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food MARKETING & TECHNOLOGY इंडिया

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Developments in the Global Bakery and Confectionery Sector

Bakery, confectionery and snacks are of global interest. Many individual products, however, have a local focus. This has to do with specific tastes and expectations, dietary requirements and simply regional preferences. The sweet tooth of the Middle Eastern countries is different to the healthy needs of the southern Europeans and the sheer variety of the Germans. Interestingly, the same products can taste differently in another region. With chocolate bars we offer personal experience.

There are nevertheless a lot of similarities and overlap. Soft white bread can be found everywhere and continues to lead the market. Artisan and specialist products have their own niches and many convenient products to eat as you go are also gaining in popularity. In some regions it can almost be seen as a status symbol if a more up-market bread product is consumed. When considering health aspects, the need for increased dietary fibre in baked goods is still a need to be met.

In the industry it is becoming more challenging to find new ideas and equipment. Health worries are still predominant. Travel budgets have become tighter and tighter, which gives the option of using more digital tools and virtual marketplaces on the net to find a wider range of options to prepare for the future and at the same time to increase the efficiency of actually visiting trade fairs.

Thankfully the fair organisers have also recognised this. Webinars and other online events have managed to combine the feel of being at a show, with the flow of information. The added bonus is that a webinar can be recorded and viewed later, at convenience, ultimately saving time when the day-to-day business is more pressing.

Even as the business world changes around us, we are finding more ways to be flexible and still keep on top of the situation. This is as true of the bakery and confectionery sector as well as others covered in this issue. India, as a technologically advanced nation, is best placed to take advantage.

Dear Reader!

Welcome to the July Issue. In keeping with the new normal Food Marketing and Technology Magazine is now available across multiple digital platforms.

We hope that this issue finds you well. As we continue to work from home our daily routine is infused with webinars. Our most recent appointment was to attend the Suman Food Consultants webinar on ATMANIRBHAR BHARAT - Implication And Opportunity For Food Processing Industry on 18 June 2020. The webinar highlighted the impact of several relief packages being announced for Food Industry in multiple tranches of these economic reforms. Eminent industry experts discussed on how these challenges can be turned into opportunities to make the Indian Food Industry self-reliant i.e. “Atmanirbhar”. Apart from webinars as we all know that food ingredient is a major concern for society today. There are some interesting article from ingredients section.

In an article, Mintel have revealed 2030 Global Food and Drink Trends. There are three key trends that will shape the global food, drink, and food service industries over the next 10 years. Change Incorporated: Successful companies will be those that improve the health of the planet and its population. Smart Diets: Technology will enable consumers to construct hyper-individualised approaches to physical and mental health. High-tech Harvests: Consumer trust in food science and technology will strengthen as these become vital tools to save the food supply.

We have one more article in this issue on Starch because of its wide application. The industries manufacturing starches in large quantities are readily available. In India and abroad, starch application is very common. For every alternate use in cooking, manufacturing, baking starch has been used. The only issue with starch is that it gets retrograde after cooking, to avoid this we need to add gums in the products. Starches are healthy in nature and help in digestion, are also, a main source of carbohydrates lending energy. Starches are friendly in nature and can be used in cooking, just add a little while making your favorite dish.

Apart from this we have an interesting article on Inulin: A Prebiotic. Inulin and oligofructose are widely used in functional foods throughout the world for their health-promoting and technological properties. They are ingredients of the future that meet the needs of the food industry today and are on the leading edge of the emerging trend toward functional foods.

We hope that this issue will be very beneficial for you.

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MINTEL REVEALS 2030 GLOBAL FOOD AND DRINK TRENDS

By Alex Beckett*

Mintel, the experts in what consumers want and why, have revealed three key trends that will shape the global food, drink, and food service industries over the next 10 years:

1. Change, Incorporated: Successful companies will be those that improve the health of the planet and its population.

2. Smart Diets: Technology will enable consumers to construct hyper-individualised approaches to physical and mental health.

3. High-tech Harvests: Consumer trust in food science and technology will strengthen as these become vital tools to save the food supply.

Expect to see consumers further prioritise plants in their diets, with the planet's health in mind as much as their own. From beer made from rejected cereal pieces to containers made from organic mushroom waste, food waste will lead the way for more sustainable consumption and innovation.

MINTEL DISCUSSES HOW ISSUES OF HEALTH, TECHNOLOGY, AND TRUST WILL INSPIRE FORMULATION, PACKAGING, MARKETING, AND MORE IN THE YEARS TO COME.

Consumers will gain a better understanding of what makes food items unique using health testing services, artificial intelligence-enabled apps, and increased personal data collection. Meanwhile, with consumers expected to live longer, many will want to learn how their diet can benefit from long- term cognitive health.

Expect to see brands use science and technology to create new products, shorten production time, and confirm trustworthiness.

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MORE CONSUMERS WILL BE ABLE TO GAIN IN-DEPTH KNOWLEDGE OF THEIR BIOLOGY THROUGH PERSONAL HEALTH TESTING KITS WHICH WILL EMPOWER THEM TO PERSONALISE THEIR DIET AND HEALTH REGIMES.

Meanwhile, new ingredient growing regions, such as those in Africa and India, and agricultural innovations, including floating farms will emerge to tackle global food insecurity.

Looking ahead, Mintel discusses how issues of health, technology, and trust will inspire formulation, packaging, marketing, and more in the years to come.

CHANGE, INCORPORATED

In the next decade, consumers will be hungry for leadership and demonstrable change on environmental issues, ethical business practices, public health, and other important causes. Consumers will reward brands that take action and improve important societal issues. The companies that will win in the next 10 years will be those that fuel the new era of conscious consumption. Tomorrow's conscious consumers will be looking for eco-friendly packaging and products, while also seeking guidance on how to make their diets more sustainable.

SMART DIETS

Looking ahead, more consumers will be able to gain in-depth knowledge of their biology through personal health testing kits which will empower them to personalise their diet and health regimes. Analysis of these tools will inform consumers of the steps needed to address every aspect of their health, including brain and emotional well-being. As a result, to succeed over the next decade, brands will have to offer more personalised product offerings, develop smart home solutions, and assist consumers in addressing mood and brain health.

HIGH-TECH HARVESTS

"Science will interlace with the food supply chains to boost yields and combat climate change. Celebrating the sustainable, health, and cost benefits of lab-grown food will be crucial in educating consumers about nature-identical alternatives. But the food and drink industry will be compelled to elevate the role of nature, and humans, in the story telling of these new, modern solutions. Transparency of information is essential to building trust in a future where scientists play as integral a role as farmers. And championing the people behind the food—whether it is grown in a laboratory or a field—will remain a timeless way of building trust with consumers."

* Author is Associate Director, Mintel Food & Drink

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INULIN A PREBIOTIC

By Swati Solanki*

Inulin, a white, mildly sweet, indigestible polysaccharide that occurs particularly in the roots or tubers of various plants. It consists of Fructooligosaccharide (FOS) which is a soluble prebiotic fiber that is resistant to digestion and then reaches the large intestine. This prebiotic has a very Low Glycemic Index which means they are slowly digested, absorbed and metabolized. It nourishes the Friendly Bacteria and is a widely used ingredient from chicory root.

Oligofructoseor Fructooligosaccharide (FOS) has 35 percent of the sweetness of sucrose, and its sweetening profile is similar to sugar. Standard inulin is slightly sweet, while high-performance inulin is not. Its solubility is higher than the classical fibers. When thoroughly mixed with liquid, inulin forms a gel and a white creamy structure, which is similar to fat. Its three-dimensional gel network, consisting of insoluble submicron crystalline inulin particles, immobilizes a large amount of water, assuring its physical stability.

The Global Inulin Market is forecasted to register a CAGR of 6.5 percentand reach a value of USD 2.1 billion, by 2024.

Weight Loss Ingredients Market is projected to reach an Industry Value of USD 408.36 billion by the end of 2024.

It has become a natural sugar replacer, used in every growing number of products, and its presence means that companies can also flag up the enhanced fibre content on the label. In some food industries, it is used as a substitute of fat, as a humectant (to keep things moist) or as thickening as a binding agent. These are also vital to maintain your bone health. The main advantage of inulin is that it helps to maintain the weight as obesity is a major concern of today's society.

In one documented case, inulin caused an anaphylactic reaction. As the use of inulinas an additive in the food industry increases, reports of allergic responses will probably increase.Inulin may be behind more food allergies than is currently recognized. The list of known allergies include: flatulence, bloating, cramps, abdominal pain, and diarrhea. As inulin permeates our food supply, the list of side effects is expected to grow.

SOURCE OF INGREDIENTS

Inulin is a part of our daily diet for hundreds of years. We find it in many fruits and vegetables such as bananas, onions and wheat. The root of the chicory plant (CicoriumIntybus) is the natural source of Frutafit® inulin and Frutalose® oligofructose.

Based on Ingredients through which inulin is produced are of following types:

- **Chicory Root:** Substitute for sugar or fat, humectant, thickening agent, or binding agent used in a multitude of baked items such as reduced fat, sugar-free cookies, bars, biscuits, pretzels, pancakes, French fry coatings, crackers, chips, and tortillas. Chicory root is the primary source of inulin industrially currently utilized.Chicory root extract is a dietarysupplement or food additive produced by mixing dried, ground chicory root with water, and removing the insoluble fractionby filtration and centrifugation.
- **Vegetables and plant-based sources:** Sources of inulin include many vegetables such as artichokes, agave nectar, yam, leek, garlic, asparagus, onion, and roots derived from plant sources such as dandelion, chicory.
- **Fruits:** Wide variety, such as bananas.
- **Herbs:** Sources of inulin are cinnamon, parsley, powdered red chili peppers, ground black pepper.
- **Wheat:** Derived from the wheat grain, primarily used via a flour source.

CONCLUSION

Inulin and oligofructose are widely used in functional foods throughout the world for their health-promoting and technological properties. They are ingredients of the future that meet the needs of the food industry today and are on the leading edge of the emerging trend toward functional foods.

* Auhtor is Copy Editor in Food Marketing and Technology Magazine

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New Option in Brilliant Orange

GNT Group has launched two new EXBERRY® Coloring Foods that deliver bright orange shades in powder and oil-dispersible formats. Made from paprika and carrot, the new Brilliant Orange products provide solutions for a range of applications.

The EXBERRY® Shade Brilliant Orange powder is oil-soluble and water-dispersible. It is designed for a broad range of applications including non-aerated confectionery, bakery and savory products. The oil-dispersible EXBERRY® Shade Brilliant Orange Intense, meanwhile, is ideal for coatings of compounds, spray-coated oil seasonings and other fat-based applications. The powder and oil-dispersible options are available in addition to the existing EXBERRY® Brilliant Orange liquid format.

The new products are pH-independent and offer good light and heat stability as well as a good shelf life. They are 100% plant-based, halal and kosher, and made without any chemical solvents. As such, they offer a perfect clean-label replacement for artificial colorants as well as additives such as annatto, beta carotene and paprika extract.

EXBERRY® COLORING FOODS ARE MADE FROM FRUIT, VEGETABLES AND EDIBLE PLANTS USING ONLY GENTLE PHYSICAL METHODS SUCH AS CHOPPING, HEATING AND FILTERING.

Sonja Scheffler, Product Manager at GNT, said: "We are delighted to add these new Brilliant Orange products to our range of EXBERRY® Coloring Foods. With a liquid format already available, it means we can help manufacturers deliver stunning orange shades for a vast range of food and drink applications." EXBERRY® Coloring Foods are made from fruit, vegetables and edible plants using only gentle physical methods such as chopping, heating and filtering. They retain the characteristic properties of the source material and the concentrates are not selectively extracted. As a result, they qualify for cleaner and clearer labelling declarations.

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STARCH

By Harsha Pore*

INTRODUCTION

The word starch came from German for root which means strong, stiff and strengthen. Starch is also known as amylum. Starch is a carbohydrate consisting of numerous glucose units joined by a glycosidic bond. Starch is the most common form of carbohydrate and is available in large number of food ingredients mainly in tubers and cereals, such as rice, wheat, potatoes, maize etc. We often think of potatoes as a "starchy" food, yet other plants contain a much greater percentage of starch (Potatoes 15%, Wheat 55%, Corn 65%, and Rice 75%).

Starch is a white or off-white, odorless, tasteless powder. It is granular organic chemical compound produced by plants. It is a polysaccharide comprising glucose monomers. The formula for starch is $(C_6H_{10}O_5)n.(H2O)$

The simplest form of starch is amylose and amylopectin, which is a mixture of these two molecules. Natural starches consist of 10 - 30 % of amylase and 70 - 90 % of amylopectin. Amylose is a linear polysaccharide composed entirely of D-glucose units joined by the α-1,4-glycosidic linkages. Amylopectin is a branched-chain polysaccharide composed of glucose units linked primarily by α-1,4-glycosidic bonds but with occasional α-1,6-glycosidic bonds, which are responsible for the branching.

ENERGY SOURCE

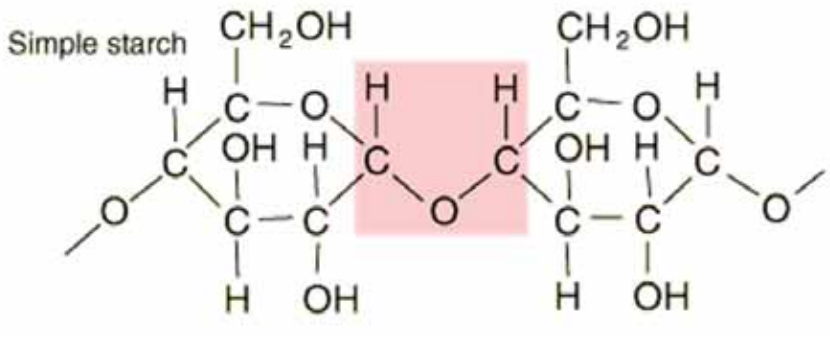
Starch is the storage of energy. In humans and other animals, starch from plants is broken down into its constituent sugar molecules, which supply energy to the tissues. The human digestive process breaks down the starches into glucose units with the aid of enzymes, and those glucose molecules can circulate in the blood stream as an energy source. Tillery, et al. point out an interesting example of this enzyme-catalyzed breakdown process. If you chew a piece of bread for a while, it will begin to taste sweet because of the enzymes in saliva are already beginning to break down the starch into glucose, a sugar.

STARCH INDUSTRY

The starch industry extracts and refines starches from seeds, roots and tubers, by wet grinding, washing, sieving and drying. The main commercial refined starches are cornstarch, tapioca, arrowroot, wheat, rice, and potato starches. These are natural starches, the chemically modified starch is also available in the market.

A modified starch is a starch that has been chemically modified to allow the starch for proper functioning under conditions frequently encountered during processing or storage, such as high heat, high shear, low pH, freeze/thaw and cooling.

Structure of starch



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APPLICATION OF STARCH IN FOOD INDUSTRY

Starch used as an additive in food industry, food starches can be used as a thickening and stabilising agent in foods such as puddings, Ice creams, Soups, Sauces, Gravies, Salad dressings. They function as thickeners, extenders, emulsion stabilizers and are exceptional binders in processed meats. Potato starch, corn starch and modified starch are highly used starches in food industry.

Resistant starch is also highly used starch in healthy food applications as it helps in digestion.

High amylose starch from corn has a higher gelatinization temperature than other types of starch and retains its resistant starch content through baking, mild extrusion and other food processing techniques. It is used as an insoluble dietary fiber in processed foods such as bread, pasta, cookies, crackers, pretzels and other low moisture foods. It is also utilized as a dietary supplement for its health benefits. Below are the examples.

1] Baked products (bread, pies, samosas, wafers, biscuits and sausages)

Baked products like biscuits, pies, bread, cakes wafers and sausages are high density products requiring heat resistant starches. Hence cross linked starches are used since they are more resistant to oven baking temperatures of 120 ≥ 230°C. Gelatinized starches are also used in ready-to-eat cereal meals such as corn-flakes, etc. The temperature, humidity and degree of stirring determine the texture and quality of the product.

2] Confectionery (candy, sweets and sweetmeat)

Oxidized starches have high clarity or transmittance, low viscosity and low temperature stability. It is frequently used in confectioneries for coating candies and sweets since they easily melt.

3] Gravies, soups and sauces (soups, sauces, tomato paste or ketchup)

Crosslinked starched have higher stability for granules-swelling, high temperature resistant, high

shear stability and acidic conditions stability. They are used as viscosifiers and texturizers in soups, sauces, gravies, bakery and dairy products. Etherified starches have improved clarity of starch paste, greater viscosity, reduced syneresis and freeze-thaw stability. Crosslinked starches

4] Mayonnaises, salad dressing, ice cream, spreads and beverages

Hydrolyzed and esterified starches are mostly used in salad dressing and beverages. Hydrolyzed starch (acid-modified starches) has lower paste viscosity under cold and hot conditions. Hence they are used in mayonnaises and salad dressing. Esterified starches have lower gelatinization temperature and retrogradation, lower tendency to form gels and higher paste clarity, and are used in refrigerated and frozen foods, as emulsion stabilizers and for encapsulation of beverage clouds.

5] Pasta (spaghettis, macaroni, others)

Pregelatinized and crosslinked starches are mostly used in pastas. Gelatinized starch affects pastas elasticity and softness, delectableness and digestibility. Crosslinking gives the needed structural firmness to the pasta.

6] Puddings (custard, pap, others)

Pregelatinized starches are used in puddings, instant lactic mixtures and breakfast foods to achieve thickening or water retention without employing heat. They are also used in ready-to-use bread mixtures. They are used where little or no heat is required and the increased absorption and retention of water improves the quality of the product; as an agglutinant in the meat industry; and as a filling for fruit pies. (Source: https://www.intechopen.com/books/chemical-properties-of-starch/chemical-properties-of-starch-and-its-application-in-the-food-industry)

The application of starch is wide. The industries manufacturing starches in large quantities and are readily available. In India and in abroad, starch application is very common. For every alternate use in cooking, manufacturing, baking starch has been used. The only issue with the starch is it gets retrograde after cooking, to avoid such retrogradation, we need to add gums in the products. The easy way to achieve desired softness and consistency in starch rich products. The industries like Cargill, Baneo, Ingredion are biggest players in starch manufacturing. Starch like resistant starches are healthy in nature and helps in digestion, also, main source of carbohydrates leads energy. Starches are very friendly in nature and can be used in cooking, just add a little and make your favorite dish.

* The Author is R & D Manager at Maverix Platforms Pvt Ltd

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Develop a Plant-based Range with Natural Cereal Bases

The cereal bases from a Belgian company help food specialists to easily create their own recipes for plantbased drinks, yoghurts, ice creams and desserts.

By using a natural process, Meurens Natural has preserved a maximum of features and properties of their raw materials (taste, color, minerals), allowing their customers to make delicious and authentic products. The range includes organic & natural bases made from oat, rice and spelt. The company can also produce tailor-made solutions.

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For example, simply add water to the bases to make a pure oat drink, free from any additives. You can then apply your own formulation to your taste, adding the ingredients of choice, to give it the desired taste and texture. These bases are also particularly suitable for making plant-based yoghurts, ice creams or desserts.

The bases save storage space with their concentrated format. They also provide great flexibility of use over time as their shelf life extends from 3 to 12 months depending on the products.

ORGANIC AND NATURAL RANGES

As a pioneer in the European organic sector for 30 years, Meurens have developed a unique range based on a completely natural process for the processing of their raw materials in a clean, simple and sustainable way.

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Doris Lengauer (on the right), Head of the experimental station for special crops in Wies, is happy with her team about the new color sorting device. Photo Sesotec GmbH

Best Color Sorting Ensures Purest Seeds

Cleaning process significantly improved in terms of accuracy and speed

The "Experimental Station for Special Cultures" in Wies in southwest Styria, Austria, is an institution of the Province of Styria. For more than five decades the experimental station has been a reliable partner of vegetable and horticultural businesses. Practical experimental work provides results for vegetable producers, commercial gardeners and herb companies. A further focus is the preservation of old, rare crop varieties. The product range comprises around 700 species and varieties of herb and vegetable seeds.

MANUAL SORTING OF SEEDS IS TIME-CONSUMING AND COSTLY

The work of the experimental station is characterized by practical experiments, special cultures are examined in small quantities and many different batches make the process complex. In addition, the seeds to be processed are differentiated according to size, color and shape as well as to different degrees of contamination. The manual sorting of the seeds is time-consuming and causes very high personnel costs.

Sesotec ASM supplied the intelligent optical sorter QUASAR 1000 for the sorting of small seed´s quantities. Thanks to the highresolution true-color cameras, the device can detect the finest color differences with the highest precision and eliminate off-colors. This guarantees maximum purity with minimum loss of good material. The sorter is very compact, the operation is easy to understand. Additional benefits are the good price-performance ratio and the excellent quality.

The installation of the intelligent optical sorter QUASAR 1000 has significantly improved the cleaning process in the test station in terms of accuracy and speed. The pre-cleaning is still carried out with simple devices, the post-sorting is no longer necessary and also saves costs. The whole process takes less time and gives a very high seed purity.

"Until now, we have sorted the seeds by hand and our team was busy with it for days. Definitely, the new sorter makes our work easier, which we are very pleased about," emphasizes test station manager Doris Lengauer. "We are also very satisfied with the machine in terms of price-performance, operability and product results, as well as with the support provided by the Sesotec staff."

From Bean to Burger: Food Disruption through High Moisture Extrusion Technology

By Anubha Garg PhD*

There has been an extraordinary trend toward plant-based diets in the last couple of years. More and more consumers are opting for vegetarian or vegan diets, or becoming flexitarians, reducing their meat consumption, and looking for attractive meat substitutes. In the social-media world, hashtags such as #meatfree or #govegan are among the most popular searches on Instagram, Twitter, and other platforms. Many people are trying to live more healthily and sustainably by re-thinking and re-evaluating their diets. Others are just curious about meat substitutes and are trying out the different products available on the market. It is now easy to spot such products in different supermarkets and the product portfolio for this segment is constantly expanding. These products are not only limited to plant-based burgers, chicken-like products, or minced meat, but there is also a large movement toward pork and fish substitutes.

THE ROLE OF HIGH MOISTURE EXTRUSION TECHNOLOGY

The versatile twin-screw high moisture extrusion technology has made it possible to achieve such a disruption in the food market. As the raw materials, mainly composed of protein concentrates and isolates, are fed into the extruder, the temperature, pressure, and shear conditions present inside the extruder enable restructuring of the plant proteins. These restructured proteins then flow into the cooling die, which helps to realign the proteins, resulting in fibrous and layered meat-like structures. For research purposes and product development, a small-scale cooling die in the throughput range of 50 kg/h is ideal, such as the PolyCool 50 supplied by Bühler. This level of throughput enables different recipes and process parameters to be explored without requiring enormous quantities of raw materials. It is also useful for prototyping and initial production set-up.

MARKET GROWTH AND DEMAND FOR SCALE-UP

The exceptional growth increase of this segment has led to a demand for increased throughput from the machines involved. The extruder is already an advanced machine with very high throughput capacity, however the cooling die is a much

more recent technology in terms of design. A scaleup is nonetheless required for the cooling die to match the standards of industry-scale production. Bühler's new PolyCool 500 is a one-of-a-kind cooling die that enables a production rate of around 500 kg/h for different ingredients and novel textures. Its new, hygienic wing door design is easy to clean, operate, and maintain.

THE NEXT GENERATION OF MEAT SUBSTITUTES

There is a great deal of ongoing research and development work, both toward recipe formulation as well as process optimization of high moisture extrusion. As an example, Bühler is engaged as an activity leader in a multi-partner research project under the EIT food umbrella. This project focuses on the process optimization and product development of meat substitutes. In addition to their active engagement in research, Bühler is a solution provider along the protein value chain, starting from grain handling, through grain processing, to the extruded meat substitute. With this holistic process knowledge, reliable machines, and large-scale capacity, Bühler can be seen as the market leader from bean to burger. Bühler's customers can profit from the state-of-the-art technology and personnel support at their application centers located in Uzwil (Switzerland), Minneapolis (USA), and Wuxi (China) to develop new recipes and processes. Some of the most popular ingredients used for these products include proteins from peas, soy, oats, rice, potatoes, and fava beans. Upcycling opportunities from oilseed's expeller cakes and side-stream valorization allow for the production of tasty and sustainable meat substitutes. Nowadays, the newer ingredients such as proteins from mushrooms or hemp, as well as proteins from bioreactors, are being scrutinized in terms of their function and potential for forming meat substitutes as soon as these raw materials become commercially available.

THE FUTURE OF FOOD

Currently, it is difficult to obtain a holistic understanding of the market due to the regional nature of data gathering, though some reliable studies predict that around 10 to 25% of the meat market will be replaced with plant-based meat substitutes within the next 5 to 10 years. This indicates a clear shift in consumer behavior. Aside from product and process development, universities and research institutes are also investigating other important factors, such as the digestibility characteristics of these products. In addition, the involvement of restaurants, canteens, and food chains, such as Burger King, is boosting the plant-based movement. Overall, consumers are accepting the meat substitutes with enthusiasm. However, acceptance is highly dependent on the taste and texture of the product. There is a large opportunity for the food industry to invest in this segment. Currently, a plethora of companies, ranging from start-ups to multinationals, are seeking to engage in the development and production of meat substitutes. Therefore, it can be said that there is a clear market need for plant-based meat substitutes, which represent the future of food.

* Author is PhD works with Bühler AG, Uzwil, Switzerland

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Optical Sorting Foreign Matter

By Mr. Gurinder S. Rance*

We all know that COVID-19 pandemic of 2020 had a deep impact on the Indian economy and industry, but there is a hope and opportunity that food processing business, will probably be the first to not only fully recover, but will do better than before.

Admittedly, it will go through changes which will become its long term routine which will stay and we shall have to adapt to this new normal. The rules on food safety are being tightened worldwide and consumers have also become more demanding

With more and more people putting their faith in packaged or ready to serve food, it has become even more important to live up to the expectations of the consumer or suffer a complete wipe-out of even the best established brands, in case ever any contaminated food reaches a client.

It has been the objective of responsible food processing firms to optimize their sorting process; to detect as many foreign materials and defects as possible and without unnecessarily removing good products

Most raw materials contain some components which are inedible or have variable physical characteristics. Manual sorting that is mostly done by human labour is no longer an option.

With migrant labour vary of coming back to cities; there might be a shortage of labour. Those who return might be commuting and living in close proximity with other labourthus the possibility of risk of spreading the virus. Risks of contamination at work places due to human touch,thus are very obvious. Thus time has come to make "Dark Factories" wherein there is minimum of labour used especially during the processing phase.

In such a scenario, besides other stages, the industry must aggressively remove foreign matter (FM) not only what comes along with raw material but also unwanted material after the process of de-hulling, de-shelling, trimming and destemming with the useof mechanical screening/metal detection as well as Optical / Laser sorters.

Unfortunately, you cannot control the condition of the raw material, as no two seasons are the same. However, you do want to offer consistent quality to your customers and an efficient industry recognizes that it's important to optimize your sorting process: to detect as many foreign materials and defects as possible, and quickly too.

To achieve this efficiency, Optical sorting technology was first considered in the 1930s for the sorting of agricultural produces like fruits and vegetables. In subsequent years new and improved sorting mechanisms were developed for the removal of product defects and foreign materials based on bulk density, colour, texture, size, shape, structural propertiesby the use of lasers, UV, and IR spectrum cameras, Laser-camera combination and software-driven intelligence to help achieve the unsullied qualityfinal product.

In this regard,Optimum NV of Belgiumwas founded in July 2017 that brought together the latest technology and a blend of the best options in optical sorting machines using sophisticated camera and laser technology, with a focus on all kinds of food products such as potato, French fries, carrots, sweets and seafood like crustaceans and shellfish. In addition, the systems are also used for some non-food applications, such as the optical inspection of tobacco products and plastics.

The FOCUS may be used on a stream of fresh, dried or frozen potato products, vegetables or fruit products, and also crustaceans and shellfish.

But that's not all: the FOCUS model may be expanded with a unique camera configuration, specially developed for the sorting of French fries. The additional cameras are arranged in such a way that five of the six sides of each French fry are always shown perpendicularly.

The NEXUS has an innovative, controlled product feed, which is able to adapt to the size of your product. A feed belt ensures that the products reach the inspection and ejection area at the same speed. This controlled product supply and internal resorting stream increase the certainty with which good and bad products are detected and ejected. You see this reflected in the quality of your good product and the optimal good-to-bad ratio.

The VENTUS may be equipped with up to 16 lasers (and 32 laser detectors). Thanks to the combination of different lasers with specific wavelengths, the VENTUS is able to sort extremely accurately on the basis of color, shape, structure and biological characteristics. Fluorescence lasers detect the chlorophyll content or the presence of harmful substances such as aflatoxin in nuts and dried fruits.

The coronavirus pandemic has changed almost everything, that's why we are taking even our remote service to the next level, so you can continue to count on us.

So if you want to sort optimally, want to deliver the highest possible quality, but not at the expense of your yield – then use the latest technology, sophisticated camera and laser technology – choose Optimum Sorting for reliability and service support.

Thus a great responsibility of building back the economy and strengthening the nation rests upon the Indian Food Processing Industry and we at KIRON FOOD PROCESSING TECHNOLOGIES LLP are here to support this mission.

* Autgor is Marketing Director in Kiron Food Processing Technologies LLP

Plant Hygiene – A Core of Food Safety during Food Processing

By Anurag Mishra and Shikha Mishra*

INTRODUCTION

A Food, if not safe, is not a Food - Last few words are as simple as you read. If the food you are eating is not safe for consumption then it may be something else but not food for sure. And to produce safe food one have to inculcate Food Safety from Farm to Fork or from Grass to Glass i.e. every aspect of the entire value chain.

When you talk about Food safety during the processing, Plant Hygiene is the core of managing most of the food safety risks which are reported most of the time and we will try to understand the various aspects of Plant Hygiene.

Plant hygiene can be divided into:

- Personal Hygiene
- Equipment Hygiene
- Infrastructural Hygiene

1 - Personal Hygiene: Personal Hygiene, the most critical from the external contamination (Physical, Biological and Chemical) point view, is nothing but ensuring that there is no any contamination getting introduced in the product or equipment by the personals who are working inside the processing plant.

Personal hygiene can be dived into:

A) Hand / Footwear Washing and Sanitizing- Most of the time contamination vectors are your hand and shoes because you touch various surfaces (including yourself) with your hand and shoes and if you are not cleaning these before entering to the plant then you are inviting various bugs to you processing environment. So as a very basic practices one need to clean and sanitize the hands and put a shoe cover (minimum) before entering to the manufacturing facility (Changing shoe is better option than using Shoe cover)

B) Personal Protective Equipment – These PPEs are not for you but for the manufacturing environment minimizing the contamination which may spread by you. PPEs are:

- Hair Cover (to minimize the hair fall into the product)
- Apron/ Plant Dress (To minimize the dust/ dirt/microbes coming from outside through you dress)
- Face Mask (to stop the microbial contamination)
- Beard Mask (For those who have beard)

C) Disease Control: In case personal working in the manufacturing facility is infected with any disease then he/she can be the biggest risk of spreading the contamination among workers and may end up contaminating the food you are processing. So it's very important that workers with any communicable disease must not be allowed to work in the manufacturing environment. Security checks at gates and self-declaration is the key to avoid this.

2- Equipment Hygiene: Equipment hygiene also plays a very critical role in producing safe food. Factors of equipment consist of:

A) Equipment Design – Equipment design plays a very important role ensuring safe food and plant hygiene. If equipment is not designed hygienically then it may be a source of contamination to the product and manufacturing environment.

B) Cleaning and Sanitation of the equipment: Periodic cleaning and Sanitation need to be done to mitigate any cross contamination. Cleaning in place (CIP) and Cleaning out Place (COP) both plays a major role to ensure contamination control and thus maintaining plant hygiene. Method of cleaning and sanitation (time/temperature / Concentration etc.) must be validated to ensure that cleaning and sanitation is effective.

C) Maintenance Activity: Maintenance of the equipment is a major source of physical and chemical hazard from food safety angle and maintaining high level of plant hygiene. One can easily see the grease & oil spillage and loose part etc. get scattered all across the plant if your maintenance activities are

not effective. This is not only good for plant hygiene but also from human safety as well, there are many examples get published on daily basis which are caused by such ill practices.

3- Infrastructural Hygiene: Last but definitely not the least part is hygiene which is been supported by the infrastructure of the plant. Infrastructure of the plant is:

A) Civil Infrastructure: The more organized civil structure of the plant helps in maintaining the right level of Hygiene. The civil infra includes, the floor, drains and its slope, wall's structure, Window, doors, minimal gaps/ opening to external environment, nearby surrounding, exterior environment, roof structure, electrical wiring etc. For example if your floor is not smooth enough to clean the accumulated dust then maintaining plant hygiene is not possible. If your drain slope is not inside out then it may choke or overflow during rain. If your Doors and windows are not fixed properly then it may be the cause of pest infestation etc. etc. Other than washrooms, cafeteria etc also plays a very important role in maintaining the Plant hygiene.

B) Man and Material Movement: If plant is not designed with proper flow of man and material's movement then you may experience cluttered stuffs all the time during operation and additionally material and man movement must be designed in such way so that its not infusing outer contamination to the manufacturing environment and thus affecting the plant hygiene.

C) Waste Management: Waste management can be clubbed in man and material movement but given the level of risk it possess to the plant hygiene , we need to focus on this very specifically . Recently there have been many cases of microbiological contamination (pathogen) reported globally and while identifying the root cause , it was identified that waste handling was the vector of the contamination . In process rejection waste, quality rejection waste, wash room waste and other office waste must be handled separately to ensure that it's not cross contaminating the manufacturing environment.

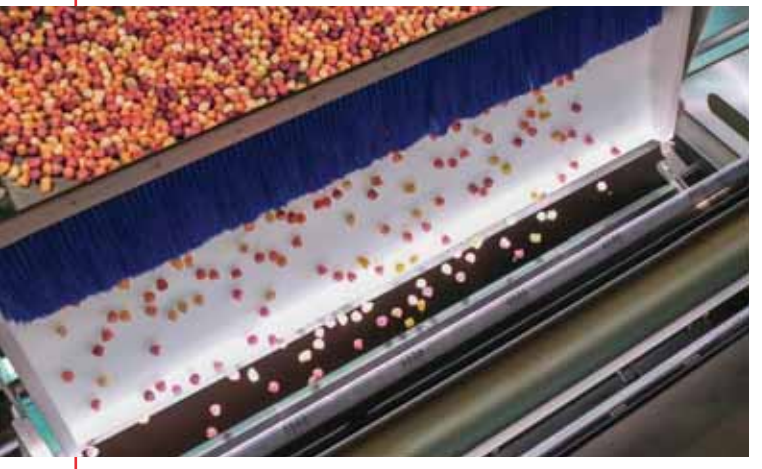
D) Maintenance, Cleaning and Sanitation: A good plant can be maintained in a same way with right and effective cleaning and sanitation practices. Civil infra, if not maintained properly then can lose its shine very soon, so right and correct Maintenance plan with effective cleaning and Sanitation is the critical part to sustain the civil part of the plan. Exhaustive preventive and scheduled maintenance, Master Cleaning and sanitation schedule covering every corner of the plant is required for sustainable plant hygiene.

Considering above, we can ensure the right level of hygiene in the plant to ensure safe food for our consumer.

* Author is Food Safety Professional and can be Reached at Anurag.ft@gmail.com. Shikha Mishra is a student of Ph.D. in Botany – Perusing

HEAT AND CONTROL

Key Technology Introduces VERYX Digital Sorters for Gummy Candies



Key Technology, a member of the Duravant family of operating companies, introduces VERYX® digital sorters for gummy candies. Designed specifically to detect and remove foreign material (FM) and gummies with bits of remaining starch as well as color and shape defects, VERYX enables gummy candy manufacturers to improve product quality and protect their brand while virtually eliminating false rejects to maximise profitability.

"VERYX's unique sensor configuration not only allows for the most thorough all-sided surface inspection, but also offers patented Pixel Fusion® for advanced detection," said Karel Van Velthoven, Advanced Inspection Systems Product Marketing Manager at Key. "Our gummy candy customers with installed VERYX systems are experiencing a sort accuracy that was unseen until now."

VERYX sorts oil-coated, sugar-coated, yoghurt-coated and vitamin-enhanced gummy candies. It detects colour, size, shape and structural properties to find gummies with bits of remaining starch, even when inspecting milky-white, yoghurt-coated candies that are the same colour as starch and have a similar texture. It detects all types of FM, including plastic and wood, to give candy manufacturers using plastic or wood trays in their candy-making process assurance that fragments of a broken tray don't get packaged with product. The sorter also detects colour defects such as mixed-colour gummies and shape defects such as clumps, conjoined gummies, malformed gummies, mold spills and more.

Key optimises VERYX with the ideal cameras, laser sensors, algorithms and ejection system for gummy candies. Additionally, an application-specific line layout with an optional defect resort system blends Key's expertise in digital sorting and mechanical product handling, further contributing to new standards of performance for gummy candy sorting. This integrated solution combines a chute-fed VERYX sorter with specialised Iso-Flo® and Impulse® vibratory shakers to achieve superior FM/defect removal rates with virtually no false rejects.

Equipped with front- and rear-mounted cameras, laser scanners and multi-sensor Pixel Fusion™ detection modules, VERYX views all sides of the product with no blind spots to find and remove more FM and defects. The next-generation 4-channel cameras and high resolution laser sensors offer twice the resolution of previous sensor technology to see smaller FM and defects, including gummies with bits of remaining starch as small as one square millimetre. Key's unique Pixel Fusion technology combines pixel-level input from multiple cameras and laser sensors to produce higher contrasts, enabling VERYX to find and remove the most difficult-to-detect FM and defects.

Object-based sorting facilitates advanced shape sorting algorithms and intelligent ejection on VERYX. While most gummy candy manufacturers will program their sorter to remove shape defects such as clumps and conjoined gummies, other minor misshaped gummies might actually delight young consumers and may be programmed as acceptable on the sorter. Intelligent ejection improves the accuracy of all FM/defect removal and reduces false rejects. Rather than firing an ejector at the defect itself, VERYX performs contour-based and/or centroid-based calculations to target ejectors at the object's center of mass to ensure FM/defect removal while maximising yield.

Product changeovers on VERYX are fast and easy. With double-sided Pixel Fusion, the detection system is so advanced, every type of gummy candy can be accurately sorted using the same background so hardware changes are eliminated. VERYX's unique recipe-based sorting takes away the hassle of configuring the sorter for each new type of candy. Changing over to a new gummy shape or color takes only a couple of taps on the touchscreen to load the dedicated recipe. This recipe-driven operation simplifies use and ensures repeatable results so product quality is guaranteed, regardless of personnel changes and across multiple lines and locations.

VERYX can also leverage Key's powerful Information Analytics software, which allows users to analyze and share big data across their enterprise via an OPCUA-compliant infrastructure at the same time they sort. Data about the sort process and about each and every object flowing through the sorter, whether the data is used to make sort decisions or not, is available to reveal patterns, trends and associations. This data can help a processor optimise processes upstream and downstream of the sorter to achieve the next level in operational efficiency.

VERYX is available in multiple sizes to satisfy a range of capacity requirements, with the highest volume system sorting up to five metric tons of gummy candies per hour.

Key Technology is represented exclusively in Australia, New Zealand and India by Heat and Control. Find out more at www.heatandcontrol.com or email info@heatandcontrol.com

ABOUT HEAT AND CONTROL

Established in 1950, Heat and Control is a privately-owned company with a global team that has built an extensive knowledge bank and developed a wealth of experience and expertise. Access to production and technical support from a network of engineers, food technicians, field service technicians, skilled tradespeople, and support teams provide food manufacturers with confidence to achieve production goals.

- Ten manufacturing facilities, 11 test centres, more than 30 offices globally
- Testing, design, engineering, manufacturing, installation commissioning, user training, spare parts, and provision of after sales service.

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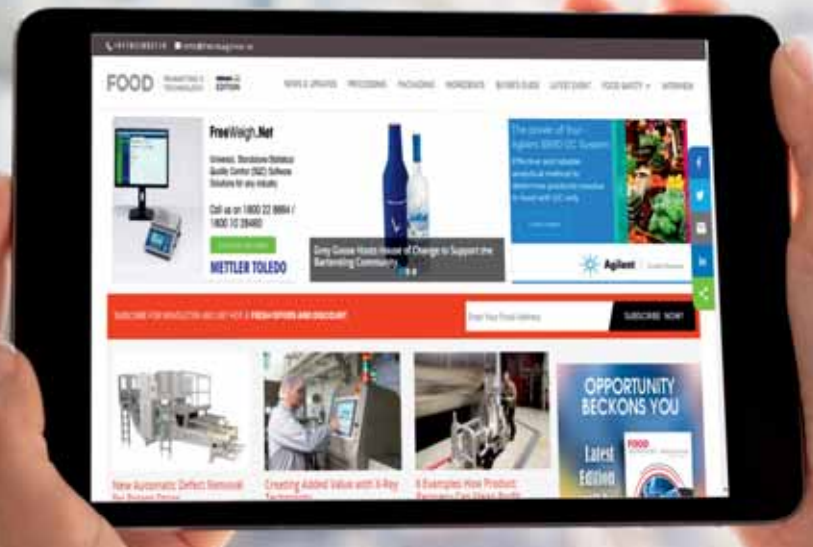

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Food Marketing and Technology Magazine, India, had an tete-a-tete with Murli Iyer, Business Head F&B at Ecolab India. During the interaction, he touched upon interesting topics including the challenges food and beverage companies are facing due to the COVID 19 and the ways Ecolab is working with them for the safety and sanitisation of plants.

Could you tell us in brief about the products and services of Ecolab for the food and beverage industry?

We offer a breadth of solutions to our dairy, beverage, food and brewery customers including products that clean and sanitize equipment as well as environmental surfaces. We help our customers generate deeper, more actionable insights that drive compliance in quality assurance, operational efficiency, and production optimization.

This supports our customers in creating a competitive advantage in the market while protecting their brands' quality and food safety worldwide. Ecolab employs a total plant assurance approach, offering a unique combination of world-class service, total impact solutions and unsurpassed industry expertise to customers around the world.

Today due to the epidemic situation the most important agenda in the minds of manufacturing companies are to keep the factory running, keep everyone working in it safe and produce safe clean food products. How does Ecolab address this major challenge companies face?

For years now, our plant cleaning and sanitation solutions have helped food and beverage businesses make product processing safer, while also ensuring the safety of their employees. With the Covid-19 pandemic, the issue of safety has taken centre stage. As they reopen post the lockdown, the focus for F&B companies undoubtedly been on getting their plants running and back to capacity in a safe and sustainable manner.

We've been working closely with our customers, supporting them as they grapple with the challenge of meeting the twin priorities of employee health as well as food safety. For instance, our 3D TRASAR® technology allows for 24x7 remote monitoring of key Cleaning in place operations in the plant by our expert engineers. Thus, our customers are assured of food safety despite limited employee strength in the plant. As businesses embrace the new normal, we are working even more closely with our F&B customers to help them come up to speed as quickly and safely as possible.

Could you draw a parallel between water and hygiene technologies to productivity?

Real and lasting change is accelerated when economic and environmental benefits are in alignment.

Therefore, we follow a TCO (Total cost of operations) approach that credibly documents operational, economic and resource savings related to water, energy, waste, their asset life, as well as employee safety.

By linking performance outcomes to sustainability metrics and cost savings, we quantify the bottom-line benefits of our solutions. In 2018, Ecolab helped customers conserve more than 188 billion gallons of water and save 19 trillion BTUs of energy globally. In addition, our customers could avoid 2.4 billion pounds of CO_2 emissions and eliminate 54 million pounds of waste using our solutions.

Please enlighten the readers with one to two examples in Indian conditions where Ecolab has

helped companies to achieve sustainability goal?

We use our TCO approach to help customers exceed their sustainability goal while offering them net monetary benefits. For example, one of our customers, a leading fried snacks manufacturer in India, was able to conserve 72000 litres of water in a year while saving 20% time in cleaning operations through our proprietary fryer cleaning program.

Similarly, one of our big dairy customers was facing issues with incoming milk quality from the milk chillers. We not only helped them improve the micro count of the milk but they also achieved a 10% reduction in their total cost of operations through our specialty cleaning program.

Food safety processes come with a price tag with every intervention that may increase the cost of production so how does a small company balance these factors?

This is extremely relevant today since plants are struggling to balance the higher cost of employee safety against diminishing demand in certain segments. However, improvement in food safety need not always come at a higher cost. Our proprietary cleaning and sanitation programs ensure that food safety is never compromised while allowing customers to reduce costs through lower utility expenses and productivity improvement. Thus, food safety standards can go up without a substantial increase in cost.

Due to the unusual situation in the world the demand for some technology companies have risen more than the others. What is your estimate about the growth of industrial cleaning and sanitation industry?

As mentioned before, food safety and employee health have become more important than ever for F&B businesses in the wake of the pandemic. Maintaining the highest standards of cleaning, sanitation and infection control practices while limiting physical interactions is top priority of all industrial customers. Therefore, industrial cleaning and sanitation solutions are in much greater demand and technology has a big role to play here.

IN INDIA, WE ARE COMMITTED TO OUR VISION OF PROVIDING AND PROTECTING WHAT IS VITAL: CLEAN WATER, SAFE FOOD, ABUNDANT ENERGY AND HEALTHY ENVIRONMENTS. OUR BUSINESS IS CLOSELY ALIGNED WITH GLOBAL MACRO TRENDS, INCLUDING THE GROWING POPULATION AND WITH IT, INCREASED DEMAND FOR FOOD, WATER AND HEALTHY ENVIRONMENT IN A WORLD OF LIMITED RESOURCES.

The environmental hygiene category comprising of general cleaners and sanitizers for plant facilities is quite small in India compared to other countries. However, we can expect to see an uptick in the demand, along with an increased need for hand hygiene products (a highly commoditized category). In turn, this will spur the industrial cleaning and sanitation segment.

Innovative digital solutions that help companies keep a strict check on hygiene compliance and 24x7 remote monitoring of key cleaning and sanitation processes, will only drive faster adoption of these solutions.

Ecolab has recently launched the Drysan Duo™ single step dry cleaner cum sanitizer and Tsunami 100 fruit and vegetable sanitizer. How does it help the customer in these times?

The Drysan Duo™ is a ready-to-use spray and wipe cleaner cum sanitizer. It can be used to clean and sanitatize food contact surfaces in plants as well as in offices; especially where the use of water-mixed products is not possible. It is a one-of-a-kind product that cleans and sanitizes unlike most other products which are either cleaners or sanitizers.

In these times, there is significant load on the entire cold chain infrastructure given the high demand for home delivery of essential food items. In such a scenario, the Tsunami-100 offers increased shelf life of fresh fruits and vegetables through control of microbial load which can be a boon for farm to fork integrators.

What is the market share of Ecolab in India? What are the strategies in place to increase it?

In India, we are committed to our vision of providing and protecting what is vital: clean water, safe food, abundant energy and healthy environments. Our business is closely aligned with global macro trends, including the growing population and with it, increased demand for food, water and healthy environment in a world of limited resources. As we look to the future, our core capabilities will remain vital to a wide range of industries, with tremendous growth potential, but we continually refocus our strategy to ensure we're meeting the business goals of our customers.

Sustainable Contamination Protection

SÜDPACK films promote safe and dependable supply

The current SARS-CoV-2 / COVID-19-pandemic has underscored it once again: protecting sensitive, vital products remains the key contribution that packaging solutions make to sustainability. Damaged, spoiled or even contaminated food and medical products are harmful for both human beings and the environment. With their packaging solutions, film manufacturers like SÜDPACK Verpackungen GmbH & Co. KG are making a system-relevant and sustainable contribution to ensuring a safe supply for the population – and that not just during the current "corona crisis."

In the sometimes heated debate over plastic packaging, this central aspect is often neglected: when it comes to protecting sensitive and easily spoiled food products like cheese, meat or sausages, in many cases there are hardly any equivalent alternatives for plastic packaging.

"Choosing not to use plastics often means making significant sacrifices in product protection and shelf life," says Erik Bouts, Spokesperson for the Senior Management of the SÜDPACK Group. Meat products, for example, have a longer shelf life of up to 25 days – without compromising on quality and hygiene. And SÜDPACK films deliver similar benefits for many other food products.

"Plastic packaging and sustainability are by no means opposites," Erik Bouts says. "On the contrary: nothing has such a strong negative impact on the climate budget as the loss of resourceintensive products due to spoilage or damage. Our films prevent precisely these types of loss – and actively help protect human beings and the environment."

Just how essential this aspect is can be seen in the current SARS-CoV-2 / COVID-19 pandemic: "Thanks to their excellent barrier properties, our films also and especially protect their contents from contamination by bacteria or viruses," says Erik Bouts. "Our solutions are extremely durable – without compromising the quality of the packaged product."

This high level of protection explains why the German Federal Ministry of Food and Agriculture now has classified film packaging solutions as system-relevant: by ensuring safe transport and helping citizens to plan and set aside provisions, they are a critical component of providing the population with safe, uncontaminated food products. Consequently, for the past several weeks, film production has been running at full speed at SÜDPACK headquarters in Ochsenhausen, Germany, and its other sites.

"Our employees are giving their all to ensure there are no shortages in the availability of film packaging," emphasizes Erik Bouts. "In some cases, we've added extra shifts – and at the same time, introduced even stricter safety measures."

SAFE PACKAGING FOR MEDICAL PRODUCTS

Not only for food products but also in the Healthcare sector film packaging solutions have become practically indispensable: in order to ensure the safety of patients and medical staff alike, sterile packaging is required for syringes, bandages, diagnostics and countless other healthcare products. Film packaging solutions are the first choice here since they not only protect against damage but also against contamination with germs.

SÜDPACK Medica manufactures tailormade film packaging solutions for a broad range of medical, pharmaceutical, and diagnostic products – some of which are now being used to combat the spread of SARS-CoV-2 / COVID-19.

"In this critical situation, we bear a special responsibility", says Thomas Freis, Managing Director of SÜDPACK Medica. "Ensuring the safety of our employees, society at large, and patients around the globe who depend on safe health technology, pharmaceutical and diagnostic products is part of our core values."

PART OF A COMPREHENSIVE SUSTAINABILITY STRATEGY

Protection and safety, both in its manufacturing processes and in the products themselves, are central elements of SÜDPACK's company-wide sustainability strategy, as manifested in their roadmap for sustainable film packaging: achieving resource conservation through downgauging as well as better overall recyclability through the use of recyclable materials and renewable raw materials are two important parameters that SÜDPACK uses to measure its own progress in terms of sustainability. Over the past few years, the company has made major advances in all these areas: today, SÜDPACK offers more sustainable product variants in every product segment of its portfolio.

"We're proud of the fact that we're now one of the leading providers of safe and sustainable film solutions," says Erik Bouts.

Active and Intelligent Packaging: An efficient way of food value chain management

By Prof. J Mitra*

INTRODUCTION

The basic concept of packaging is to contain the food, provide physical, chemical, or microbial contaminant free food to consumer and nonetheless to communicate the product composition and properties.Of late,the growing consumerdemand for increased shelf life, minimally processed food hascompelled the food scientists and packaging industriesto develop innovative solutions to address the changing demands of the consumers. These resulted in active and intelligent packaging. Active packaging is used to increase protection function of package by enhancing mechanical, barrier, optical and most commonly antimicrobial property. However, intelligent packaging is an extension of communication function of the package.

Food is a highly perishable and readily interact with the ambience. Intrinsic factors affecting the food quality include pH, water activity (aw), nutrients, presence of antimicrobial compounds, respiration rate, and the biological structure, initial microbial load; whereas, extrinsic factors include storage temperature, relative humidity (RH), and the surrounding gas composition.

Figure1: Active agents for active food packaging(source: Vilela et al. 2018)

ACTIVE PACKAGING

Active packaging interacts with the food or with the headspace gas composition to add certain functionality to the package. These are optical barrier, oxygen scavengers, ethylene scavengers, liquid and moisture absorbers, flavour and odour absorbers or releasers, antimicrobials, and very recently nanocomposites etc.Nanostructures immobilize enzymes, kill/inactivate microbes, act as biosensors etc.

INTELLIGENT PACKAGING SENSE, DETECT AND INFORM THE CONSUMER ABOUT THE QUALITY OF THE PRODUCT.

Table 1: Common active packaging systems:

Active Packaging systems	Mechanism/compounds	Commercial names
Oxygen Scavengers	Iron, iron salts,photosensitive colouring matter,Ascorbic acid, unsaturated fatty acids (oleic, linoleic), Enzymes (glucose oxidase/catalase, alcohol oxidase), Mechanism: Get oxidised and control the oxygen concentration inside the package.	Independent systems: Ageless®, ATCO® oxygen scavengers, FreshPax®, FreshMax®,FreshCard®,Freshilizer ®, O-BUSTER. Integrated systems: SHELFPLUS® O2, OxyguardTM,OxbarTM, CryovacOS,valOR ActivBloc100, Amosorb series, ZERO2, Bioka Oxygen Scavenging Film Laminate, and ActiTUF®
Ethylene Scavengers		Ethylene Control Power Pellet sachets and Retarder®, Bio-fresh packaging system, Ethysorb, Evert-Fresh Green Bags®, PEAKfresh®,Profresh.
Moisture Absorbers	Silica gel, montmorillonite, molecularsieves, carbohydrates, minerals, calcium oxide, cellulose fibres, polyacrylate salts and polypropylene glycol.	ADPTM, Dri-FreshTM, InflexTM, ToppanTM, Crisp-itTM, Dri-FreshTM Resolve, Eat-FreshTM, Dri-Loc®, Lite-Loc® Plus, Humidipak, Luquasorb® FP 800, Luquasorb® P 1480, NatraSorb®, ATCO Pad, and Pichit.
Flavour and Odour Absorber/Releaser	eliminate, undesirable compounds/odour releasingdesirable compounds	Releaser: Aroma-Can® and Compel Aroma®. ABSCENTS, Aroma-Can®, ATCO® oxygen scavengers, Compel Aroma®, ODORLESS D, and Sincera® Absorber: Minipax, Natrasorb, 2-in-1 Pak® are multipurpose absorbent. BHM powder (EKA Noble), ABSCENTS Deodorizing powders
Antimicrobials	Ethanol, carbon dioxide, silver ions,chelators, etc. chlorine dioxide, antibiotics, organic acids, essential oils, spices, and allyl isothiocyanate etc. bacteriocins such as nisin,lacticin, and pediocin. Chitosan.	CO2 releasing: Ageless® G, FreshPax, and Freshilizer®. Agion® Antimicrobial: microbeguard®, food touchTM and Ciba® irgaguard
Antioxidants	vitamin E, phenolic compounds, terpenes, cyclodextrins	

Oxygen Scavengers

The deteriorative reactions in many foods accelerate by oxygen,produceoff-flavours, change colours, degrade vitamins (vitamins A, C, E), causes rancidity (oils, nuts, and fatty foods), and induces microbial growth.This can be controlled by oxygenscavengersto as low as 0.01% oxygen.

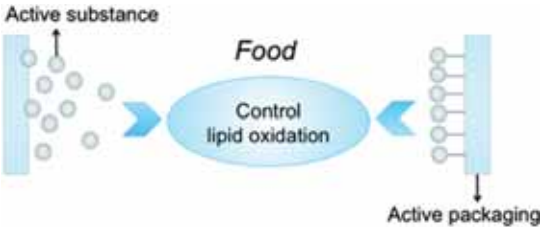

Figure 3: Active packaging to control lipid oxidation (source: Emma eley, 2013)

Ethylene Scavengers

Ethylenecauses ripening, tissues oftening, chlorophylls degradation, and consequently deterioration of fresh fruits and vegetables specially in climacteric fruits and vegetables such as apples, kiwis, bananas, mangos, tomatoes, onions, carrots, and asparagus.

Moisture Absorbers

High moisture causes softening of dry and crunchy products (snacks, biscuits, pasta, cookies), initiate microbial growth, and causes caking in milk or coffee powders.moisture absorbers are selected based onintrinsic and extrinsic factors.

Flavour Releaser/Odour Absorber

Release of artificial flavour/aromas during storage are controlled by temp, pH, RHetc. Gradual release of flavours can offset the natural loss of taste or smell of products with long shelflife.

Antimicrobials

Volatile antimicrobials of package can penetrate most of the food matrix and offer antimicrobial effect. High carbon dioxide concentration is desired for fresh and processed fish, meats, cheeses, and baked goods, to retain the organoleptic properties of the products and to impart bacteriostatic effect.

Figure 4: Smart packaging can promote traceability, product security, sustainability (Newswire.com)

Antioxidants

Oxidation of lipids, nuts, butter, fresh meat, meat derivatives, bakery products, fruits and vegetables leads to reduction in shelf-life due to changes in taste, odour, nutritional quality, texture and functionality of muscle foods.Radical scavengers eliminate free radicals as soon as they are formed.

INTELLIGENT PACKAGING

Intelligent packaging sense, detect and inform the consumer about the quality of the product. This quality changes can cause due to temperature fluctuations during transfer and storage, microbiological contamination of food, physical damage, tearing etc.Intelligent packaging includes time-temperature indicators, gas detectors, and freshness and/or ripening indicators.

Figure5: Time temperature indicators (tiptemp.com)

Table 2: Common intelligent packaging systems:

Intelligent Packaging systems	Mechanism	Commercial names
Time-Temperature Indicators (TTI)	Based on enzymatic reactions, polymerization, or chemical diffusion.	Ovum and Novus Ice, Monitor MarkTM, Warm Mark Time-Temp Tags, Check Point, Cold SNAP, Fresh-Check®, Log-ic®, ThermRF tag, Coldmark, ThermRF Logger, and ThermRF Tag. Log-ic® RFID and VarioSens®
Freshness Ripening Indicators	Indirect detection: colour indicators (pH). Direct detection: biosensors Detect genetic modification, and food safety, presence of Salmonella sp., Campylobacter sp., Listeria sp., Escherichia coli, etc.	FreshTags®, (Eo)®, Timestrip®, ripeSense®, SensorQTM Food Sentinel SystemTM (detect food pathogens) Toxin Guard™
Integrity indicators	Chemical or enzymatic reactions based. Redox dyes (methylene blue, 2, 6-dichoroindophenol) for O2 intelligentink detects presence of oxygen by changing its color	O2 indicator:Ageless Eye®, Wondersensor O2 absorber:Wonderkeep

Time-Temperature Indicators (TTI)

Temperature fluctuation during storage and transportation induce chemical, biochemical and microbial changes to perishable foods; hence, the shelf life deviates from the designed one. TTI are strictly irreversible. They arevisual indicators and radio frequency identification (RFID) tags.The RFID tag uses RF electromagnetic fields to store and communicate real-time information of the product.RFID tag (inbuilt microchip connected to a tiny antenna)remotely monitor multiple items at a time and store it.

Integrity indicators

The headspace gas composition, moisture and temperature may change due to leaks/tear of the package.Chemical or enzymatic reactions causes colour change in most of the indicators when it reaches the critical limit.

Freshness and/or Ripening Indicators

Freshness indicators (FI)indicate the quality by measuring the concentration changes of metabolites(glucose, organic acids, ethanol, carbon dioxide, biogenic amines, volatile nitrogenous or sulphuric compounds) during storage which signify microbial growth for meat, fish etc., and diacetyl, amines, carbon dioxide, ammonia and hydrogen sulfide, produced during aging of foods.

Figure 5: The colour sensor for meat based on ammonia detection.For spoiled meat, the bottom of the hourglass appears grey. (photo: To-Genkyo).

Other systems

Scavenger antibodyoffers a higher sensitivity towards atoxic substance.Nanocomposites retain freshness, show high barrier and antimicrobialproperty, thermal buffering, and deliver nutrients also. Nanofibers and microfibers encapsulate bioactive moleculesmay dictate the future packaging strategies using biosensors. Nanosensors detect the antigens-antibodies binding, enzymes and substrate/cofactor, through a physical and/or electromechanical signal and detect chemical contaminants, toxins and antibiotic residues in food.

Figure: Freshness indicators (packagingconnections.com and foodbev.com)

CONCLUSION

The primary objectives of packaging i.e., protection and communication have come across a huge transformation as active and intelligent packaging systems, which truly offers exciting opportunities for food industries. Oxygen scavengers and moisture absorbers are by far the most commercially important sub-categories of active packaging followed by TTIs.

The upcoming change in food packaging using nanotechnology and electronic devices is inevitable and will significantly reduce the food losses in future. However, the scientist and food industry people should tactfully deal with the technological issues as well as cost-economics for large-scale implementation of active and intelligent packaging.

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Atmanirbhar Bharat: Implication and Opportunity for Food Processing Industry

The 'Atma Nirbhar' economic stimulus package, to the tune of 10% of the GDP (Rs 21 lakh crores) cushions the economy to a certain extent, but certainly there is more than can and should be done until the structural reforms being implemented.

Fi India and Hi along with Suman Food Consultants conducted a webinar on ATMANIRBHAR BHARAT - Implication And Opportunity For Food Processing Industry on 18 June 2020.

The webinar highlighted the impact of several relief packages being announced for Food Industry in multiple tranches of these economic reforms. Eminent industry experts discussed on how these challenges can be turned in to opportunities to make the Indian Food Industry self-reliant i.e. "Atmanirbhar".

The lockdown crisis has certainly probed the Indian Government to push a big economic reform – ATMANIRBHAR ABHIYAAN, a relief package and incentives for the Indian Industry aimed to make the nation self-reliant and to counter the economic impact of the Covid-19 pandemic.

THERE WERE FIVE SPEAKERS

1. AKSHAY BECTOR, Chairman & MD Cremica Food Industries Ltd
2. ANAAM SHARMA, Sr. Manager Corporate Affairs Coca – Cola India Pvt. Ltd
3. NITIN PURI, Sr. President Food & Agri Strategic Advisory & Research, YES BANK
4. SAMANA TEJANI, Director – Production Gits Food Products Pvt.Ltd
5. SAGAR KURADE, Managing Director Suman Food Consultants

Mr. Nitin Puri Sr. President Food & Agri Strategic Advisory & Research, YES BANK, explained in this webinar that Processing of food is not the only way to add value and increase farmer's income. Some other factors like farmer's varieties, back end skilling, lower pesticide residue and quality also help for right impact. According to Mr. Akshay Bector, MNC's have added a considerable amount of value to the ecosystem. He believes that collaborations with multinational companies bring management technical know-how to the country while contributing to the economy. Mr. Samana Tejani elaborated his point of view that technology wise, India is way behind, foreign collaborations help in development. Additional highlights of the discussion were the need for preprocessing infrastructure to carry the supply chain forward and the need for the right value chain.

As per the opinion of Mr. Anaam Sharma, Atamnirbharta is a journey which has to transverse over time, the technology and the machines are imported to match quality, which can't be achieved on locally available technology. Atamnirbharta in the supply chain is not enough; the source of funds have to be widely used. Nitin Puri addressed the need to widen the scope to include the fresh food produce space. He highlighted that the demand side disruptions and consumers' behavioral changes have happened for the better. "The focus on health and immunity will give birth to the new categories, innovations in India"

Wear-resistant sliding movement in an extremely small space with FDA compliant iglidur tribo-polymer coating from igus for Food Industry

Picture PM4319-1
Wear-resistant sliding in extremely small spaces: new coating materials made of tribologically optimised iglidur plastics make metal surfaces abrasion-resistant. (Source: igus GmbH)

iglidur coating technology with igus tribo-plastics makes surfaces of metal components resistant to abrasion

For lubrication-free sliding in a very small space, igus has now developed three new materials made of maintenance-free tribo-polymers as coating material for metal components such as metal sheets, valves or even shafts. This means that, for users who do not have enough space to install a plain bearing, a wear-resistant, compact and cost-effective solution is now available.

In Food and Packaging industry, the demand for space-saving machines is growing unceasingly. As a consequence, technical design engineers are creating small machines and equipment for use where installation space is at a premium. As regards components, more solutions are called for in the area of plain bearing technology as every single millimetre counts. In order to meet the new requirements in the area of mechanical engineering, igus has made use of its decades-long experience in the development of tribologically optimised plastics and has now developed three new maintenance-free and lubrication-free tribo-polymers as coating materials specially for very small installation spaces. As a result, not only the lubrication-free iglidur plain bearings but also the iglidur coating service for metal surfaces with the material iglidur IC-01 and the new IC-02, IC-03, IC-06 & FDA compliant IC-05 materials are now available to the user.

Less installation space due to coating

The installation space needed for a plain bearing can be reduced through the use of a coating: ideal for small and compact machines and equipment. Thanks to the polymer coating, the surface of moving components is extremely durable and wear-resistant. The surface is also corrosion-free and resistant to chemicals thanks to the tribo-polymers. The coatings are used in valves, pumps, for guide plates and for guide systems.

ABOUT IGUS

igus GmbH is a globally leading manufacturer of energy chain systems and polymer plain bearings. The Cologne-based family business has offices in 35 countries and employs around 4,150 people around the world. In 2018, igus generated a turnover of 748 million euros with motion plastics, plastic components for moving applications. igus operates the largest test laboratories and factories in its sector to offer customers quick turnaround times on innovative products and solutions tailored to their needs.

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Innovation in Food Packaging in Post Lockdown 4.0

By Swati Solanki*

A Webinar on "bringing sustainability and innovation in food packaging post lockdown 4.0" held on 22 May, Friday at 11:00 am in India.

It Includes some speakers:

- Anand Ramanathan, Partner, Deloitte India (Moderator)
- Harish Kumar, Assistant Director – Food Safety and Standards Authority of India (FSSAI)
- Ramesh Ramchandran, Associate Director - Food packaging sustainability - R&D, AMESA & APAC, PepsiCo
- Barun Banerjee, Head of packaging, Nestle India
- Dr. Ashok Tyagi, Executive Director, Haldiram's
- S.N Venkatraman, Divisional Marketing Head, ITC
- Akshay Kanoria, Executive Director, TCPL Packaging
- Rhea M Singhal, Founder, Ecoware

The session was moderated by Anand Ramanathan, Partner, Deloitte India.

The panelists shared insights on underlining the food safety and contamination risk involved in food packaging, reshaping the food packaging industry while keeping sustainability in the front seat and transformation through packaging innovation, while being compliant to the pandemic situation.

Barun Banerjee gives his point of view and says that we have to do risk assessment. We should use plastics that are reusable in home consumption.

In this webinar all the panelists discussed about concerns of food safety and an approach to staying ahead of the curve by adopting innovative yet sustainable packaging for food and beverages.

All the companies should not change their strategies but should innovate the old one for example Nestle is not looking to convert their stratergies but the Product categories, The channels, Route to market, E-Commerce should come up again and again. So the innovation has to be done in E- commerce Packaging, larger packaging formats. The packaging should provide us freshness and long shelf life. The value chain mapping should be good, So that the delivery will be faster. We should keep in mind these three pillars that is Right design, Right time, Right material should be used. Recycling is also very important. Food Safety is mandatory and is on priority. Ecofriendly material should be used.

They also discussed about NetSCoFAN, a network of research & academic institutions working in the area of food & nutrition. It is the collection and development of database on food safety issues for risk assessment activities. The nutritional value of packaging should also be immersed. There is no quick fix here but yes the packaging material should inhibit the growth of microbes. Haldiram organises various sustainability programs to reduce the plastic use from food packaging. They supply plastic to various vendors like to various roads, cement industry etc.

The Covid-19 pandemic is bringing new challenges among businesses and pushing them to innovate and adopt flexible and sustainable food packaging solutions.

Summarising their words they said that recycling is the key factor for sustainable packaging. Home delivery should be preferred and the most important that manufacturing process should be taken in mind.

* Auhtor is Copy Editor in Food Marketing and Technology Magazine

The Ticket to Quality and Safety

Optimising your metal detection system

When dealing with products intended for human consumption, like foods and pharmaceuticals, every care must be taken to ensure that they meet the highest safety standards possible. It is simply not an area where brands can afford to take any risks, or gamble with their reputations.

Due to their impact on consumer health, harm to brand reputation and the financial implications of legal proceedings, even minor quality shortcomings in the production process can be hugely damaging, perhaps irreversibly so for consumer brands. Product recalls are a particularly embarrassing and costly outcome for a producer to endure. The detection of hazardous foreign objects, such as ferrous metals, non-ferrous metals and stainless steels, is hence an area of massive importance.

The latest food and pharmaceutical industry trends show that consumers, whilst attracted by low prices in uncertain financial times, are nonetheless increasingly drawn to product safety and quality re-assurance. It is vital that brands find a cost-effective way to meet these contemporary demands and advanced metal detection systems provide a solution.

A NECESSARY PROCESS

"Every company needs to perform a hazard analysis for every product it produces to assess the risk of metal contamination in their products. If the hazard analysis shows there is a risk of metal contamination, then, a metal detector will be required." British Retail Consortium (BRC) - Global Standard Guidelines

An optimised metal detection programme is not a matter of choice for food and pharmaceutical producers – it is a matter of legal necessity.

To identify and remove contaminated products from the production line, metal detection solutions use either "balanced-coil" or "ferrous-in-foil" search heads. Balanced coil heads can detect all types of metal contaminants, including ferrous, non-ferrous and stainless steels, in fresh and frozen foods, while multi-simultaneous frequency heads are used to detect ferrous metals and magnetic stainless steels within fresh or frozen products packed in aluminium foil wrapping. Balanced coil systems are by far the most common metal detectors in use. Systems of this type recognise any trace of metal through a three-coil arrangement that generates a high-frequency field, the voltage of which is disturbed by the presence of any metals in any material passing through it. Products can be inspected in the bulk processing phase or in their finished form, although a combination of the two is most effective.

Producers faced with choosing a metal detection system must sort through numerous parameters that influence which system is ideal to handle the varied potential sources of contamination, so partnering with an experienced supplier is important to guarantee food safety. They must choose a supplier that can tailor solutions to their specific product and application needs, and provide the highest quality equipment and assistance without the burden of unnecessary cost.

FITTING THE BILL

The key to an effective metal detection programme is rooted in optimisation around certain key areas: product type, packaging used and the particular working environment. The array of available system options means that virtually any type of food, in any unusual shape or size, or any type of specialist package, can be inspected with equal rigour. A top-level metal detection supplier will take all of these into account, working with the producer at all stages so that their requirements are fulfilled.

The product being inspected will govern the search head design and aperture which is the opening through which the product passes. Detectors with a "balanced coil" search head can inspect unwrapped or wrapped fresh or frozen products, even products wrapped in metallised film. Detectors utilising the latest multi- simultaneous frequency technology to push metal detector performance to another level. This technology incorporates a product signal suppression technique to effectively cancel out the product signal from difficult to inspect products. Cancelling these product signals or the effect of the package makes it easier to detect metal contaminants up to 50% smaller than previously possible.

For meeting local and global compliance needs, the processed food manufacturers are implementing data collection software which maximizes rigorous quality regimes and optimizes their production. It significantly reduces complexity and sources of error caused by multiple operating systems and proprietary machine software.

The choice of the most appropriate automatic rejection system to remove contaminated items also depends on the product and application and several options are available.

A pneumatic air blast is ideal for light, single-file, discrete products running on a narrow belt, while a punch/pusher design suits light- to medium-weight discrete packs that are spaced and oriented on a narrow belt. A sweep or diverted arm is suitable for light- to medium-weight, discrete, random non-oriented products running on a narrow belt, typically up to 350mm wide. An end flap/dump suits random, small discrete items or loose bulk items (dry or sticky) running on a wide flat or dished inclined conveyor belt, while a retracting belt is reliable for most applications when more than one product passes in-line across the width of the conveyor. Lastly, for bulk loose, dry or sticky products, or multiple random items, a reverse belt is ideal.

During the manufacturing process, products come under threat of contamination from numerous sources, from the processing of raw materials through to in-house filling and packaging. For instance, mince meat products are at risk of metal contamination from metal tags in the raw material stage, from personal effects such as jewellery and buttons in handling, and metal fragments from in-house milling machines. An appropriate metal detection solution must be devised to take account of these factors – finding the right balance between in-process and finished product inspection.

The manufacturing environment is no less important in dictating the specific detection solution required. In some plants, the slightest temperature variation or vibrations from motors and pulleys can induce false rejection of a perfectly safe product when inferior metal detectors are used. Microscopic movements of the coils relative to each other as small as one micron can cause a signal sufficient to result in a false rejection. One way to negate this problem is by "potting" the detector case - filling it with an appropriate material, the weight of which prevents relative movement of the coils. Similarly, temperature changes, build-up of product in the aperture, ageing of electric components and slow changes in the mechanical structure will also contribute to an out-of-balance voltage. This can be eliminated by electronic techniques such as Automatic Balance Control or quartz crystal control, which enable the detector to permanently maintain this sensitivity without operator attention and without the generation of false rejects.

One feature that all metal detection systems must observe is a metal free zone (MFZ) in the area immediately adjacent to the detector head. The MFZ is necessary to negate the magnetic field leaking from the detector's metal case through the aperture. It is therefore necessary to have an area containing no metals around the opening. Technological expertise and experience are required to find the absolute optimum size for the MFZ. Also, producers with limited space are now able to install a compact unit utilising "zero metal free zone" technology, where the MFZ is much smaller.

To ensure that a reject device is operating properly, that contaminated packs are accurately rejected and the metal detection system is operating effectively, additional devices can be included. These customized features may include a container or rejected product bin to collect contaminated product, failsafe systems and alarms to indicate the occurrence of faults in the detector or rejection device or reject confirmation systems to confirm that the correct product has been rejected from the production line. Producers also have the option of adding further features such as high level warning beacons or audible alarms that can signal when a problem occurs. These additional features allow food producers wide scope in customizing their setup – taking account of product type and, crucially, available budget.

Clearly, manufacturers must consider every last detail in order to optimise the performance of their metal detection programme. They must be able to rely on experienced, reliable and flexible machinery suppliers to ensure all specific criteria are met – whether dealing with fresh or frozen, wrapped or unwrapped products.

KEEPING STANDARDS HIGH

Technological innovation and efficiency optimisation are all well and good; but without proof of due diligence and regulatory compliance, they count for very little. Plant inspections require that safety standards are met at all stages, and the penalties of any deviation can be severe. Metal detection equipment must have features such as condition monitoring, record keeping and traceability to support compliance.

When a contaminant is found, current metal detection systems allow highly accurate record keeping and traceability. Metal detection systems allow preventive action to be implemented rather than having a dependence on reactive maintenance and frequent verification testing. The detection process is therefore constantly refined. Similarly, the latest metal detectors are designed with general hygiene in mind, constructed using materials that be easily cleaned and re-assembled without excessive downtime. Sealing standards to prevent water ingress to electronic components and enclosures is also very important, particularly in harsh aggressive environments.

THE FULL PACKAGE

Perhaps surprisingly, stringent safety standards do not have to come at the expense of line efficiency. The eradication of potential threats posed by stray metal through the introduction of a sophisticated metal detection programme actually pays huge dividends to those companies who seek to put the long-term success of their business ahead of ill-advised corner cutting.

Wise investment provides peace-of-mind, strengthens consumer trust and protects brands from complications arising from failed plant inspections. There is no better method for complying with food safety trends and regulations than through the installation of a reliable, consistent metal detection programme.

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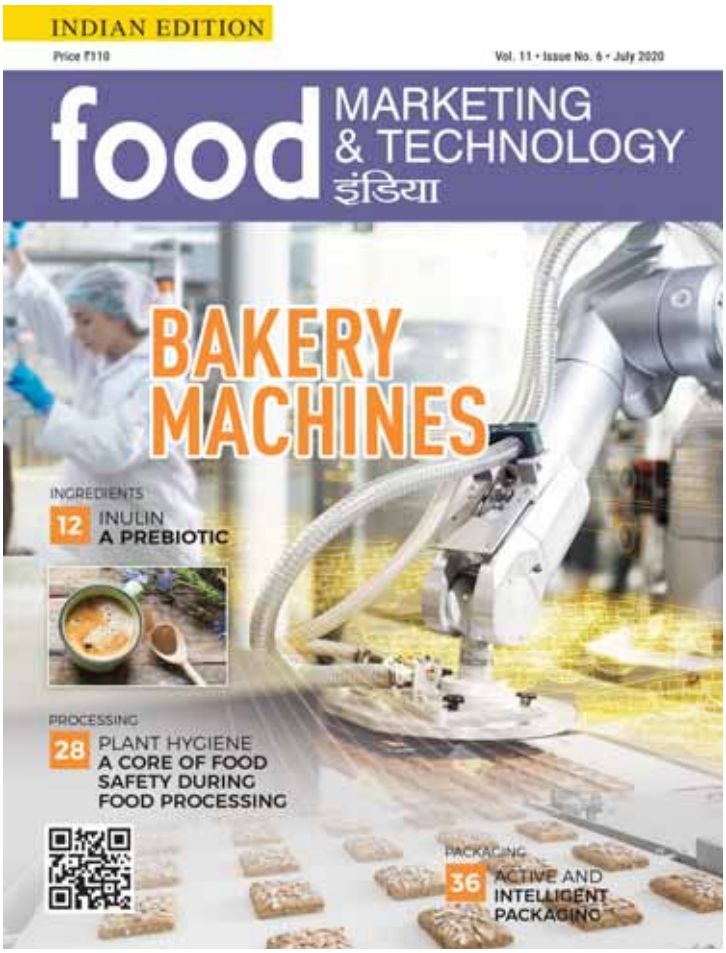

National Events Calender

VIRTUAL FOOD SHOW 2020
31 July.....Organised by Orbit Exhibitions Pvt. Ltd.

INDIA VIRTUAL FMCG SUPPLY CHAIN EXPO 2020
10-14 August.....Organised by FICCI

ANUTEC - INTERNATIONAL FOODTEC INDIA
26-28 November.....Mumbai

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