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**APR '18**



# **ESSEN RIVESTA**

**MEAT & POULTRY**



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# FABLE

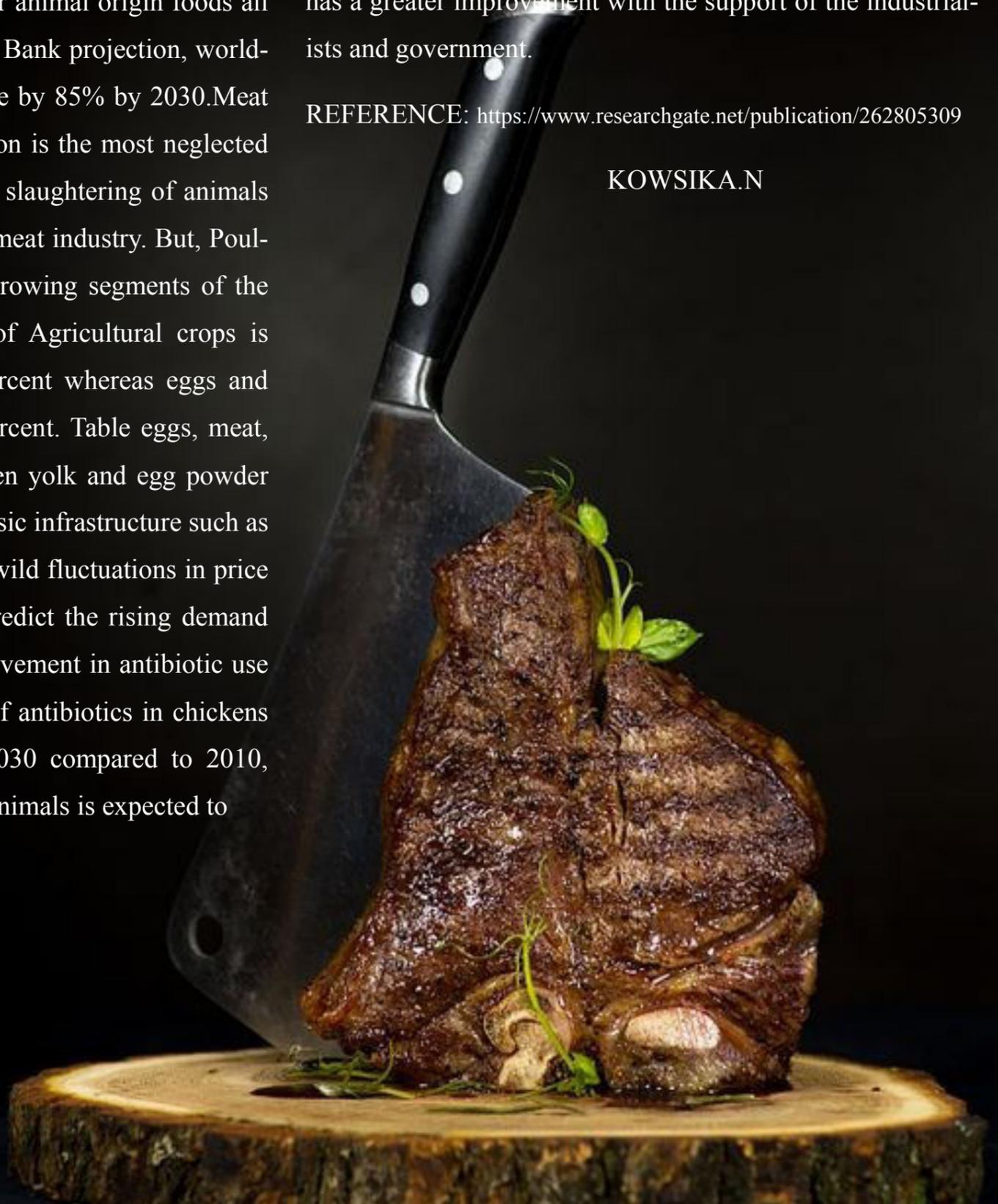
## Of Meat & poultry industry

Livestock production play a vital role in Indian economy. Meat sector plays a pivotal role in India because it not only provides meat and by-products for human consumption but also contributes towards sustainable livestock development and livelihood security for millions of Indians from weaker sections. Though India is bestowed with huge livestock, Indian Meat industry has not attained its due status .Because major portion of meat from sheep, goat, pig and poultry is consumed in the form of hot meat only certain portions of meat from cattle, buffaloes ,and poultry is exported. Meat is highly demanded food because of the presence of plentiful proteins, minerals and all B-complex vitamins with all essential amino acids. Ample increase in population, change in lifestyle, urbanization and increased per capita income are fuelling the massive demand for animal origin foods all around the world. As per the world Bank projection, worldwide demand for meat will increase by 85% by 2030. Meat sector in India for local consumption is the most neglected sector. Unhygienic practices, Open slaughtering of animals have ruined and flawed the Indian meat industry. But, Poultry industry is one of the fastest growing segments of the livestock sector. The production of Agricultural crops is growing at a rate of 1.5 to 2 percent whereas eggs and broilers are at a rate of 8 to 10 percent. Table eggs, meat, value added products such as frozen yolk and egg powder are exported from India .Lack of basic infrastructure such as storage & transportation results in wild fluctuations in price of the poultry products. Experts predict the rising demand for protein will cause a upward movement in antibiotic use in livestock. India's consumption of antibiotics in chickens is predicted to rise fivefold by 2030 compared to 2010, while globally the amount used in animals is expected to

rise by 53%.Ministry of Food Processing Industry (MFPI) has established National Meat and Poultry Processing Board (NMPPB) at New Delhi to support the healthy and organized development of meat sector for clean wholesome of meat products. It also serve as a mediator for producers and manufacturers and exporters of meat and meat products and regulates the industry for attaining self sustainable. The share of Indian meat exports in the world is less than 2%. Deboned and deglanded frozen buffalo meat contributes 97% of the total meat export. Meat that is exported, produced in disease free zones and processed in modern abattoir and processing plants are certified with HACCP and ISO 9002 following world class SPS measures. Meat and poultry industry in India has shown a tremendous development in the last decade, has a greater improvement with the support of the industrialists and government.

REFERENCE: <https://www.researchgate.net/publication/262805309>

KOWSIK.A.N



## TREACHEROUS DRUGS IN MILK



I remembered the line that, Milk is filled with essential nutrients like protein, Ca, K, vitamins etc.. But now milk contains highly toxic substances like painkillers, antibiotics and growth hormone, that reduces the protein-Caerin level in milk. These growth promoters and drug were given to the cattle via cattle feed. that cow's milk contains traces of anti-inflammatory drugs (niflumic acid, efenamic acid, ketoprofen, diclofenac, naproxen, flunixin, phenylbutazone), antibiotics( florfenicol), steroidal hormones(17-alpha-ethinylestradiol),antifungaldrugs(triclosan). It also contain hormone **17-beta-estradiol**, which may cause ovarian tumour in fe-

male, polycystic ovary syndrome (PCOS), hypopituitarism. These chemical contaminants are now showing up in all types of milk including breast milk and cow's milk. There's also the issue of recombinant bovine growth hormone (rBGH), which is used significantly to increase the milk production in cows. Treated cows can produce 15-20% more milk. Hormone -treated milk contains increased levels of the hormone IGF-1, which promote breast, colon and prostate cancers. In rBGH-injected cow's milk have increased somatic cells count (SCC), that may change the organoleptic characters of milk quickly. Injection of illegal drugs and antibiotics used to treat mastitis but increase the level of the thyroid hormone enzyme thyroxin-5-monodeidase. We know it's hard enough to raise pure food these days considering that environmental pollution is rampant, so finding pure soil and water can be a challenge. Taking no steps to ensure that milk they produce, are free from drugs and hormones is due lack of knowledge and social responsibility.

REFERENCE: <https://www.pharmacytimes.com/news/5-dangerous-food-drug-interactions>

**NACIBA.N**

## VARIOUS BY PRODUCTS

India is bestowed with vast livestock wealth and it is growing at the rate of **6%** per annum. The contribution of livestock to GDP would increase if by-products utilization is increased. Utilization of by-products has impact not only on economy but also on environmental pollution. Non-utilization of by-products leads to the added and increasing cost of disposal of these products and also create major aesthetic and catastrophic health problems. By-products such as blood, liver, lung, kidney, brains, spleen and tripe has Medicinal uses as well as nutritive value. Even by products are filled with many essential amino acids, hormones, minerals and fatty acids .some of the by-products are:

### **BLOOD PLASMA:**

Blood is used in food as an emulsifier, a stabilizer, a clarifier, a colour additive, and as a nutritional component Most blood is used in livestock feed in the form of blood meal. It is used as a protein supplement, a milk substitute, a lysine supplement or a vitamin stabilizer.. Plasma forms a gel at a protein concentration of 4.0–5.0%, so act as fat binder. The strength of



the gel increases with increasing concentration. Blood plasma also has an excellent foaming capacity, and can be used to replace egg whites in the baking industry. The application of transglutaminase (TGase) from animal blood and organs or microbes improves binding

### **HIDES AND SKINS:**

Animal hides have been used for shelters, clothing and as containers by human beings since prehistoric times. Hides and skins are generally one of the most valuable by-products from animals. The finished products from the hides of cattle and pigs, and from sheep pelts, are leather shoes and bags, rawhide, athletic equipment, reformed sausage casing and cosmetic products, sausage skins, edible gelatine and glue .

### **GELATIN:**

Gelatin extracted from animal skin and hides. It is added to wide range of meat products especially in meat pies and it forms a major ingredient in jellies andaspic because of it's "melt in the mouth" properties It is also widely used as a stabilizer for ice cream, yoghurt, cream pies and other frozen desserts..Approximately 6.5% of the total production of gelatin is used in the pharmaceutical industry. Most of it is used to make the outer covering of capsules. Gelatin can also be used as a binding and compounding agent in the manufacture of medicated tablets and pastilles and also act as zinc gelatin in ointment.

**TALLOW AND LARD:**

Animal fats play a major role in meat packaging industry . The major edible animal fats are lard and tallow. Lard is the fat rendered from the clean tissues of healthy pigs. Tallow is hard fat rendered from the fatty tissues of cattle or sheep. Lard and edible tallow are obtained by dry or wet rendering. Because of consumer demand, lard and tallow are now often bleached and given a deodorizing treatment before being used in food. Traditionally, tallow and lard were used for deep frying but now the use is declining in the fast-food industry, due to consumer health concerns. Tallow and lard are also used for margarine and shortening . Some edible lards are used in sausages or emulsified products .

Collagen from hides and skins also has a role as an emulsifier in meat products because it can bind large quantities of fat. This makes it a useful additive or filler for meat products. Collagen can also be extracted from cattle hides to make the collagen sausage used in the meat industry.

**LANOLINE:**

Lanolin and its derivative have been used emulsifiers as well as emollients for skin protection and also act as moisturizer for the skin. Emollient very thick substance derived from sebaceous gland of sheep . They are externally used on the skin, lips, nails, and hair.

REFERENCE: Journal Process Food Industry magazine

**MONALISHA.B**

**COLLAGEN:**

## HIKING SCOPES FOR MEAT PROCESSING

India produces about 5.7 million tonnes of meat from different meats of animals. A very large proportion of these animals including buffaloes, sheep, goats are aged animals whose meat is less compatible and generally tough but more suitable for processing to products both on economic and quality considerations. With the rapid growth in poultry industry availability of layer and broiler hens as culls has also increased which could be beneficially utilized products for the processing to the benefit of producer and consumer. Value added products could be broadly classified based on processing and function. Processes such as portioning, deboning, seasoning, tenderization, retorting, tumbling, battering, emulsion preparation, breading and variety of cooking methods are utilized in production of value added meat products. Appropriate quality raw materials, correct formulations, right package, optimum processing, storage stability, flavor and color changes, nutritional value, labouring requirements, product specifications and labeling requirements are important factors in the success of processing of meat products. Some value added meat products :

***Emulsion based meat products :***

Development of emulsion based meat products facilitate better utilization of meat and products from different aged animals including aged hens. Tough meat is minced in a mincer and emulsion is produced in a bowl chopper adding meat, salt, fat, phosphate, spices, condiments, ice flakes in correct proportion to a desired consistency. Emulsion quality contributes to product yield and palatability to a larger extent. Emulsion could also be stored and fresh products could also be stored to a larger extent.

***Combination of meats:***

In order to complement and supplement qualities and availability of different meats and byproducts, combination of meats is desirable to produce value added meat products. Blends of chicken and mutton or chicken byproducts such as skin or chicken fats resulted in highly acceptable products such as nuggets, patties and sausages. Eggs possess several functional properties which may compliment meat proteins in meat products. Highly acceptable meat products of lower cost were produced incorporating eggs up to 30% in the formulation.

***Enrobed products :***

Enrobing or coating of meat products with edible materials in the form of flour, whole egg liquids and other additives is a method of value addition which enhances the acceptability of meat products. Enrobing improves in the crispy texture of meat products and increases the pleasure of eating with desirable flavours. Products will be juicier as the juices are retained.

***Incorporating vegetables in meat products :***

Incorporating seasonal vegetables such as cabbage, cauliflower, bottle guard, pumpkins in meat products would be advantageous in reducing the cost of meat products to facilitate consumption of vegetables and in maintaining a healthy and balanced diet. Meat products along with vegetables may find wide popularity among the Indian consumers.

REFERENCE: [nopr.niscair.res.in](http://nopr.niscair.res.in)

**A. Haniya Azfar Fathima**

STUNNING



SLAUGHTERING



INCISION



EVisCERATION



SPLITTING



?



DEBONING



MINCING



## FARM TO FORK

Welcome back to the farm to fork session. This session delineates the minced meat process. Today, it became an important ingredient for many recipes including Hamburger and Spaghetti bolognese. The meat of beef, lamb, & pork are used for mincing in many countries, but mostly South Asian prefers goat meat for producing Keema through this process. As usual, one of the process is missing and will be mentioned in the next edition. Find the process for making minced meat



### MINCING PROCESS:

The first process is stunning, after spending some resting hours in lairage. In stunning, animals are brought to unconsciousness state with the help of captive bolt pistol or Co2 gas. It is followed by slaughtering and hoisting on an overhead rail.

Following dressing operations are performed in the hoisted carcass. Nearly 6-8 minutes are left for complete bleeding. After this, an incision is made across the larynx and the oesophagus is tied off. The Heads and the hind legs are detached from the body. De-skinning process is carried and the hides are removed with the help of hide puller.

The next step is Evisceration, where all visceral organs are removed. The entire carcasses is sawn into two halves. It is then taken to the washing followed by chilling and storing. The name of the missing process has to be found by the readers.

The bones and the cartilages are removed through both mechanical and manual process. The boneless meat is chopped into small pieces either with the help of large knife or with a grinder. The chopping method varies based on fat percentage and the cuts are Round steak and Chuck steak.

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



## ANTIMICROBIAL EDIBLE FILMS FOR MEAT PRESERVATION

Animal origin foods are widely distributed and consumed around the world due to their high nutrients availability but may also provide a suitable environment for growth of spoilage and pathogenic microorganisms. Edible films and coatings (EFC) added with natural antimicrobials are a promising preservation technology for raw and processed meats because they provide good barrier against spoilage and pathogenic microorganisms. Meat quality is highly dependent on preslaughter handling of livestock and postslaughter handling of meat. Among the main factors affecting meat quality is pH, which is determined by the glycogen content of the muscle and varies from 5.4 to 5.7 in postrigor muscle; another important factor is temperature, which must be quickly decreased from 37°C to refrigeration temperatures (4–8°C). There are three mechanisms involved in meat and meat products deterioration during processing and storage: **microbial spoilage, lipid oxidation, and enzymatic autolysis**. Edible coatings are food grade suspensions which may be delivered by spraying, spreading, or dipping, which upon drying form a clear thin layer over the food surface. The use of films in foods dates back to the 12th century in China where waxes were used to coat citric fruits to retard water loss, whereas the first edible film used for food preservation was made in the 15th century from soymilk (Yuba) in Japan. EFC act as barrier between food and the surrounding environment to enhance the quality of food products protecting them from physical, chemical, and biological deterioration. They provide moisture loss reduction during storage of fresh or frozen meats, prevention of juice dripping, and decrease in myoglobin oxidation of red meats. A wide range of hydrophobic compounds has been used to produce EFC, including animal and vegetable oils and fats (peanut, coconut, palm, cocoa, lard, butter, fatty acids), waxes (candelilla, carnauba, beeswax), natural resins (chicle, guarana, and olibanum), essential oils and extracts (camphor, mint), and emulsifiers and surface active agents (lecithin, fatty alcohols) In fresh and processed meats, lipid

incorporation into EFC can improve hydrophobicity, cohesiveness, and flexibility, making excellent moisture barriers, leading to prolongation of freshness, colour, aroma, tenderness, and microbiological stability. **Palmitoylated alginate** is the only lipid-containing material of AEFC recently reported to wrap beef muscle and ground beef. Film-forming proteins are derived from animals (casein, whey protein concentrate and isolate, collagen, gelatin, and egg albumin) or plant sources (corn, soybean, wheat, cottonseed, peanut, and rice). Protein-based films adhere well to the meat hydrophilic surfaces and provide barrier for oxygen and carbon dioxide but do not resist water diffusion. Plasticizers, such as polyethylene glycol or glycerol, are added to improve flexibility of the protein network, whereas water permeability can be overcome by adding hydrophobic materials. Despite their advantages, protein films may be susceptible to proteolytic enzymes present in meat products or allergenic protein fractions may cause adverse reactions to susceptible people. Incorporation of antimicrobial compounds into EFC as an alternative to their direct application onto the meat surface has the advantage of gradual release of the antimicrobial compound from the AEFC. Antimicrobial compounds within AEFC are less exposed to interaction with meat surface components than those added directly to the surface and thus maintaining their activity. Commonly used antimicrobials are **organic acids, essential oils and plant extracts, bacteriocins, proteins, chitosan, Lauric arginate**. Antimicrobial packaging can be a promising tool for protecting meat from pathogens contamination by preventing microbial growth by direct contact of the package with its surface. However, some challenges remain such as the need to improve and standardize coating procedures according to industry requirements aiming to reduce costs and increase shelf life to meet consumer demands without altering sensory characteristics of meat and meat products.

REFERENCE: WWW.meatscience.com,  
WWW.Foodsafetymagazine.com.

**SANDHYA.R**

## GLANCE OF FROZEN MEAT

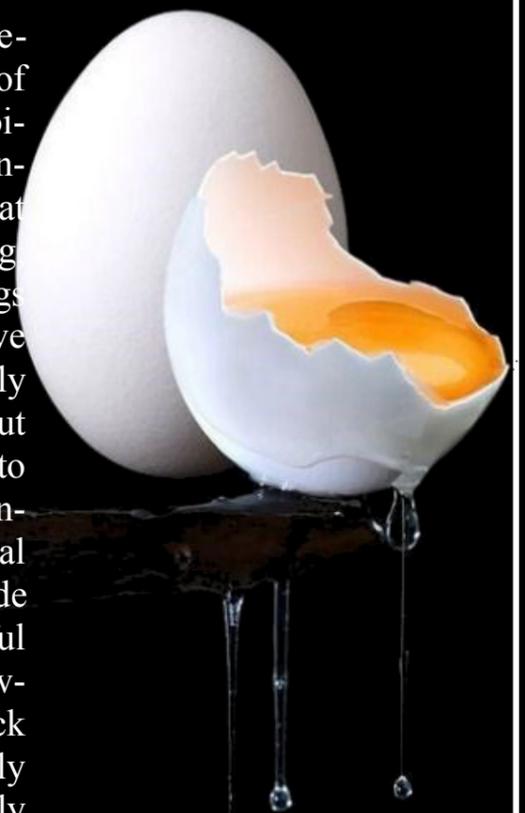
Frozen meat is the meat which is preserved by rapid freezing to a temperature colder than -18°C and is then stored and distributed in this frozen form. The shelf life of the products may extend to 1 year. It slows down the growth of bacteria. It is maintained throughout the cold chain system to preserve the freshness, nutritive value and eating quality of the meat. First question comes into our mind is "Is it nutritious?" yeah!! It is nutritious. Freezing technology does not affect the nutritive value of meat. But we should have the often look at fat content. "The fattier the meat, the better it will freeze". Freezing prevents sensitive vitamins and nutrients from being lost during transportation. The next questions are "Is it gives more taste?", "Is it cook fast?" The answer is yes. The water in the cell's cytoplasm will form water crystals, expand and rupture the cell wall. When upon thawing, the cytoplasmic contents will seep out of the tissues and then undergo chemical processes even more readily. The tissue structure of the food will be altered and thus this changes its texture, cooking time and even its behavior when cooking. The next question is "Is it contains any chemicals?" No, it does not contain any chemicals. Because it is a natural form of preservation. The main advantages of frozen meat are it prevents meat from micro organisms. Shelf life of meat is increased. It reduces meat wastages. It is cheaper than fresh meat. It prevents the enzyme activity. Frozen meat is very convenient to use. The disadvantages are handling should be very careful. Sometimes preservatives are added and it leads to some health issues. I must say that frozen meat is better than fresh meat. But we are lack of awareness about frozen meat. We are thinking that fresh meat is very nutritious and tasty because it is slaughtered in front of our eyes. But frozen meat is very good than fresh meat.

S.RANJANI PRIYA

## PASTEURIZING THE EGGS ?

MOGANA. V. S

Are you the one fond of consuming mayonnaise, hollandaise sauce, eggnog, ice-cream, Royal cake icings, marzipan, béarnaise sauce, or Italian meringue and a list of food prepared using raw eggs. Then there is a significant risk of salmonella food poisoning from raw eggs. Fresh eggs, even those with clean, uncracked shells, may contain Salmonella. Kids and pregnant woman should be particularly careful not to eat foods made from unpasteurized raw egg. Thus pasteurized eggs, liquid egg handling spray dried eggs are gaining health and commercial importance. The pasteurized eggs reduces the contamination to one in 20,000 chance that an egg you have might have salmonella from the greater risk possibility. On pasteurizing eggs are cooked briefly at a high temperature and then cooled. The yolk must reach a temperature of about 63°C for 40 minutes. Eggs scramble at a much higher temperature, so it is possible to heat the yolk to pasteurize it without cooking the egg. The eggs still have the consistency of raw eggs (and can be used just like them in any recipe) but microbial growth of harmful bacteria is slowed or eliminated. Later a thin layer of food-grade wax to seal in the freshness. Pasteurized Eggs and to further keep out any harmful bacteria. But this kind of thermally pasteurized eggs have slight changes in yellowness and flavor of the yolk. In case of egg white, it turns into a firm, cloudy and thick mass due to change in protein structure on heating. eggs are treated with extremely high heat resulting in a turbid or milky appearance also, In essence they are partially cooked. Thus ozone pasteurized eggs are gaining momentum recently. Researchers forced high concentrations of ozone gas into the egg and applied a little bit of heat. The eggs became pasteurized and had no risk of containing salmonella. This was a very interesting discovery, which immediately got the attention of the egg processors worldwide. Moreover there ozone pasteurized eggs are also effective against bird flu. Ozone-pasteurized eggs have the same appeal as raw eggs, and can be cooked without flavor loss. This promising new ozone process maintains good sensory quality relative to thermal processing. There were no differences in taste when compared to all egg treatments for measures of aroma, flavor, texture and overall liking of the consumers.



REFERENCE: <https://onlinelibrary.wiley.com/doi/full/10.1002/fsn3.134>

## WHO AM I?

I am an antibiotic produced by strains of *Paenibacillus polymyxa*, so I am also known as **polymyxin E**. I am an effective one against Gram-negative bacteria like *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*. I have the potential to cause nephrotoxicity and neurotoxicity, If doses are high. Doctors know me as "last hope" antibiotic because I am used to treat patients who are critically ill with infectious resistant to most drugs. Many people indiscriminately use me in poultry that increases the chance of developing resistance to the drug by bacteria and become useless when treating the patients. The resistant bacteria will spread on the chicken farms, in the air surrounding them, contaminate the meat, spread to the farm workers through their faeces flies. It is advised to use me only on sick patients and not as feed for chickens. Did you find me?...

So I'm **COLISTIN**.

## CRUSTACEANOUS REPLACEMENT in packaging



A new material made from substances common in crab shells and tree fibres could replace the flexible plastic packaging used to keep food fresh. Researchers from the Georgia Institute of Technology sprayed multiple, alternating layers of chitin—a fibrous substance consisting of polysaccharides that is present in shellfish, insects and fungi—and cellulose, a biopolymer present in plants and trees, to form a flexible film that can compete with plastic packaging film. “The main benchmark that we compare it to is PET, or polyethylene terephthalate, one of the most common petroleum-based materials in the transparent packaging you see in vending machines and soft drink bottles,” J. Carson Meredith, a professor in Georgia Tech's School of Chemical and Biomolecular Engineering, said in a statement. “Our material showed up to a 67 percent reduction in oxygen permeability over some forms of PET, which means it could in theory keep foods fresher longer.” The researchers suspended the cellulose and chitin nanofibers in water and then sprayed them onto a surface in alternating layers. After the material is fully dried, it is flexible, strong, transparent and compostable. They worked on the

cellulose nanocrystals for several and explored its use in lightweight composites as well as food packaging. On continuous monitoring, they found that the chitin nanofibers are positively charged, and the cellulose nanocrystals are negatively charged which would form alternating layers in coatings. Packaging used to preserve food must prevent oxygen from passing through. However, the new material is an improvement as a gas barrier over conventional plastic packaging because of the crystalline structure of the film. It's difficult for a gas molecule to penetrate a solid crystal, because it has to disrupt the crystal structure,” Meredith said. “Something like PET on the other hand has a significant amount of amorphous or non-crystalline content, so there are more paths easier for a small gas molecule to find its way through.” This material could one day be a viable replacement for petroleum-based materials, the researchers still need to develop a manufacturing process that maximizes the economy of scales. Also, unlike industrial processes to mass produce cellulose, methods to produce chitin are still in their infancy. More research is also needed to improve the material's ability to block water vapour.

REFERENCE: Journal -ACS Sustainable Chemistry & Engineering.

KOWSIKA. N



# INDUSTRIAL UPDATES

## CHANGE IN PRINTING NORMS:

Packaged food industries in India may soon have to change their printing and packaging norms due to safety issues with chemicals being used currently to print labels and packages. The Bureau of Indian Standards (BIS) is working to update the current standard (IS 15495) for printing ink for food packaging and several harmful chemicals, including toluene, may be banned with the new standards coming into effect. Toluene, a chemical used in paint thinners, can cause damage to the liver and kidney in humans. Around 80% FMCG companies in India still use toluene based solvents in Packaging materials. If the new norms are put in place, printing experts said, FMCG companies have to mandate the usage of toluene-free inks in their technical specifications of packaging material to their packaging suppliers

## HUL PLANS FOR READY-TO-EAT FOODS:

Hindustan Unilever Limited (HUL) has announced that the company will be integrating its foods and refreshment categories in India under the name of Ayush foods, with effect from July 1, 2018. The integration will help HUL increase its organizational agility, better serve local consumers and drive synergies, while harnessing the advantage of global scale. The integration of these two categories is also in alignment with the structure of Unilever globally. The company also announced two key changes in the management committee. Sudhir Sitapati, presently executive director, refreshment, will be redesignated as executive director, foods and refreshment (F&R), and will be responsible for the integrated F&R business. He will continue to be a part of HUL's management committee.

## MoFPI RELEASES THE LIST:

The ministry of food processing industries (MoFPI) has released a consolidated list of food parks in a bid to open the National Bank for Agriculture and Rural Development (NABARD) fund of Rs 2,000 crore to more food processing units. The list consists of 201 designated parks which includes mega parks, food parks, industrial areas, industrial estates, private parks with an integrated infrastructure development centres, export promotion industrial parks, industrial growth centres, integrated food parks, agro-processing clusters and industrial complexes. Until now, a large part of the fund could not be disbursed on the account of restriction of its use for units in the food parks only. However according to MoFPI officials, since the announcement of the Pradhan Mantri Krishi Sinchayi Yojana (PMKSY), more clusters would come up, and the fund would be utilised. Arpita Mukherjee, professor of Indian Council for Research on International Economic Relations (ICRIER), said, "If there is a benefit given to the food processing sector, it should be open for all, and not linked to where they are located." The F&R business has delivered consistent growth in India.

## MEGA FOOD PARK IN UP:

Baba Ramdev's Patanjali Group's proposed plan to set up a mega food park in western Uttar Pradesh's Greater Noida is well in place. This was affirmed by a senior official of the ministry of food processing industries (MoFPI), saying that the mega park still has time until June 30 to get the necessary nod from the state government. Moreover, if there is a requirement to extend the deadline beyond June 30, the ministry is open to do so. "Although we have also communicated this to the chief minister of Uttar Pradesh and state chief secretary, there was some delay on the part of the state government. However, if the need arises to extend the deadline, we will examine the progress, and the same can be extended," he added.

## FARM TO FORK (Answer for the last edition):

The process principally serves the purpose of modifying the melting properties of oil and fats in order to improve its functional properties and also to improve the stability of oils and fats. In edible oil processing, a fractionation process consists of a controlled cooling of the oil, thereby inducing the partial or fractional crystallization. The remaining liquid (olein) is then separated from the solid fraction (stearin) by means of filtration or centrifugation

ANSWER: **FRACTIONATION**

## BALUT FOLK MEDICINE



Imagine yourself eating a duck foetus?

It may sound obnoxious, but every culture has its own culinary speciality. Balut is a developing duck embryo that is incubated for a period of 14–21 days and then boiled and eaten from shell. Originated in Philippines and sold as post-sundown snack in streets of Southeast Asian countries such as Vietnam, Thailand, Philippines Cambodia. Though the duckling features are recognizable, It's soft enough to eat and swallow the product. It's considered highly nutritious especially for pregnant women, and stiffen the knees. It's unfortunate that balut is listed in bizarre foods because of mental discomfortness in eating a duckling features.

## READER'S COLUMN:

This edition expatiates the "MEAT & POULTRY INDUSTRY". This edition includes about the reclamation of meat & poultry industry. It also discussed the pasteurization of egg in detail. It enunciates the crustaneous replacement in packaging and antimicrobial edible film in packaging of meat and meat products. This edition talks about its steep growth and achievements of industry within a decades and also in making good and useful value added products. It includes the Balut folk medicine in SE Asian countries. Interesting columns are added.

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