Extending shelf life in food products through **laser micro-perforated packaging**

Yvonne Dick

A new packaging technology may help companies keep fresh products fresh for longer periods of time. Known as laser micro-perforated packaging, it involves a little bit of science along with the very precise placement of holes in plastic produce packaging. Via the use of precision placed holes, a plastic bag or covering becomes a means to enhance freshness in food products and extend the shelf life for consumers. While options exist to purchase rolls of perforated packing material for produce, one of the ways to ensure the highest quality of fresh goods is through custom packaging options.

Joan Rosen, Business Development North America for PerfoTec BV, says that one of the benefits of using a system such as PerfoTec is the results. "You can optimize the product quality by customizing the number and size of laser micro-perforations in the film real-time, directly on-line in the packing or processing plant," she explains. "This allows you to change the packaging design as the product's needs change throughout the year and you achieve a more flexible and efficient packaging system as well as optimal modified atmosphere. If you want the best results then you will need the number and size of micro-perforation holes to change depending on the types of produce and times of the year. The seasons, growing location and variety can affect the respiration rates of produce, and different fruits and vegetables also have different rates of respiration."

To stay fresh, fruits and vegetables need oxygen in order to avoid spoilage.

A PerfoTec laser installation working with fresh strawberries.

When oxygen is insufficient, anaerobic respiration can occur and produce will quickly spoil. This is why we do not keep fresh produce in plain sealed plastic bags until it has all been consumed. Modified atmosphere packaging, such as laser micro-perforated packaging, helps prolong shelf life and reduce waste in fresh goods. By using the natural respiration rates of fruits and vegetables, optimum levels of oxygen and $C0_2$ prevent oxidation, the process whereby produce begins to lose taste and flavour. Using the special packaging along with calculations for the specific product create an Equilibrium Modified Atmosphere Packaging. The right sizes and amount of micro-perforation patterns in an item's packaging allow a balanced atmosphere which keeps produce fresh.

"With the PerfoTec AMAP software, you can determine the optimal micro-perforation needs based on the rate of respiration and other factors such as package size, weight, film permeability and CO_2 and oxygen targets," says Rosen. "There is a camera built into the PerfoTec laser micro-perforating system which takes a picture of each hole and verifies that they are the correct size. This ensures the optimum micro-perforation rate for each product. The inline PerfoTec laser system can adjust the number and size of holes which are made in the packaging."

Fresh goods will spoil at varying rates. Nuts and dates, for instance, are slow to spoil while artichokes and brussels sprouts are very fast. Luckily, a laser micro-perforated package can enhance the shelf life of produce. In the case of brussels sprouts, you can add an extra one to three days of shelf life. Faster spoiling fruits and vegetables such as broccoli are enhanced for three to seven more days, spinach for one to three more days. Produce which once may not have been shippable outside of its grower area can now be transported further and still arrive fresh.

"The goal of laser micro-perforation is to reduce food waste and enhance the freshness of the product," notes Rosen. "In Europe currently, the PerfoTec laser micro-perforated packaging system is being used in the floral industry to create an environment for shipping where there is no need for water or refrigeration while in transit."