microbial decontamination	5.0	10.0
		Sterilization	10.0	25.0
6	Body care and cleansing products	Microbial decontamination	5.0	10.0
		Sterilization	10.0	25.0
7	Cut flowers	Quarantine application	0.25	1.0
		Shelf-life extension	0.25	1.0

Radura as a symbol of value addition denoting radiation treated food: As per the FSSAI latest regulation the label of a food, which has been treated with ionizing radiation, shall carry a written statement indicating the treatment in close proximity

to the name of the food. Also all packages of radiation processed food shall bear the Radura logo in green colour and following declaration.

PROCESSED BY RADIATION



Name of the Product: _____

Purpose of Radiation Processing: _____

Operating License No. : _____

Batch Identification No. (BIN) (as provided by facility): _____

Date of Processing:





Food irradiation facilities: Currently 24 gamma irradiation plants are operational in the country treating food and allied products (Table 2).

Table 2. List of Food irradiation plants operational in India

Sr. No.	Names of Food Irradiation Plants
1	Radiation Processing Plant, BRIT, Vashi, Navi Mumbai, Maharashtra
2	KRUSHAK Irradiator, Lasalgaon, Nashik, Maharashtra#
3	M/S Organic Green Foods Ltd., Dankuni, Kolkata, West Bengal
4	M/S A.V. Processors Pvt. Ltd., Ambernath (E), Thane, Maharashtra
5	M/S Universal Medicap Ltd., Vadodara, Gujarat
6	M/S. Microtrol, Bangalore, Karnataka
7	M/S Agrosurg Irradiators, Vasai, Thane, Maharashtra
8	M/S Gamma Agro Medical Processing, Hyderabad, Telangana
9	M/S Jhunsons Chemicals Pvt Ltd., Bhiwadi, Rajasthan
10	M/S InnovaAgri Bio Park Ltd., Malur, Dist. Kolar, Karnataka#
11	M/S Hindustan Agro Co-Operative Ltd., Rahuri, Ahmednagar, Maharashtra
12	M/S Impartial Agro Tech (P) Ltd., Unnao, Lucknow, Uttar Pradesh
13	Gujarat Agro Industries Corpn. Ltd, Bavla, Ahmedabad, Gujarat#
14	M/S Aligned Industries, Dharuhera, Rewari, Haryana
15	Maharashtra State Agricultural Mktg. Board, Navi Mumbai, Maharashtra#
16	M/S Pinnacle Therapeutics Private Limited, Ahmedabad, Gujarat
17	M/S Electromagnetic Industries, Vadodara, Gujarat
18	M/S Avantee Mega food park, Devas, MP
19	M/S Shriram Applied Radiation Centre (SARC), Delhi
20	M/S Jamnadas Industries., Indore, Madhya Pradesh
21	M/S Microtrol Sterilisation Services Pvt. Ltd. Bawal
22	M/s Andhra Pradesh Med Tech Zone, Ltd., Vishakhapatnam
23	M/s Solas Industries, Kosi Kalan, Mathura, UP
24	M/s AV Gamma Tech LLP, Ambernath, Maharashtra

Food irradiation facilities for low dose applications.

Conclusion: Radiation technology provides a very effective solution to the post-harvest losses of food while ensuring their safety. It has enabled the trade of fruits and vegetables across the countries that were once prohibited due to the fear of importing pests along with the produce. Existing numbers of food irradiation plants are minuscule in India w.r.to quantum of produce. Therefore, India is in dire need of many more food irradiation plants coupled with cold chain and appropriate transportation facilities to control the huge post-harvest losses of agri-produce.

Acknowledgement: The contributions from scientific & technical staffs of Food Technology Division, BARC, Mumbai in taking the national food irradiation program on a successful path is gratefully acknowledged.

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Principles of Air Frying Technology

**Siddiqui Arjumand
Nausheen**

**Trainee- content development
at foodtechpathshala**



Introduction

Frying is one of the most common practices used in food preparation and employed in restaurants, homes, and food industry. Fried food is based on principle of dehydrating food that is immersed in hot oil, a technique widely used all over the world. The positive attributes like crispy, crunchy texture and appealing aroma are results of physical and chemical changes during frying, including oxidation, hydrolysis, and polymerization, which are related to chemical and physical modifications in the food products.

The biological consequences of the consumption of oil-fried foods on human health has been well established. The content of the polar compounds in frying is associated with endothelial dysfunction, hypertension, and may be related to a higher chance of developing chronic diseases, especially those of the cardiovascular system. Also, people who eat fried foods are more likely to develop obesity and intestinal diseases. Despite all the restrictions, fried products are trendy and highly consumed both inside and outside homes and are typically found in fast food dishes and many other food services.

However, because of the risks of a high-fat diet, there is an increasing need to seek more nutritious and safer food alternatives. Therefore, the reduction of the oil content in fried foods has become a necessity. A series of alternatives have been proposed, with the intention of replacing the traditional frying process with systems capable of providing properties similar to those of fried food while providing higher nutritional quality to the product as well as ease of use.

Based on this idea, air frying technology has emerged in the market. The equipment uses hot air in combination with high-speed air circulation. Foods are heated from all sides at once, and there is no need to add oil to most of them. The purpose is to

obtain fried food with small amounts of fat with same organoleptic properties as that of conventional frying.

Air Frying of Food:

Air Frying Technology is based on the principle of convection heating by circulating the hot air around the food to produce the desired crispy texture. It also results in browning/ maillard reaction (reaction between amino acid and reducing sugars in presence of heat) to alter the colour and flavour of food. The rapid circulation of air at high temperatures makes the food crisp as like in deep frying but without using oil.

In deep frying or conventional frying methods, hot oil is used as heat transfer medium while in Air fryer it is hot air. The Air fryer consist of an heating element and a powerful fan which allows rapid and even dispersal of heat thereby cooking the food in less time.

In general, an Air fryer is a countertop electrical device with adjustable time and temperature controls and a compartment, often a removable basket, which holds the food that is being cooked. The heating temperature can range from 40-250 °C. The cooking process relies on the mechanism of rapid air technology, in which a heating element within the top of the machine radiates heat downward, while a fan rapidly circulates air around the food and inside to heat it evenly from all angles. In some Air fryer models, the food basket is perforated and in continuous motion to promote homogenous contact with the hot air. The air-tight, compact design of air fryers ensures that all air is contained in the chamber and actively flows around the food, promoting the intensity and efficiency of cooking. This mode of heat transfer is also known as convection, in which energy is distributed through the movement of a liquid or gaseous medium.

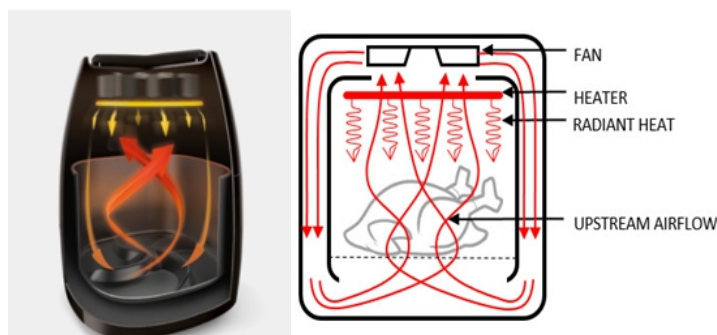


Fig.1 Mechanism of heat transfer in Air Fryer

Rapid Air Technology is based on RUSH principle i.e Radiant and Up-stream Heating. Fig.1 explain the RUSH principle, where radiant heat is coming from a heating element just above the food and convection heat is coming from a strong upward

moving air stream that flows through the open bottom of the food chamber. So, the heat comes from both sides and is totally focused on the food. All air is forced to pass over the food and heater surface by every circulation cycle, there is no idle air circulating around (like in a convection oven). The total air volume to be heated is limited and circulates inside the space where the heat is required. A special star shaped air guide profile on the bottom of the heating chamber creates a optimized airflow pattern to distribute the air, loaded with heat energy, evenly over the bottom side of the food.

In conventional frying, oil can hold and transport much more heat per dm³ (cubic decimeter) than air, it takes much more air movement to transfer the same amount of heat. While the rapid airflow inside an Air fryer transports the heat to all parts and sides of the food with such high intensity that it can penetrate through a thick pile of food. The radiation from the heater, which is partly in the far infra red range, penetrates deep under the food surface. This combination causes a very high heat transfer rate and can create a cooking result that is comparable with deep frying.

Although less common, a few air fryers also utilize far infrared radiation, in which electromagnetic waves with wavelengths between 0.015mm -0.1mm vibrate molecules within the food and generate thermal energy, which accelerates internal cooking. Meanwhile, excess fat and residues typically drain into a compartment below the food to be discarded, greatly reducing the amount of fat in final product.

Air Frying Vs. Conventional Frying

The traditional practice of deep frying in oil goes back to prehistoric time. Commercial deep frying became widespread around the late-1800s to mid-1900s with the emergence of cast iron kettles, edible oil hydrogenation, and sophisticated technologies for freezing, frying, and packaging of potato products. Achieving a crunchy, golden-brown crust, the main characteristic distinguishing fried foods from those that are baked, boiled, steamed, etc. is essentially a process of dehydration.

Fig.2 depicts the heat and mass transfer mechanism in conventional frying. When food is submerged into hot oil between 150-200°C, heat from the oil diffuses into the uncooked food, gradually cooking it. Meanwhile, the surface temperature of the food meets that of the oil, and moisture at the surface, often from within a batter coating, quickly reaches the boiling temperature of water and evaporates out. As steam bubbles break out of the food and rise through the oil, they leave behind tiny cracks and pockets that lend a porous, crispy texture, as well as enable potential absorption of the surrounding oil. While

moisture is lost, proteins denature, sugars caramelize, starches gelatinize, and the Maillard reaction takes place, browning the food and imparting complex, toasty aromas. Unlike shallow frying and stir frying, deep-frying allows heat from oil to penetrate all surfaces of a food at once, leading to even, efficient cooking and browning.

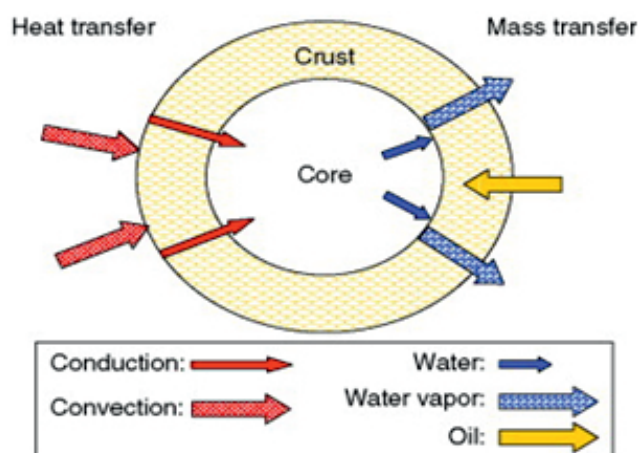


Fig.2 Heat and Mass transfer in Conventional frying

Unlike traditional deep frying, air frying involves the addition of only a few tablespoons of oil to coat the food before cooking, or in many cases, does not require adding oil at all. In an air fryer, the medium of convective heat transfer is air rather than liquid oil, and the hot air rapidly circulating within the chamber is responsible for removing moisture from the surface of food. However, air carries less heat per unit of volume compared to most frying oils, so it must be moved at a faster rate to achieve the same effect as deep frying and reach the temperature necessary for the Maillard reaction to occur, 140-165°C.

Convection ovens also rely on the circulation of hot air to cook food more quickly and evenly, but compared to air fryers, their larger size means that hot air must travel throughout a larger space and heat is less efficiently concentrated around food. Although convection ovens can accommodate more food at once, air fryers suit more uses and are generally more efficient, consuming significantly less energy and requiring up to 50% shorter cooking times and up to 75% shorter preheating times.

Physicochemical changes in food:

When a food is subjected to conventional frying various physicochemical changes take place both in food and frying oil. The food mainly undergoes hydrolysis, protein denaturation, Maillard browning etc. The heating oil also undergoes various chemical changes like, increased viscosity, hydrolysis, oxidation and polymerization. Because of these changes, the frying oil needs to be changed regularly adding to cost to the manufacturer. Following table depicts the physicochemical

changes in different food components during conventional frying.

In air frying, since oil is not used in significant quantity, it eliminates all the risk and cost associated with conventional frying. Cooking effects depend greatly on the hot air speed through which heat is distributed. Although Rapid Air technology is suitable for all kinds of food, the effects on French fries are used to illustrate the differences with a convection oven. One effect is that because the heat intensity is much higher, Maillard reaction and crust forming sets in earlier and the preparation times are shorter. The crust functions as a protective layer that preserves the original nutritional values and moisture levels inside the food.

Component	Changes during frying
Fat	Increased concentration and change in composition
Water	Significant loss
Reducing sugars	Maillard reaction
Starch	Gelatinization
Proteins	Alteration of the composition
Amino acids	Formation of heterocyclic flavoring substances
Flavoring substances	Formed by oxidative and Maillard reactions
	Interaction with frying oil
Vitamins	Moderate loss
Minerals	Small loss
Antioxidants	Moderate loss

Another effect is fat reduction. Basically, all types and size of fries can be prepared in an Air fryer. Prebaked fries already have a layer of fat, they don't need addition of oil to cook in Air fryer. Homemade fries require a pre-treatment to distribute a bit of oil over the food surface. During the air frying process excess oil, drips off the surface and is collected in the pan underneath the basket and can no longer in contact with the food. The Air fryers can remove up to 80 % of fat from the food.

Practical Application:

Air frying technology is preferred alternative over deep frying, conventional ovens, baking, microwave cooking etc. It offers a higher nutritional quality product due to possible fat reduction, lipid degradation and oxidation. The air frying equipment showed significant energy savings upto 70% than other conventional methods. It also has advantage of reducing expenses of vegetable oil, reduced effluent emission and pollutants in environment as well as the attraction of health-conscious consumers. But commercial Air fryers has little disadvantages as being compact, it cooks the food in small volumes and not suitable for large batches.

As it is an emerging technology, an extensive study and research should be focused on detailed evaluation of its mechanism of action on food components, physicochemical properties of food, kinetics of heat and mass transfer and subsequent effect on human health. ■

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Incubation Centre for Growth of SMBs

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Many unconceivable things have happened and are still happening during this Pandemic of COVID 19. It has been accepted that Incubation Centres have been playing a major role in growth of the Small and mid-size enterprises (SMEs). For the last few centuries, incubation centres have been monitored by the many corporates. But when the pandemic stuck the world, there was no limit for the operation of incubation centres and new centres started operating and doing their work effectively.

Incubation centre is a place where an entrepreneur who is planning to set up a business in any given domain, gets a mentor who will guide, help and assist him or her throughout the process. At an incubation centre the mentor performs deep and detailed research on the business one is planning to start and then comes up with some effective strategies as probable solutions to the different challenges that may come along the way.

Many a times the entrepreneurs can hope to get financial support from the mentors at the incubation centre. If one is planning to get started on his or her journey of becoming an entrepreneur then one should definitely get guidance from the incubation centres.

A centre can provide a whole new start-up ecosystem for the young entrepreneur. One can opt for the following definition

- A platform where innovative idea can be nurtured into viable business
- Where one can get expert guidance
- Helps to find initial funds and networking

Entrepreneurs can be an individual or group of working people for the development of innovative products/ processes/ services and must have a scalable business model with a high potential of employment generation or wealth creation.

Entrepreneurs should be registered as legal entity in India and may



Dr Prakash Kondekar at Baramati Incubation Centre, 2nd Nov 2021.

be registered under either form of business entity like, single Person Company, Private Ltd Company or Sole proprietorship Company and such other entities. Entrepreneur's company registration should not be older than 7 years. Its annual turnover in financial year should not exceed Rs. 25 crore. Entity has to work for innovative products/ processes/ services and must have a scalable business model with a high potential of employment generation and creation of wealth.

Although mentors will provide help, the start-ups have to do their own work mostly, they should not wait for incubation centre but should start working wherever and whenever they can.

SMEs are the backbones of Indian economy hence CASMB has been working closely with them and trying to support them by mentoring at various levels. With this intention, I, as an Advisor, CASMB, visited, AIC-ADT Baramati Foundation, for inaugural function of ADT's Incubation Centre on 2nd November 2021. The inauguration took place at the hands of CM of Maharashtra Hon. Uddhav Thakre, in the presence of Hon. Sharad Pawar and Dy. CM Hon. Ajit Pawar and many other VIPs.

The Centre's theme was "Leveraging Innovation, Research and Incubation in Agriculture." World class plug in play co-working space has been designed to fulfil the demands of start-ups with free Wi-Fi, printer, storage space, conference rooms, recreation area and also space for unconventional ways of thinking.

There are seventeen mentors, one of them is Shri Nilesh Lele, our CASMB President. AIC-ADT Baramati Foundation, is an Agri Tech focused incubator supported by NITI Aayog, GOI and together with its parent organization, Agricultural Development Trust, Baramati. The trust has supported more than 32 start-ups in last two years, from Maharashtra, Madhya Pradesh, Telangana, Andhra Pradesh and Rajasthan. Hope all members of CASMB will get benefitted by using the facilities of this Incubation Centre in Baramati.

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Destination Tripura Invest Summit 2021

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On 9th and 10th December 2021, Tripura Summit which took place at Agartala for the first time will play a significant role in the state's huge industrial prosperity including, economic development and generating huge employment opportunities. The COVID-19 pandemic was the reason for adjourning the Summit which was supposed to take place in March-April 2020.

Tripura Chief Minister Hon. Biplab Kumar Deb on Sunday 13th Dec 2021, asserted that during the recently-concluded 'Destination Tripura Investment Summit' a trade agreements worth of Rs 3,000 crore have been signed by industrialists & representatives of various companies. Chief Minister added that Sabroom, a small town in south Tripura, is emerging as a stepping stone to the commercial and huge economic prosperity of the state through its utilization of various opportunities including Special Economic Zone, Integrated Check Post and 'Maitri' Bridge which was long neglected in the question of overall development. Now the state is reaching the pinnacle of development as a result of the sincere efforts of the Prime Minister, Hon. Narendra Modi. During the Summit, Central Industries Minister, Hon. Piyush Goyal also congratulated the state government, in his online speech, assuring all type of support for the state of Tripura.

The state government of Tripura has worked on a priority basis to ensure business security by creating an industry-friendly and investment-friendly environment in the state. As a result, national and international industrialists who at one time were reluctant to invest in Tripura attained interest in investing heavily across the north eastern state, realizing the various facilities provided by the state government and the favourable environment for industrial development. Because of all the

developments, Tripura can be said to be the gateway to North Eastern States of India. These activities not only transform the other North Eastern States but also fall in line with the Prime Minister, Hon. Narendra Modi's vision, Make in India. The Tripura government is functioning on three principles, NIYAT, NITI and NIYAM.

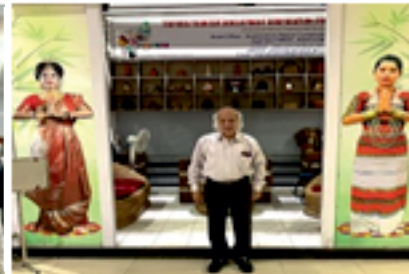
At present Tripura is the second largest rubber producing state of India after Kerala and has plans for 30,000 hectares of additional land for rubber plantation with modern facilities. Under Invest India, vision, developments of Roads, Waterways Railways and Airways, including International Airport are in progress. The one window MAITRI portal of the State government will be very helpful for investors for all types licencing and also for releasing of government subsidies.

From this summit, the possibility of investing in IT sector has been created. Besides, Rubber & Agar cultivations, food Processing companies will also highly invest in Tripura. Agar Trade has been brought under the regulation by the new government.

On behalf of government of Tripura, Policy Advocacy Research Centre (PARC), has invited Dr. Prakash Kondekar, Advisor, CASMB. Mumbai for this two days Summit.

Dr. Kondekar, attended the Summit, in Agartala on both the days and signed an MOU with Industries Minister Hon. Manoj Kanti Deb and Secretary Dr. P.K. Goyal, for investments in Food Processing Units, through the Two Megha Food Parks in Tripura. Vikram Sankaranarayanan Executive Director, PARC, Ruchita Rane, Head, Network Development & Strategic Alliances, PARC and Mugdha Mahabal, Territory Head for J&K, PARC, witnessed the function. After the valedictory session on 10th Dec 2021, Dr. Kondekar, along with officers of Tripura government, personally visited, Sikaria Mega Food Park and saw the various facilities available there. Visits to Pran Beverages factory, in Bodh jungnagar, in RK Nagar was also successful. Tripura Handy Crafts and Jute Textiles are managed by about 133,000 handloom workers. Our members may like to take advantage of this MOU with Tripura government. Dr. Kondekar, personally met Hon. Biplab Kumar Deb, CM of Tripura.

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Electric Food Trucks: Leveraging Innovative technologies for food business

Sriram Narayanamurthy

Founder and CeO, ZaZen Systems, Core Member, CASMB



Food truck business or a restaurant on wheels has been gaining popularity as a concept in India, among entrepreneurs and consumers alike. The concept of food trucks is growing rapidly in metros and other big cities. Dosa Inc started in 2013, claims to be the largest food truck company in India offering South Indian cuisine. It claims to be serving over 13,000 customers across Delhi-NCR every month.



Food trucks offer quality food minus the large bill of premium restaurants. People consider food trucks as a source of authentic local food available at an affordable price, often attracting a large following of local followers. Food trucks can be a source of great income and function just like any other normal business but with the benefit of mobility.

Along with food, they may sell cold beverages like soft drinks and water. Drawing inspiration from the food trucks or restaurants on wheels in the U.K. and the U.S.A., this new dining format has gained rapid popularity in India.



Some food truck owners park their vehicles inside apartment blocks, corporate offices, private areas, or schools. Many food trucks are modified into stationary kitchens or parked for business in basements of the mall or at private events. There are also a few food streets in major cities where you can start. In fact, with the threat of Covid-19 following us everywhere, a food

truck is a safer bet. People can wait for the food in the safety of their cars or can line up, maintaining social distance. The advantage of mobility in a food truck gives the owners access to multiple locations.

What you need for a Food Truck ?

Vehicle: To start things off you will need a truck - you can use a second hand one or you could buy a new truck. Typically a truck will cost you a minimum of **INR 4 lakhs**.

Equipment: All the equipment put together would cost you around **INR 2 lakhs**.

Raw Material: It would cost you about INR 20-30K.

Staff and Marketing

Why a Food Truck ?

Low investment, low risk: A food truck would not cost you more than INR 10 lakhs if you spend carefully.

Fewer resources required:

Catering at events: Besides everyday operations, building a few partnerships and cater at events, corporate festivals and more are also added benefits. **The Curry Up Now** food truck, for instance, sells excellent Indian street food and caters to a large number of tests and corporate events.

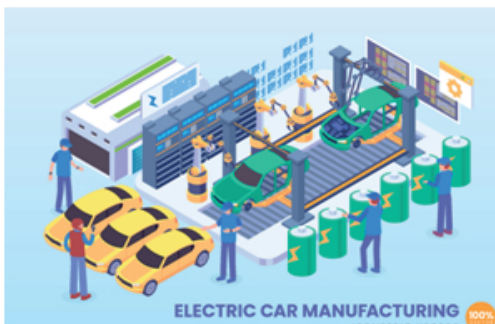


Electric Food Trucks and DC Appliances:

Electric vehicles are the current trend in the two wheeler, three wheeler and car segment due to their fractional operational costs as compared to petrol and diesel vehicles, given the fuel prices are on high rise.

The advantages of electric vehicles are not only in the lower operational costs, but also due to the limited number of functional parts required such as 20 parts vis - a - vis 2000 parts in an IC Engine. The lesser parts lead to increased production at a

short time frame and also lesser maintenance charges make it an interesting option.



The cost of the battery is the largest in an EV compared to the rest of the parts,

and is coming down drastically due to demand and consumption in large quantities. Charging locations are also something that are a dependency for the vehicles and are associated with long charging times, when run on domestic low cost chargers.

An interesting concept of battery swapping allows an electric vehicle to be fully charged up to its maximum range in a couple of mins, similar to the LPG cylinder in autos. This concept is now gaining traction and acceptance for the two wheelers and autos in several states as the cost of ownership of the vehicle without the battery is half of the total vehicle and the battery is swapped for a fixed charge based on the consumption available from another energy operator. This concept of separating the vehicle and the battery makes EV more attractive due to lesser capital and lower operating costs and is gaining a lot of acceptance amongst users.

The same concept when applied to food trucks make the whole proposition all the more interesting with a right combination of system component sizing such the motor size, motor power and the battery size based on the range required. The cost of the vehicle goes up with the increasing power and energy requirement corresponding to the speed and the range needed. In case of food trucks which have fixed location, the range of the battery is quite known and a suitable battery can be swapped either everyday or once in a week depending on the distance travelled and the distance to the swapping station.

Esmito, a company incubated by IIT Madras is providing swapping solutions for two wheelers and three wheelers which are available on rental basis with unlimited swaps per day. The need for high power of the motor goes with the speed required and is quite an important factor for cars and bikes, however, for food trucks which carry assembled equipment, the speed requirement is low and reduces the motor size required and thereby lower costs again.



The food truck retrofitting either from a used truck with a new added build up of kitchen equipment would be much cheaper option compared to going for a new electric vehicle, as the body anyways needs to be worked on for customising the kitchen. Kitchen equipment could

involve heating, cooling and cold storage as some of the processes along side food processing equipment.

With Induction Cookers becoming a easier choice for cooking at homes, offices and also street shops due to their sleek design, ease of use and lesser risk of accidents, they make a excellent fit into the food truck design operating off a battery.

ZaZen systems, a company incubated out of IIT Madras, works on motor drives and battery chargers for electric vehicles as one of their verticals along with DC powered appliances that can be powered off the battery as another vertical.

DC Appliances termed usually as Inverter models in Air Conditioners and as BLDC motor models for fans and other

appliances, are upto 60% more efficient than the conventional ones and have very less starting current requirement eliminating the need for Diesel Generator.



ZaZen systems makes DC powered chest freezers, air coolers, water coolers and pumps that run off DC power which can be easily integrated to renewables making it much more power versatile and minimise the operating costs.



MilletCraft, a company incubated by IIMR produces Millet Batter for making Idli and Dosa is working jointly with **ZaZen systems** to come up with a electric food truck serving Idli and Dosa on the run. It employs a combination of DC Appliances and

Electric Vehicle Retrofitting with swappable batteries from **Esmito Solutions pvt ltd.**



The idea is to lower the capital costs of the vehicle ownership, lower the operational costs of the vehicle transport, rent of the place and also the equipment required for battery grinding using High Speed Stone DC Grinders, Batter storage using DC Chillers and cooking using Induction Stoves running off the vehicle battery.

The DC Air Coolers also add on to the environment for the customers sitting around the food truck giving them comfort while eating.



The food truck parked or operational during the day will be fitted with solar panels on top to charge the battery continuously for minimal usages like the lights, fans and the air coolers making it a green food truck.

This could be the way forward for business looking for food trucks as their ways to employ a combination of electric vehicles with swappable batteries and DC powered appliances for lowest operating costs and lowest capital with a quick pay back period less than 2 years. □

Post Pandemic Impact on Agri-Food Market/Industries

Dr. Sunita M. Karad

Director- MITCOM, Dean-
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The future of food and agriculture trends and challenges

The Food and Agriculture Organisation (FAO) has estimated a humongous rise in the world's population to 9.73 billion in 2050 where the food demand will soar to 50% of the current needs. The rural population is poor and suffer from micronutrient deficiencies. Experts have predicted that about 653 million people will be undernourished in 2030. Covid 19 is the 5th pandemic which has spread its claws rapidly across six continents and has resulted in 2,850,268 deaths. This led to health emergency declaration by most of the countries on 11th March 2020. Since then the food supply chains have prolonged dramatically as the physical distance from farm to plate has increased with subsequent incidences in the consumption of processed, packaged, and prepared foods.

Trends observed in Covid Pandemic:

1. **Increased Safety standards in post-Covid world:** Enhanced food safety norms in kitchen/ their workers and restaurant all over the world.
2. **Changing habits in post Covid Era:**
 - a. **Post Covid witnessed the rise of plant-based foods:** SavorEat is an Israeli start-up that develops plant-based meat using a combination of chef robots, proprietary 3D printing, and non-GMO ingredients. At present, the start-up produces meatless burgers and plans to expand to steaks, kebabs, and alternative seafood.
 - b. **Healthy food, healthy body:** Many US based, food start-ups such as Farmhand Organics develops naturally probiotic, plant-based, fermented foods using organic ingredients to maintain immunity. High sugar consumption through chocolates among children is one of the growing concerns and the adoption of sugar reduction technology can substitute sugars with healthier alternatives. Indian food regulators have issued a regulation on products high in sugar, fat, and salt which must show a red colour code on the front of the package. In response to this, Cadbury launched a dairy milk variant with 30% less sugar.

- c. **Nutraceuticals:** As per recent reports, consumers are focusing more on eating healthy such as nutritional supplements, functional foods, medicinal food, and gut microbiome enhancement foods (prebiotics, probiotics, and post-biotics) during or post pandemic. The Indian start up **Voll Sante** provides functional foods, beverages and nutraceuticals.
- d. **Changing food habits (Insect based protein):** Consumers are shifting towards alternative protein sources due to both health and environmental concerns. Cultured meat, plant, edible insects, and mycoprotein-based foods are the primary alternative protein sources at present. They reduce the overall costs as alternative protein sources in demand. Malaysian start-up **Entomo farms** has produced an insect-based alternative protein, which offers more proteins per gram than beef, with added advantages of requiring less land, water, and food than traditional livestock production.
- e. **The protein brewery offers animal-free protein:** Dutch start-up "The Protein Brewery" has developed **FERMOTTEIN**, a proprietary animal-free alternative protein source produced using non-allergenic crops and fungi which does not need additional processing there by enabling tasteful end products.
- f. **Organic food products:** During the pandemic, people became aware about the Agri produce with least insecticides and pesticides to avoid cancer like diseases. The only sustainable solution to this problem is organic foods grown safely. At present, the organic food industry in India is in a nascent stage.
3. **The disruption of JIT (Just in time):** People across the cities are increasingly loving the food prepared by kitchen entrepreneurs, who are increasingly opening their kitchens. The concept of Home-grown kitchens during COVID-19 has played its part as people are apprehensive of visiting commercial restaurants and are looking to have homemade food. The South Korean start-up **Ghost Kitchen** provides individual kitchen spaces for quicker delivery. At present, the start-up owns 143 kitchens with adequate hygiene management and workflow from material storage to cooking, packaging, and delivery which helps to minimize expenses. This start-up sources its ingredients directly from farms and other local suppliers, thereby reducing the carbon footprint due to transport.
4. **Greater investments in food manufacturing software:** The use of the Internet of Things (IoT) in intelligent farming is aided with various sensors implanted in the agricultural farm which helps to collect farm data, manage drones for spraying, monitoring on field, monitoring livestock's health, predicting rainfall and environmental condition, Operating

greenhouses etc.

AAHI is a Czech start-up that provides customer engagement platform for restaurants where contactless ordering platform uses digital QR codes to minimize direct contact during Covid 19 with customers.

5. Use of Geographic information system (GIS) in agriculture:

GIS is a technology that represents any geographical entity in the spatial representation using hardware, software, and data. The hardware in satellites, drones, GPS systems are used to locate data points and fetch information from them for analysis. In the agricultural domain, farmers can use computerised GIS to analyse complex spatial data like Crop health, Land condition, rainfall amount, topography, soil elevation, slope aspect, wind direction, flooding, erosion, etc.

6. Transparency AI/ML & data science in agriculture technology:

Artificial intelligence is the application of human intelligence via a machine body where instructions are fed into the machine, and hence you get clever work without effort. The entire lifecycle of agriculture involves detection of soil condition, seed sowing, prediction fertilizers, detection of crop infections, irrigation of water, and protection from weed, predicting yield, intelligent harvesting & pricing decisions, storing and prevention of wastage.

Robo Eat is a Canadian start-up developing AI-based autonomous robotic kitchens for restaurants, grocery stores, and office spaces. The start-up's **ARK 03** robot uses proprietary software for autonomous operation of kitchen tasks, including food storage, cleaning, sanitizing, automatic ordering and inventory control to improve efficiency of food production and food safety.

a) Orderscape creates restaurant voice bots:

US-based start-up **Orderscape** is a voice market-place that works in integration with Amazon Alexa and Google Assistant. The start-up integrates its solution into restaurants' existing digital order receiving devices such as point-of-sale (POS) devices and tablets, enabling convenient voice-based food ordering for all users.

b) Tastewise develops a food intelligence AI engine:

Tastewise is an Israeli start-up that provides food intelligence AI engine to collect customer data based on their interactions in social media and digital restaurant platforms which helps restaurant owners to formulate strategies for product innovation and customer retention.

7. Block chain:

Once the crops and produce is ready, farmers dive into the troubles of fair trading, selling, marketing, and proving the authenticity of their produce. Hire **Blockchain** developer helps farmers ensure the safety of their crops with Agri-Insurance & subsidies, preventing theft with food tracing, efficiently managing the supply chain, and balancing the food ecosystem.

8. Advancement in Agri technology:

a. Growing interest in high-pressure processing among companies:

High-Pressure Processing (HPP), as the name suggests, is a process that kills harmful microorganisms with the application of intensive pressure in the ranges of 400-600 MPa. This technology preserves and helps to retain the taste, appearance, and nutritional value of the food.

b. Frozen food technology is small but growing:

The Indian frozen food market has been galloping, driven by a growing demand for natural products such as fruits and vegetables, meat, seafood products and their pieces. Individual Quick Freeze (IQF) is a fast-freezing process rather than blocking freezing, which is introduced by domestic companies in India.

c. Vacuum frying and freeze-drying are gaining momentum:

Several start-ups in India have introduced healthy snacks such as vacuum frying and freeze-dried snacks. When compared to atmospheric frying, the temperature is lower, containing less fat, retains nutrients and original flavour.

Use of Robotics, Drones, custom tractors, harvesters, and modern technology has evolved for agriculture automation. Thus, you can meet the international promise to produce agro-produce for high population with less human intervention. Asia-Pacific (APAC) emerged as the leading region in the Cloud Kitchen market with the largest market share in 2020, and a number of key innovators in the region have made their mark: India-based **Rebel Foods** became a unicorn in October after a \$175 million fund raise took its valuation to \$1.4 billion.

d. Agriculture is getting a new face in Asia too:

APAC based companies have started building facilities with advanced technologies such as vertical and indoor farming in agriculture. Notable companies include Farm8 and N.THING Inc. from South Korea, and Singapore-based Sustenir Agriculture, Foodland Ventures from Taiwan have hosted the APAC Food & Beverage Innovation Summit 2021 to put one by one networking opportunities with investors & start-ups.

9. Restaurant digitization:

Restaurant digitization provides enhanced customer experience and enables smooth operation management. The disturbance in the food & beverage industries due to COVID-19 has caused a shift in restaurants adopting digital management systems across the supply chain. Digitalization assists to reduce direct human-to-human contact and solve restaurant related queries, and cashless payment.

Lean Restaurant is a Kuwait-based start-up that provides end-to-end restaurant digitization services and purchasing support. The start-up's *Kitchen* and *Waiter App* allow kitchen staff and waiters to monitor the order in real-time and serve the customers. The *E-Menu* and *E-payments* assist customers in contactless transactions through digital menus and QR codes.

Impact of COVID-19 on the Indian agricultural system:

The production growth has highly declined in Karnataka, Maharashtra, Odisha, and Uttar Pradesh due to reverse migration caused fear of infection. Perishable food items were completely disrupted due to restricted movement whereas non-perishable food items were sold at high prices. India's food and beverage packaging market were worth USD 26.28 billion in 2019, which is expected to touch USD 122.78 billion by 2025 due to rise in the start-ups. According to the National Restaurant Association of India (NRAI) estimates, the Indian foodservice industry's Rs. 4,23,86,500 crore market in 2018-19 is expected to grow to Rs 5,99,97,820 crore by 2022-23. Overall, the food business has been and will continue to thrive forever. The question is: are you prepared to take advantage of the immense opportunities that the food business offers? Until you have your

Management degree in Agri & Food Business from MIT College of Management (MITCOM), your chances of success will remain slim.

Forthcoming policy briefs for the food processing industry

The "Strategic preparedness and response plan" by WHO includes the health measures that all countries have to prepare for and respond to this pandemic. According to this plan, priority steps and actions are outlined under six main topics:

- 1) Coordination, planning, and monitoring at the country level
- 2) Risk communication and community participation.
- 3) Surveillance, quick response teams, and case investigation.
- 4) National laboratories
- 5) Situation management and control of infection
- 6) Operational support and logistics (WHO, 2020a).

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SILVER AWARD Most Innovative - Innovative Category

National Awards in the Great Indian Ice Cream Contest 2017

SILVER AWARD Mango Sorbet - Sorbet Category
SILVER AWARD Best Chocolate Category
Bronze Award Tiramisu Tiramisu - Tiramisu Category

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Hangyo Ice creams: An era of growth and excellence!

Deepa Pai

President - Branding & Designing



A quiet revolution of innovation and ice-cream making has been happening since 1997 when the first 'Softee' ice cream vending machine arrived in Karnataka's coastal city of Mangaluru. With the outward-looking brains of Dinesh R. Pai, Chairman and Pradeep G. Pai, Managing Director of Hangyo Ice Cream and his team, this odyssey of innovation has gone on an overdrive to reach new destinations. Words fall short to describe the growth trajectory of Hangyo Ice creams. In several products, Hangyo has surged ahead of many MNC brands. In terms of consumer reach and satisfaction, it has no parallel. With over 2 million customers and operations in 8 states, Hangyo Ice Cream produces 70,000 litres of ice cream and 25,000 litres of milk products. The company has over 350 channel partners, 60 exclusive shops, 11 industry awards and is now a ₹ 250 crore group with goodwill earned so far that is priceless and seamless!

Research on flavour, product improvement, branding is an ongoing affair at Hangyo. Two of its products will be engraved forever in the history of the ice-cream industry as the first vegan ice cream. Coconut and Choconut are the products that are the results of high-quality scientific inputs with the collaboration of Central Plantation Crops Research Institute.

The new generation range under the semi-premium products under the 'Rave' brand and the super-premium 'YO' brand Ice creams are now on the top of every gourmet's dessert list! Pradeep Pai and Deepa Pai have taken innovation to a new level which has now become an industry standard. It is also about breaking conventions and off-roading, which is going where nobody has gone before.

Apart from the enormous consumer goodwill and client following, Hangyo has got several prizes and awards. These started falling into Hangyo's basket as early as 2003 starting with Pradeep Pai, founder and chief promoter of Hangyo receiving the prestigious Udyog Bharati award, followed by ISO

certification 22000-2005 in 2012, followed by Best Entrepreneurship by the Indus Entrepreneurs award received by our Chairman Dinesh R. Pai in 2014, and Small and mid-size enterprises (SME) excellence award in growth and customer acquisition by Karnataka Small & Medium Business Owners Association (KSMBOA) in 2015.

Hangyo was also adjudged the fastest 50 growing brands by World Consulting and Research Corporation (WCRC), Mumbai in 2016, bagged 6 national awards instituted by DuPont Nutrition and Health and Indian Dairy Association at the Great Indian Ice Cream contest at Gurugram in 2017 and the Indywood Business Excellence (IBE) award by the IBC in 2019.

In March 2020, Pradeep G. Pai, Managing Director was honoured by Federation of Indian Chambers of Commerce and Industry (FICCI) with outstanding contribution award for developing the Coastal Karnataka as an Icecream goblet of India.

YO' becomes a runaway success!

The super-premium brand of Hangyo 'Yo' has seven stellar flavours- Brownie Fudge, Choco-Hazelnut (a unique combination of premium chocolate and the crunchy Hazelnut - this combination is one among the firsts), Shahi Meva Malai (creamy and so milky that you can taste the freshness), Almond Rocks (nutty and crunchy), Rose Petals (highly aromatic and sprinkled with enchanting rose), Saffron Carnival (true strands of saffron), Caramel Crunch (soft Ice Cream with blasts of crunchy caramel).

New flavours on the block!

In October and November 2021, three nostalgic flavours, evergreen in the minds of the consumers have been introduced. These include Rose and Paan Kulfi and the nostalgic Cotton candy flavour Ice cream. They have quickly become prominent among the wish list of connoisseurs of Ice cream.

The mellow, but yet refreshing Rose is thick and rich Kulfi avatar of milk is a niche product on the Kulfi shelves. The kind of pink colour it sports is natural, and every bite oozes with the goodness of rich dairy fresh creamy milk. The Paan Kulfi is one of the most revolutionary flavours of recent times.

The soothing thick milk kulfi having a distinct flavour of Rose Kulfi and Kolkata Paan- the best freshener that the Indian diaspora has ever experienced, has come together to give the Indian Ice cream lovers a different experience!

December 2021 was yet another highlight- in this journey of delightful tastes and flavours. The green apple Ice candy was launched. The mellow green, subtly sweet and tangy and extraordinary flavour of the green apple right through the last lick, is what this new product is all about. ❑

How to Plan Your Digital Marketing Strategy?

Yashang Gokani

Director, Digital Marketer
my E platform®



Well! Digital Marketing, is the trendiest and most effective way of marketing, people are trying to make the best use of it. But it is quite natural, that everyone is not really aware of all the methods of digital marketing and their results. Before planning any kind of marketing strategy, one needs to be aware about the following:



- 1. PRODUCTS/SERVICES:** Before planning any strategy, one should have a knowledge and understanding about own products: whether it is E-Commerce based or what kind of services are provided? Basically, one must deeply understand about own business. If it is a consultancy or a doctor by profession or a manufacturer, one must perform a proper background check and only then can one design a suitable marketing strategy for his/ her own business.
- 2. TARGET REGION:** It is very important to know where one's target audience is, i.e., which area they belong. This will eventually help to focus the target region geographically. It differs from business to business. One can generate leads from even a 1km target area.
- 3. TARGET AUDIENCE:** Target audience is another aspect, which is essential to note before planning one's best suitable

strategy. It means that a business needs to know about their client base or which sector the audience belongs to. The target audience can be patients, the local public, doctors, farmers, manufacturers, dealers, etc. This data is necessary for more effective campaigns.

- 4. NATURE OF AUDIENCE:** The nature of the audience is very critical. There can be two kinds of audiences, i.e., B2B or B2C. This implicates whether the business deals with bulk buyers or the end customers. This is a vital factor while planning a strategy because when the nature of the audience changes, their search trend changes too and one needs to stay updated with the user behaviour.
- 5. DURATION:** Tenure of one's marketing activities is really important as it will help to decide which platform is best suited for the business in a given time frame.
- 6. AIM OF CAMPAIGN:** Before running any campaign, the aim of the campaign should be understood. Campaigns can be run for two reasons: one is for brand awareness and the other is for lead generation.
- 7. BUDGET ALLOCATION FOR DIGITAL MARKETING STRATEGY:** Whenever it comes to investments, the budget is the biggest hurdle. Digital marketing strategy is available for all kinds of budget limits. It is very true that on one hand, 100 rupees a day is also enough while on the other, 10,000 rupees may be less. A better understanding of the budget capacity can lead to the best suitable marketing strategy.



KYC of Social Media

These are the factors that are going to help to grow one's business. For any kind of business, before providing the service or even before selling the product, it is very necessary to make a note of what the customer wants or to which niche the customer belongs.

Whenever one is creating the marketing content, and strategies to promote the brand, it is obvious to get carried away with

creative elements in which most of the time, the client's need and their expectation may get neglected. But one must keep in mind that the only fraternity the businessmen are serving is that of the customers.

Also, one needs to keep track the behaviour of the audience on digital platforms. Their tastes and preferences are something that will help one to track down the right audience.

Successful business owners understand what their customers actually want and the most effective way of making their product or service available.

This is why, knowing the desires of the customers should be the priority before planning any marketing strategies. The business owners need to connect and engage with them, to know their basic desires.

Knowing the customer base is crucial as it will help to understand which digital marketing tactics are working the right way!

For some industries, based in some particular region, Facebook ads will work. For some Instagram shall work, whereas, for others, Google Ads shall work.

The following are the popular social media platforms:

FACEBOOK

Facebook is the most commonly used social media platform in India today. This is why, if the customer wants to reach a mass public from metro to rural cities, from middle age (35 to 45) or elder age (45+) then focus can be laid particularly on this platform.

INSTAGRAM

Instagram is another commonly used platform amongst the youthful India. Well, in this case, if the target audience is the female group, of the age below 35 and if the products or services are related to cosmetics, training, gadgets, or maybe fashion, then Instagram can do wonders.

OK CUPID OR TINDER

This platform is for lovers. Any niche related to weddings, the wedding industry or maybe personalized gifts or something related to decorations and stuff can be concentrated on this platform.

LINKEDIN

An extremely professional platform, where one will find manufacturers, MNCs, Corporates, Industry experts, Job seekers, Job providers, Students, H.R Managers. So if the products are related to these fraternities, then definitely, LinkedIn will serve the purpose.

TWITTER

A huge microblogging system where people can tweet any kind of announcement and also can follow others and read their tweets. All the VIPs, urban population, Government Agencies, MNCs can be tracked on this platform.

Thus, it is very necessary to know the customer thoroughly and make a note of minute details about the business, only then can one be able to plan the appropriate Digital Marketing strategy. ❑

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1. धर्मबीरजी, आपने बिना किसी औपचारिक शिक्षा के एक बहुउद्देश्यीय खाद्य प्रसंस्करण मशीन विकसित की है। आपने इसे कैसे संभव बनाया?

उत्तर: एक छोटा किसान सारा साल खेतों में व्यस्त रहता है। लेकिन फसल तैयार होने पर लगभग 30 परसेंट तो खेत पर ही खराब हो जाती है। दूसरा मंडी में जाकर अपनी फसल को औने-पौने दामों में बेचा जाता है, पूरा मुनाफा भी नहीं मिलता। प्रोसेसिंग करने के लिए बड़ी-बड़ी फैक्ट्रियां लगी हुई हैं लेकिन, गेटकीपर अंदर जाने नहीं देता ताकि कुछ देखे, समझे। काफी फैक्ट्रियों में घूमें लेकिन, कोई जानकारी तो क्या देगा, गेटकीपर ही मना कर देता है। फूड प्रोसेसिंग फैक्ट्री में कोई भी बाहर का आदमी अलाउड नहीं करता। अजमेर, पुष्कर राजस्थान में बागवानी (हॉर्टिकल्चर) विभाग के सहयोग से जाने का मौका मिला। यहां पर मैंने आंवले को पत्र पर रगड़ कर आने की मिठाई बनाना देखा। उनके हाथ की उंगलियां पत्र पर आंवला रगड़ते समय रगड़ी जाती थी। जो बड़ा दुख भरा काम था; पहली बार देखा और सोचा की फलों और सब्जियों की भारी बर्बादी को रोकने के लिए क्यों नहीं ऐसी मशीन बनाई जाए जिससे काम आसान हो जाए।

2. मशीन को विकसित करते समय आपको किस प्रकार की चुनौतियों का सामना करना पड़ा?

उत्तर: जब मशीन बनाना शुरू किया तबसे की बहुत कमी थी। मशीन तो बन गई लेकिन कुछ कमियां फिर से आ गई। जैसे सोचा था वैसे मशीन काम करें लेकिन दूसरी मशीन बनानी पड़ी उसमें भी त्रुटि दिक्कत रही।

3. कैसे यह मशीन लोगों की जिंदगी बदल देगी?

उत्तर: यह बहुउद्देश्यीय खाद्य प्रसंस्करण मशीन है बहुत सस्ती भी है जो करोड़ों रुपये की भारी भरकम मशीनों से अकेली सिंगल फेस बिजली पर या सोलर पर टक्कर लेती है। कम पढ़ा लिखा युवा ग्रामीण भाई बहन भी इसे आराम से चला लेता है। गांव व जंगलों में उगने वाले फलों, सब्जियों, मसालों, अनाज, जड़ी बूटियों, औषधीय पौधों, सुगंधित पौधों को वह दूध इन सभी के उत्पाद आसानी से फार्म फ्रेश गुणवत्तयुक्त बनाकर देश व विदेश को दे सकते हैं। देश के छोटे वैद्यजी हर्बल प्रोसेसिंग, एसेंशियल ऑयल प्रोसेसिंग करके लोगों की सेवा कर रहे हैं।

4. नई तकनीक विकसित करने के बारे में आपका क्या दृष्टिकोण है और यह भारत के सभी हिस्सों तक कैसे पहुंचेगी?

उत्तर: नई तकनीक से देश में नए नए उत्पाद बनेंगे। जो भी किसान या कोई भी इस मशीन को चलाएगा वह भी अलग तरीके से नए नए उत्पाद बनाकर देश में देगा। बेहतर क्वालिटी की मशीनें ज्यादा बने इसीलिए कार्यशाला का विस्तार कर दिया गया है। बहुत जल्दी देश के हर पंचायत में एक मशीन लगे इस पर भी काम किया जा रहा है।



प्रोसेसिंग पैकेजिंग मार्केटिंग से युवा को रोजगार मिले इसीलिए आनेवाली अपार संभावनाओं को देखते हुए इस पर काम किया जा रहा है। क्वालिटी, मार्केटिंग, प्रोडक्शन के लिए बुद्धिजीवी लोगों का सहयोग मिल रहा है, ताकि जल्दी देश के कोने कोने में मशीन पहुंचे।

5. आपके बुरे दौर में आपके परिवार का समर्थन कैसा था?

उत्तर: बहुत अच्छा सहयोग रहा इसीलिए आगे बढ़ पाया।

6. नए स्टार्टअप इच्छुक खाद्य प्रसंस्करण क्षेत्र में विशेष रूप से ग्रामीण पृष्ठभूमि से गहरी रुचि दिखा रहे हैं, उन्हें किन प्रमुख बिंदुओं पर विचार करना चाहिए?

उत्तर: देश में कंडीशन युक्त गोडाउन नहीं है। मुनासिब मार्केट भी नहीं है। फल, सब्जियां, हर्बल एसेंशियल ऑयल, मसाले, अनाज इनको उचित भाव मिलता नहीं। बहुउद्देशीय खाद्य प्रसंस्करण मशीन स्टार्टअप के लिए एक नया आयाम लेकर आया है, जिससे काफी संभावनाएं जाग गई हैं। फार्म फ्रेश उत्पाद बनाकर अब गांव से शहरों में और विदेशों में जाएगा। युवा स्टार्टअप के लिए काफी इच्छुक हैं और उत्पाद बनाकर अच्छा मार्जिन भी ले रहे और सम्मान भी पा रहे हैं।

7. आपको विभिन्नकच्चे माल से विभिन्न मूल्य वर्धित उत्पादों के निर्माण का ज्ञान कैसे था?

उत्तर: अच्छे इंटरनेशनल संस्थानों और लोकल संस्थानों में जाकर जानकारीयां ली। नए नए प्रयोग शुरू किए। प्रोसेसिंग और वैल्यू एडिशन करते चले गए; नई-नई समस्याओं के नए-नए समाधान निकालते गए, नए नए उत्पाद बनाने लग गए।

8. पुरस्कारों और विभिन्न पहचान ने आपके व्यवसाय को बढ़ाने में कैसे आपकी मदद की?

उत्तर: नेशनल इनोवेशन फाउंडेशन के सहयोग से राष्ट्रपति सम्मान मिला, पुरस्कार राशि मिली। मीडिया सहयोग से देश को मेरे बारे में जानकारी मिली, तो उन लोगों का मेरे और मेरी मशीन के प्रति विश्वास जगा। मेरी टेक्नोलॉजी को अफ्रीकाई देशों में सृष्टि हनी बी नेटवर्क, नेशनल इनोवेशन फाउंडेशन, यूएसए आईडी अमेरिका द्वारा ट्रांसफर किया गया। वहां के किसानों ने अलग-अलग जगहों पर 20 मशीनें लगवाईं। जूजा एग्रीकल्चर यूनिवर्सिटी केनिया ने पूरे अफ्रीका में इस टेक्नोलॉजी की चर्चा की। जापान की संस्था जाएका

इंटीरियरने हिमाचल के गांव में मशीनें लगवा कर लाभ पहुंचाया। देश की

खाद्यप्रसंस्करण में नई पॉलिसी आसान स्टार्टअप में हरियाणा इनक्यूबेशन सेंटर हैबिक की स्थापना की। लाओ आइडिया पैसे पाओ देश की नई पॉलिसी के तहत 2500000 की सहयोग राशि CEEW संस्था के सहयोग विलग्रो संस्था का सहयोग, हनी बी नेटवर्क का ज्ञान, सृष्टि नेशनल इनोवेशन फाउंडेशन का सहयोग भी इस काम को आगे लेकर गया।

9. कृपया उन सभी उम्मीदवारों को अनुभव के कुछ शब्द 'अनुभव के बोल' दें जो अपना खुद का खाद्य व्यवसाय शुरू करने के इच्छुक हैं?

उत्तर: सभी देश को बेहतर क्वालिटी का फूड प्रोसेसिंग करके फल, सब्जी और जड़ी बूटियां, दालों, अनाजों, दूध औषधीय पौधों, सुगंधित पौधों, मसालों की हो रही भारी बर्बादी को रोकें। फार्म पर ही प्रोसेसिंग कर मूल्य संवर्धन करें और खुद भी फूड प्रोसेसिंग में नए-नए प्रयोग करें फार्म फ्रेश उत्पाद बना कर क्वालिटी की लैब टेस्टिंग करवा कर एफएसएसआई के नियमों का पालन और सभी गवर्नमेंट रूल फॉलो करते हुए आत्मविश्वास से अपने उत्पाद दें। आप का लाभ कई गुना ज्यादा बढ़ जाएगा।

साक्षात्कारकर्ता संकेत अहंकारी

बहुउद्देशीय खाद्य प्रसंस्करण मशीन के बारे में।

बहुउद्देशीय खाद्य प्रसंस्करण मशीन में एलोवेरा जूस आमला जूस सभी जड़ी बूटियों के जूस सभी फलों के जूस अमरूद का जूस अनार का जूस नाशपाती का जूस सेब का जूस पाइनएप्पल जूस के साथ-साथ बिना किसी फल का बीज तोड़े जूस और चटनी और जैन बनाए जा सकते हैं देश में आज तक हल्दी के पत्तों अदरक के पत्तों का तेल हल्दी और अदरक की गांठों से ज्यादा मिलता है पूरे देश के किसान हल्दी और अदरक के पत्तों को वेस्ट में फेंक देते हैं जबकि यह अदरक के पत्तों हल्दी के पत्तों का एसेंशियल ऑयल एजेंसी वाटर कॉस्मेटिक उत्पादों में ने काफी महत्व रखता है शैंपू साबुन मसाज के तेल में इस्तेमाल नेचुरल फ्लेवर और संतरे मुसम्मी माल्टा के छिलकों के बीच शैंपू साबुन के तेल बनते हैं अनार के बीज से अनार का शीरा बनता है मशीन अपने आप पकाती है अनार के बीज साबूत मिलते हैं जिसको मशीन रोस्ट करती है अनार के बीज का तेल भी इंटरनेशनल मार्केट में बहुत महंगा है खेत की में लहसुन को डाल कर ब्लैक गार्लिक

बनाया जाता है ब्लैक गार्लिक का इंटरनेशनल भाव बहुत महंगा है आप गूगल पर सर्च कर ले ब्लैक गार्लिक के फायदे भी बहुत ज्यादा है यह भी गूगल पर सर्च करें गुजरात के काफी किसान ब्लैक गार्लिक इसी मशीन के माध्यम से बना रहे हैं और अपना अच्छा व्यवसाय कर रहे हैं और बड़ी-बड़ी मशीनों खरीद ली है इस आदमी ने एक बार एक मशीन लेकर व्यवसाय शुरू किया उसने दोबारा और मशीनों की डिमांड करी और उनको दी भी कुछ ऐसी बहने भी हैं जो सड़क पर पत्थर तोड़ कर सड़क पर डालती थी रोड रोलर के आगे यह बहने आज 4000000 का टर्नओवर करने लग गई 4 साल ऐसे ही राजस्थान के उदयपुर के जंगलों में आदिवासी किसान बहने एलोवेरा लेमन ग्रास तुलसी महुआ के उत्पाद बना रही है इसके साथ साथ राजस्थान के आदिवासी इलाकों में लगभग 20 मशीनें लग चुकी है जिससे जंगलों के वन औषधि उत्पाद अब अच्छे भाव में लिखने लग गए सीताफल का जूस सीताफल का मलाई सीताफल का शैंपू के साथ-साथ सीताफल का तेल इंटरनेशनल मार्केट में आयुर्वेद में काफी महंगा है गडचिरोली आदिवासी बहने जामुन का जूस जामुन की कैंडी तुलसी का अर्क एलोवेरा जूस वनों में बना कर नागपुर मुंबई दिल्ली अहमदाबाद जैसे शहरों में पकड़ बना रही हूं नार्थ ईस्ट में मेघालय असम मणिपुर त्रिपुरा सिक्किम पाइनएप्पल शहतूत अदरक हल्दी पर काम करके लोकल जंगली फलों जड़ी बूटियों पर काम करके अपनी आमदनी बढ़ाने लग गए अनार का जूस बिना बीज जोड़े निकलता है यह अनार के जूस का शीरा बनाती है अनार का शीरा सेहत में बहुत महत्व रखता है इंटरनेशनल मार्केट में भी बहुत महंगा है इस मशीन से अनार का अर्थ भी निकलता है और अनार के बीज साबित होने की वजह से अनार का तेल भी किसी भी एक्सपेलर में निकलवाया जा सकता है जोकि बहुत महंगा है आप उसको भी गूगल पर सर्च कर ले हल्दी अदरक कच्चा आम आलू प्याज गाजर को छीलाई मशीन करती है और गाजर की कटिंग करके हलवा भी खुद मशीन बनाती है दूध से

खोया बनाती है लेकिन दूध का पानी अलग मिल्क वाटर मिल जाता है गुलाब से गुलाब जल बनता है तुलसी से तुलसी का वाटर तुलसी का तेल भी मिलता है सेब पपीता मँगो या कोई भी फॉलो फलों के जूस निकालने के बाद पक्का करके जैम चटनी भी मशीन बना देती है दही से मक्खन निकालती है मक्खन से घी भी बनाती है दूध का खोया और बर्फी भी बनाती है मक्के का दूध सोयाबीन का दूध अखरोट बदाम का शकरकंदी आलू चावल सिंघाड़े का दूध भी बनाती है 1 घंटे में 200 लीटर छोटी मशीन 1 घंटे में 40 लीटर क्या सिंगल फेस बिजली पर भी चलती है और यह मशीन सोलर बैटरी पर भी काम करती है एलोवेरा तुलसी हल्दी की साबुन भी बनाती है शैंपू फेशियल

हैंड वॉच मोरबी बॉडी वॉश के उत्पाद बनाती है पक्के आम धो करके सीधे डालेंगे आम का बीज नहीं तोड़ेगी और चिल्ले को भी खराब नहीं करेगी लीची का जूस निकालेगी बीज साबुत मिलेगा जामुन का उत्तराखंड की जंगली नाशपाती वाइल्ड पियर साबुन बना रही है आंवले का चमनपरास भी बनाती है पाइनएप्पल की मिठाई चेरी की अदरक हल्दी की भी मिठाई बनाती है सभी जड़ी बूटियों के जूस सत्य निकलती है इसमें पका हुआ सामान जलता नहीं कंट्रोल टेंपरेचर पर पकता है कच्चे मक्के का 1 घंटे में बड़ी मशीन 200 लीटर से ज्यादा दूध बनाती है उस दूध से आइसक्रीम और कुल्फी भी बनती है चाय भी बनती है दही और पनीर भी बनता है कैंडी टॉफी मिठाई भी बनती है अपार संभावनाएं चावल खिचड़ी सब्जी सब कुछ पकाती है आचार के लिए सब्जियां काटती है सभी फलों के जीएम बनाती है । Tomato puree tomato sauce chili sauce soya sauce टोमेटो केचप टमाटर कैंडी अमरूद की कैंडी बर्फी घीया का हलवा घीया का जूस और भी बहुत कुछ गुलकंद गुलाब जल खिचड़ी खीर दाल की बढ़िया बनाने के लिए दाल की पकाई और घुटाई पापड़ बनाने के लिए आलू की छिलाई और पकाना और mash करना सभी फूलों के तैल ईत्र बिना किसी पोलूशन के आराम से निकाल देती है । □



बालाजी वेफर्स के निदेशक चंदूभाई वीरानी का साक्षात्कार

1. बालाजी वेफर्स की यात्रा कैसे शुरू हुई?

उत्तर: बालाजी वेफर्स की यात्रा 1974 में शुरू हुई। हमारी यात्रा धुन धोराजी गांव (जामनगर जिला) से शुरू हुई। वहाँ हमारे पिताजी का कृषि related बिज़नेस था। खेती बारिश के ऊपर निर्भर थी। बारिश नहीं तो कुछ भी नहीं। एक दिन चिंतन कर के रात को वहाँ से निकल और राजकोट आ गए। यहाँ आके सिनेमा के अंदर नौकरी लगी। वहाँ स्नैक्स और नमकीन बहार से लेके बेच रहे थे। 1982 तक यही काम किया। तब तक हमने गांव की सारी जमीन बेच के यहीं पर मकान बना लिया था। बहार से आने वाली चीजे समय पर नहीं आती थी, क्वालिटी भी नहीं होती थी। तो घर में बनाना शुरू कर दिया। अब इसी प्रकारसे बेचते बेचते हमने सोचा की सिर्फ एक ही कैंटीन में क्यों बेचे? तो फिर हमने बाइक लेके बाजार में बेचा। एक एक दुकान में जाके बेचा। थोड़ा सेल बढ़ा तो रिक्शा लेके बेचा, और थोड़ा बेचा तो टेम्पो लेके बेचा, थोड़ा और बढ़ा तो इंडस्ट्रियल एरिया में प्लॉट लिया। 20000 रुपये का लोन, 180000 का टेम्पो का लोन, 360000 का लोन इंडस्ट्रियल एरिया में प्लॉट के लिए लोन लिया। तो बढ़ते बढ़ते अब तक 200 करोड़ का लोन लिया। अभी मैं राजकोट से बोल रहा हूँ। घर रे आगे बढ़ते हुए ये अब हमारी चौथी फैक्ट्री है। एक वलसाड में है। एक इंदौर में है। पहले घर से 5000 आदमी काम कर रहे थे आज 6 से 7000 लोग काम कर रहे हैं 57 सप्लायर थे आज दो हजार सप्लायर हैं करोड़ों की शान है। और गुजरात में खासकर के किसान हमारे साथ जुड़े हुए हैं। इंडिया में नंबर वन है, उसके बाद होलैंड के लिए लिस्ट में थे, हार्वेस्टर के लिस्ट में थे अच्छा स्टोर है। होलैंड में टेक्नोलॉजी का तो अच्छा raw मटेरियल मिलता है। 15 राज्यों में अभी हम बेच रहे हैं और 20 देशों में बेच रहे हैं। 15 राज्यों में बेचने के लिए 15 सो डिस्ट्रीब्यूटर हैं 600 ट्रकों द्वारा माल पहुंच जाते हैं। 12 सो डीलर हैं डीलर अपने अपने एरिया में माल बेचता है छोटा डीलर है, तो उसके पास रिक्शा है बड़ा है, उसके पास 100 रिक्शा है, तो वह 10 से 15 से दुकानों तक पहुंच जाते हैं, और वहां करोड़ों कंजुमर परचेज करते हैं। तो इसमें गांव का प्रैक्टिकल आदमी किसी को कभी टारगेट नहीं किया कभी कोई स्कीम नहीं दी कोई ज्यादा पब्लिसिटी भी नहीं की थी। अभी हमारे बच्चे नए जमाने के हैं तो वह करते हैं। मैंने 47 years में पब्लिसिटी नहीं की एखाद कर दी होगी। अब नई पीढ़ी कर रही है, उनका और हमारा विचार अलग है। वह भी अभी बड़े हो गए हैं तो वह उनके विचार से कर रहे हैं उनको करने देता हूँ। और मैं प्रैक्टिकल हूँ वह थोड़े प्रोफेशनल है मैं प्रैक्टिकल मेरे एम्पलाई प्रैक्टिकल। तो दोनों चीजें हमारे पास है मैनेजमेंट है दोनों मार्केट में है एग्जांपल चिप्स और extruded snacks प्रोडक्ट्स है वह वेस्टर्न है और नमकीन इंडियन तो दोनों है जहां सफलता आई। लेकिन हमने बिज़नेस को नहीं छोड़ा मैंने पैसा कमाने का जरिया नहीं समझा एक जीवन समझा 25 साल तक सफलता नहीं मिली लेकिन 25 साल के अंदर टोटल प्रैक्टिकल बेस हो गया जिसके ऊपर बड़ी बिल्डिंग बन सकती है तो बनाई हमारे next-

generation ने। यही हमारी एक journey रही है उसे मैंने आपको संक्षेप में बताया है।

2. बालाजी वेफर्स ने बड़े ब्रांडों से लड़ते हुए कौन से महत्वपूर्ण कदम उठाए थे?

उत्तर: हमने कुछ बदलाव नहीं किए हैं। मैं जैसा था वैसा ही हूँ। हम जब राजकोट में बेच रहे थे छोटे कंपीटीटर थे। पूरे गुजरात में बेचने लगे तो थोड़े बड़े कंपीटीटर थे। इससे आगे गुजरात के बाहर गए तो और बड़े कंपीटीटर थे। हम पहले 4-5 चीजें बना रहे थे। हम mixture नहीं बनाते थे तो वह ग्राहकों को और डीलर को बोलते थे की अगर बालाजी का कोई प्रोडक्ट लेता है तो उसे मिक्सचर नहीं देते थे ऐसी कुछ चीजें थी मार्केट में। तो हमने वह बनाना शुरू कर दिया। हम जो नहीं बना रहे थे वह दूसरी कंपीटीटर कंपनी मोनोपली क्रिएट करने का प्रयास करती थी। मैं तो यही कहूंगा कि कंपीटीटर ने हमको गुरु ज्ञान दिया। कंपीटीटर तो होना चाहिए नहीं तो हम रावण बन जाएंगे। तो यह कोई नहीं बोल सकता कि मैंने कुछ नया किया। मैं तो प्रैक्टिकल हूँ दिल से बात करता। हमारे पास दिल भी है दिमाग भी है। यह मैं बताऊंगा। मैंने पहले ही बोला है मैं दिल से काम करता हूँ मेरे बेटे दिमाग से करते हैं। कमाई जो है उसमें बदलाव आया है। मैंने बोला हमने एक रुपए की पब्लिसिटी नहीं की थी। 47 साल के पूरे कार्यकाल में मैंने कोई पब्लिसिटी नहीं की।

3. सपुरफैक्टरीज की श्रृंखला के तहत बालाजी वेफर्स पर वृत्तचित्र के प्रसारण के बाद आपने क्या बदलाव देखा है?

उत्तर: कुछ बदलाव नहीं आया। यह कोई पहली बार नहीं है। कोई भी टीवी मीडिया कोई भी पेपर ऐसा नहीं है कि हमारा इंटरव्यू नहीं लिया। कुछ नया नहीं। आपको यह नया लगा क्योंकि वह चैनल इंटरनेशनल है। तो ऐसे इंटरनेशनल मैगजीन में कई बार इंटरव्यू आ चुका है। हमारे लिए नई बात नहीं है नो डाउट इससे पब्लिसिटी मिलती है, एक इमेज बढ़ती है लेकिन इससे सेल में कोई फर्क नहीं पड़ेगा।

4. बालाजी वेफर्स ने Extruded Snacks में भारतीय स्वाद का निर्माण कैसे किया और इतना पसंद किया?

उत्तर: example मैं दूंगा कि समझो हमारी जो एमएनसी कंपनी है वह क्या करती है राइस और मक्का डालती है। हमने बेसन भी डाला। वह खाली सीजनिंग बाहर से देंगे हम क्या करेंगे हमारे पास दोनों चीज है 100% इंडियन भी है और थोड़ा एग्जॉटिक सीजनिंग की भी है। और हम क्या करते हैं सीजनिंग यहां बनाते हैं हमारी फैक्ट्री में। थोड़ा इंडियन टच डालते हैं। देखिए अगर आपको घर में आप चाय बनाए, आपकी सिस्टरने चाय बनाया, आपकी मम्मी चाय बनाएगी; एक ही एक ही चूल्हा है, एक ही कप में बनेगी लेकिन थोड़ा डिफरेंट होगा खुद का टच होता है ना। वहीं मैं बोल रहा हूँ हम इंडियन है दिल से काम करने वाले। 47 साल में कंपनी में कोई भी चीज ऐसी नहीं है कि मैंने काम नहीं किया। मैं

किसान के खेत तक गया क्योंकि मैं तो किसान हूँ। थोड़ी समझ भी है, तो वह जो रो मटेरियल बनता है कैसे बनता है, किसानों को समझाना मेरे को समझना यह बातें हैं। मुहुं में चबाके चबाके डाले खरीदी है, चुन-चुन के आलू मैंने खरीदा है, मैंने आलू फ्राई किया है, मसाला हाथ से डाला है, और फिर बाइक लेकर बेचा भी है। वह एमएनसी कंपनी नहीं करती है ना प्रैक्टिकली इतना नहीं करती। क्योंकि मेरे को 25 साल स्टेज बनाने में चला गया। तो यह पैशन की बात है पैसों की बात नहीं।

5. कैसे आधुनिक तकनीकी हस्तक्षेपों ने अत्यधिक बढ़ती मांगों के दौरान बालाजी वेफर्स को वर्षों तक बनाए रखने में मदद की?

उत्तर: देखो यही जो आपने नेशनल ज्योग्राफिक चैनल में देखा मैं पूरा उसको समझा दूंगा। रोबोट आप देखेंगे चल रहा है कार्टून भरने वाला वह कोई भी विश्व की नंबर वन कंपनी हो उसके पास नहीं है। सिंगल पैकट का है पैलेट एक साथ भरने वाला किसी के पास नहीं है। वह हमारे पास है। तो वह क्यों आया कोरोना काल में सरकार ने बोला आधे एम्पलाई पर काम कीजिए; वह तो नहीं हो सकता अगर आधा माल हम बनाएंगे मतलब अगर 5 टन माल हम पहले बनाते थे और आधा मतलब 3 टन हुआ तो उतना बनाएंगे तो ऑयल खराब हो जाएगा। तो उसके लिए हमने रोबोट मंगवाया। रोबोट आ गया मुसीबत में मंगाया था। मुसीबत में कंपीटीटर से सीखा। तो मुसीबत आई इसीलिए रोबोट मंगवाया। लेकिन फिर रोबोट तो आ गया मगर प्लाइट्स बंद थी हमारी अब्रॉड की तो इंजीनियर नहीं आ सके। तो आप देख लेना एक बार चैनल में तो हमारे सारे सिंपल एंफ्लॉय थे सारे राजकोट के इंजीनियर उन्होंने इंस्टॉलेशन किया तो मुसीबत से भी गुरु ज्ञान मिलता है। कष्ट में से ही इंसान बनते हैं। फैसिलिटी में देखो जो बच्चों को मिली वह बाबू बनते हैं कोई भी चीज बिजनेस की आपके शहर से नहीं होती। लेबर वगैरा देखो वह शहर से नहीं होंगे बाहर से होंगे। तो वह बाहर से इसीलिए आए कि कुछ करना है कुछ बनना है। वहां नहीं है उनके पास। तो यह मानसिकता होती है। कष्ट से ही आदमी आगे बढ़ सकता है। वह कष्ट आया कोरोना आया इसलिए हमने परिवर्तन किया। समय के साथ बदलते हैं।

6. कृपया अन्य Snacks निर्माताओं को कुछ सलाह दें जिन्होंने कुछ बाजार हासिल करना शुरू कर दिया है।

उत्तर: मैं तो यही बोलूंगा कि बिजनेस एक जीवन सम बनाइए। फोकस कीजिए। भावना से प्रोडक्ट बनाइए। अच्छा पैकिंग कीजिए। अच्छी सर्विस दीजिए। और समय को रिस्पेक्ट दीजिए तो समय आपको रिस्पेक्ट देगा लेकिन उसके लिए पैशन होना जरूरी है।

7. MSME क्षेत्र को किस प्रकार की आधुनिक तकनीकों को अपनाना चाहिए?

उत्तर: जरूरत के मुताबिक करना चाहिए। क्वालिटी अगर सुधरती है तो पैसा खर्चना कोई बड़ी बात नहीं है। क्वालिटी पर ध्यान देना, क्वालिटी के लिए परिवर्तन करना चाहिए। क्वालिटी और क्वांटिटी एक साथ एक ही तरह की

निकलेगी वही ध्यान में रखकर ही हमने यह सारी ऑटोमेशन की। ऑटोमेशन India में महंगी पड़ती है लेकिन उससे क्वालिटी क्वांटिटी सिमिलर है।

8. स्वच्छता, गुणवत्ता और सुरक्षा बनाए रखने से उत्पादों की बिक्री में सुधार करने में मदद मिलेगी, आप क्या सोचते हैं?

उत्तर: हां मिलती है। महंगी पड़ेगी लेकिन सफलता मिलती है। हमारे पास जो इन्वेस्टमेंट है वह इसमें करते हैं बाहर नहीं करते। सस्ती महंगी की बात नहीं है। आज तक हमने बिजनेस में जो भी कमाया इसी में इन्वेस्ट किया। हमारा गिनती करना उचित नहीं है। गिनती करनी है वहां करते हैं, बाकी हम छोड़ देते हैं। ऐसा नहीं है कि सभी चीजों में पैसा देख कर काम करना, चाहिए क्वांटिटी और क्वालिटी कंटिन्यूली कैसे होगी उसको ध्यान में रखकर ही हम हाइजीन एंड क्लीनिंग करते हैं।

9. कोई Snacks निर्माण में प्रवेश करना चाहता है, खाद्य व्यवसाय में स्टार्टअप, तो कृपया एफएसएमएस, ब्लॉक-चेन, आईओटी आदि जैसी आधुनिक प्रथाओं को अपनाने पर विचार करते हुए अपने सुझाव दें।

उत्तर: जैसा बिजनेस है उसको आप समझेंगे, पूरा पैशन से करें। पहले प्रैक्टिकली करना, चाहिए फिर हमको कौन सी चीज की कहां जरूरत है तभी पता चलेगा। देखो मैं अभी बड़ी साइज की कंपनी है इसीलिए ऐसी बात करता हूँ। छोटी साइज में मैं ऐसा नहीं करता था। छोटी साइज में मैं बाइक पर बेचता था, फिर रिक्शा, फिर टेंपो ली। मतलब स्टेप बाय स्टेप परिवर्तन किया है मैंने। समझते गया और परिवर्तन किया, सीधा-सीधा नहीं किया है तो वह सारी बातें ध्यान में रखकर आज के साइज की तरह और समय को ध्यान में रखकर आहिस्ते आहिस्ते बदलाव करें। ऐसा नहीं कि किसी ने किया और मैंने भी किया। हमें जो समझ होती है वही करते हैं ना।

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Turnkey Project

- Product Selection
- Project Report
- Location Feasibility

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- ISO 22000
- FSSC 22000
- Organic Certification
- GFSI Certification
- BRC Certification

Auditing

- Vendors, Suppliers, Distributors & Retail Chain audit
- Internal and external audit under FSSAI and ISO

Technical Services

- Consultancy of Lab Setup
- Support in conducting shelf life studies. Improving the shelf life of existing products
- Support during plant trials.
- Formulations

Training

- FOSTAC
- Training Programs related to Food Safety Management
- Personal hygiene
- International Codes and Practices
- Requirements of Voluntary Standards

Web-Services

- Website Designing
- Web & Email Hosting
- Maintenance
- Digital Marketing
- SSL Certificate
- SEO & Google Analytics

Label Checking

- Check retailer-generated packaging Food Labeling Services
- Help you avoid expensive packaging mishaps and product launch delays

Legal Metrology

- Importer
- Dealer
- Repacker
- Model Approval
- Manufacturer

New Product

- Research & Development Services
- Packaging
- Design & Development
- Compliance Services
- Product Approval

Packaging

- Product Packaging
- Design and review content and labels of new and existing products
- Packaging Approval

Foreign Compliance

- Indian Foreign Service (IFS)
- Food and Drug Administration (USFDA)

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