

# Active Packaging

## Perfect blend of an art & science for longer shelf life

*Zultec, leader in packaging technologies, discusses technology options available to increase operational efficiency, extend shelf life, reduce food waste and reduce resource use throughout the supply chain to ensure hard-won harvests will not be lost.*

When the industry thinks of marketing and branding with respect to packaging, the first aspect which comes to mind is graphics, artwork, printing and advertising. Certainly there are numerous companies, campaigns and even industries that are involved in the visual branding and marketing of fresh cut produce. The importance of graphics and visualization of the packaged product on the retail shelves cannot be over stated; however this is only part of the “total branding and marketing package”. Technology can in fact be just as effective in branding and marketing fresh produce. Globally we are talking about active packaging that changes the conditions of the packed food to extend the shelf-life or to improve safety, while maintaining the quality.

All active packaging technologies involve some physical, chemical, or biological actions for altering the interactions between the package, the product, and the package headspace to achieve certain desired outcome which results in protecting brand reputation, improving customer loyalty and offering higher sales protection.

As important as graphic appeal is, there is no substitute for the freshness, safety and quality of the produce itself as a branding advertising and marketing tool. Since packaging technology is one of the key sciences, along with postharvest physiology, optimizing fresh produce quality and shelf life; one can make the argument that packaging technology is not only a science but also a branding and marketing tool.

More than that, the growing trend towards reducing global food waste, highlights the need to have the right packaging machines and materials that can help to improve the product life. A

new report from WRAP estimates that an increase of just one day on product life across range of foods could prevent around 250,000 tonnes of food waste each year. Market drivers keep machinery makers on their toes finding ways to give customers the edge and ensure they themselves stay in the technological forefront. These days, with everyone wanting more for less, more than ever it's all about smart thinking and nurturing strong partnerships in the competitive segment of food packaging technologies. As we go further in this article, we explore most popular packaging technologies available today for food companies.

### MAP, Guaranteed Product Freshness

During processing and packaging, one of the most effective methods to preserve perishable foods is the incorporation of Modified Atmosphere Packaging technology. The air contained in the packaging is replaced by a gas mixture, like from nitrogen (N<sub>2</sub>), oxygen (O<sub>2</sub>) or carbon dioxide (CO<sub>2</sub>), which is adjusted to the product to be packed. Your products are housed in an environment other than air which reduces the growth of microorganisms and extend shelf life of the product. The process also preserves the original taste, appearance and consistency of the food and makes it more durable.

Thanks to modern packaging machines which feature devices for hermetic sealing as well as MAP technology, product quality can be preserved and the amount of added preservatives can be reduced while extending food's shelf life at the same time. This also protects brand reputation, improves customer loyalty and offers higher sales potential.

MAP equipment is divided into two main categories: Form Fill Seal machines and chamber machines. Flexible pillow wrapping machines are composed of Horizontal Form-Fill-Seal (HFFS) and Vertical Form-Fill-Seal (VFFS) systems. Chamber machines can use two different techniques. The first is thermoforming technique. In the second technique, commonly known as tray sealing, preformed rigid containers can be used for the packaging of products.

### Form-Fill-Seal Machines

A vertical-form-fill-seal (VFFS) or horizontal-form-fill-seal (HFFS) packaging machine is the anchor of the packaging distribution system. A processor's preference in bag style and need for line speed mandate the decision to choose one type of FFS machine over the other, and upstream and downstream machines must complement it. Optimizing the output of the FFS machine is the goal of the packaging line because the quantity of saleable bags produced has a direct effect on the processor's bottom line.

The FFS machine must pull film and achieve good seals with jaws that maintain the correct temperature, dwell time, and pressure while the ideal amount of product is filling each bag at a rate that optimizes the line. Thus, the success of the operation is dependent, in part, on the ability of upstream equipment to deliver the ideal amount of product to the FFS machine at the perfect speed with the necessary separation between product charges that allows the jaws to seal properly without product interfering and compromising the quality of the seal.



Form-Fill-Seal Machines.

Zultec portfolio of FFS machines range from basic to advanced HFFS and VFFS machines with varying sealing options and over 30 pack types to meet medium and high speed production line requirements. Stand up pouches are among the fastest growing pack types, niche for recloseable pack and demand for modified atmosphere are the key requirements when it comes to FFS.

Production can involve fairly short runs of different sized items. In a day the machines could need to be setup five or six times to handle products with different pack formats and sizes, which is where the flexibility of servo drive comes in. It allow pack length, infeed conveyor speed, sealing jaw position and fin wheel settings to be programmed for each product and recalled instantly from memory. This saves labor cost and provides convenience and automation to the production staff, who might be unable to set-up a mechanical machine.

While MAP is becoming increasingly important in so many areas, but up until recently the problem has been the speed, when it comes to MAP within FFS machines. That is where Zultec's PFM machines portfolio comes with the Supernova bagger capable of up to 250 MAP bags a minute, the fastest in the world. It also means a really useful uplift in product speed from maybe as low as 70 bags a minute on previously available machinery.

### Thermoforming & Tray Sealing

Zultec partners with Sealpac to bring innovative products which are already tested and deployed globally. Our innovative Tray Sealers and Thermoforming Machines are an absolute match for an end-to-end packaging that helps you make retail ready packs for variety of food products. Though MAP is the fundamental functionality, Sealpac machines have gone beyond simply biggest innovation, today's packaging industry requires a lot of new features to meet the ever increasing consumer requirements. Either its packaging your fresh produce or ready meals, the packaging line must address different requirements. With Sealpac, all you need is one automated machine to revolutionize your processes.

The thermoforming technique involves the use of a rigid or semi-rigid base material which is fed from a reel into grippers or clamps held on chains running either side of the web and the length of the machine. In the heating section, the material is heated to the point

that can be treated. Then, the treated material is transferred to a forming station. The next step in this procedure is the cooling of the material and its transfer to the product loading area. Modification of headspace in the packages can be carried out by air extraction and gas flushing into the trays.



Thermoforming & Tray Sealing machine.

Performed container machines or tray sealers and thermoforming machines seem to be similar to each other. The preformed trays used for packaging are fed to machine and the product is loaded. The tray and the material of the top lid are then transferred to the atmosphere modification chamber. It should be added that the top lid is heat-sealed.

### Vacuum Packaging

High levels of O<sub>2</sub> present in food packages may facilitate microbial growth, off flavors and off odors development, colour changes and nutritional losses. Vacuum packaging removes oxygen from the pack, reducing the activity of bacteria that require oxygen to grow and thereby achieving a significant increase in shelf life. It is today the most common method of packaging fresh produce and convenience products in a non-perishable, hygienic way with suitable portion sizes that is attractive to the customer. Vacuum packaging has several features and benefits which make it attractive to some sections of the meat trade also. Pakistani meat processors and exporters can make use of this to attain longer storage life, preserve flavors and make full use of ageing process to tenderize meat while reducing the spoilage.

One drawback to vacuum packaging that has kept it primarily on the sidelines in the US is that it deprives fresh red meat of oxygen and consequently causes the meat to darken to almost purple color. US con-

sumers have shown repeatedly that they want fresh red meat to be red, not purple. Zultec with its manual and fully automatic vacuum machines keep an eye on the medium and small food trade. The portfolio of vacuum packaging machines and dip tanks are aimed at medium to large food production businesses and are available in single and double chamber models. Advanced films not only help to provide complete packaging solutions but also help addressing particular needs. As in case of meat, where our film's meat-contact layer includes sodium nitrate which will produce nitric oxide gas when enzymes in the meat come in contact with the film. This innovative concept will help consumers to give the meat the fresh red color which consumers are familiar with. For processors, it literally eliminates the traditional process of using oxygen scavengers within their packs.

### Films – Protection from Oxygen, Water & Light

After the packaging process food shall be preserved for a long time. Depending on the product features, it is necessary to ensure protection against oxygen, water or light. The choice of the appropriate packaging material therefore is crucial. Lightproof packaging material as for example composites with UV barrier or colored glass help with light-sensitive goods. For water-sensitive products, steam barriers contained within the packaging material

are recommended, as for example, Al-metallization, polyethylene or polypropylene. Packaging material like aluminum protects oxygen sensitive goods from air penetrating the packaging.

Every application needs the appropriate material. Often, the harmful oxygen is already contained within the product and its packaging. Different procedures are available to either remove the oxygen or to keep it out of the package. This includes the vacuum procedure with the generation of a defined vacuum inside the package and MAP, a method of adding protective gas. Packaging film has to maintain the gas atmosphere, and this can only be achieved using films with low permeability to oxygen. Oxygen can pass through packaging films, but if oxygen permeates through a vacuum packaging film at a sufficiently slow rate, continued respiration of meat tissues and bacteria on the meat can consume the oxygen passing through the film. In general, a film with oxygen transmission rate (OTR) of less than 100 at 25°C and 98% relative humidity is suitable as vacuum packaging film, particularly for meat packaging applications, where lower OTRs are necessary for export packs with extended shelf life.

### Conclusion

Food manufacturers have different possibilities to implement product quality and protection at a high level. The appropriate packaging process and packaging solution are key during the whole flow of goods. Packaging machinery manufacturers render assistance and also work on new methods in future, to meet coming demands.

### About Zultec

Zultec Group is Head Quartered in Saudi Arabia with offices spanning around 23 global locations. We are the leaders in food processing and packaging technologies, serving some global conglomerates since last 30 years. Zultec partners with world known leaders in end-to-end packaging machines for meat, poultry, dairy, fruits, vegetables, ready meals etc. Our portfolio includes completely automated end-to-end processing and packaging lines starting from the point your products are processed to making them packed in retail ready packs. ♦



Vacuum Packaging machine.