

Food Safety: Why Vacuum Sealing & Blast Freezing is Safer & Healthier

By Dr. Keith Kantor

There is an alarming concern over the safety of our food supply in America. It used to be that most Americans did not worry about the food they ate in restaurants and bought at the supermarkets. Unfortunately, due to America's growing industrialized food system, it is now necessary to consider the process by which food is grown, shipped, manufactured, processed and stored. The food industry is an extremely productive business, but at what cost to our health? These profitable methods are directly related to the increase in overall food recalls and food-borne illness. In the United States alone, 76 million cases of food-borne illnesses occur each year, and many of the cases go unreported. One such food-borne illness, E. coli, sickens roughly 73,000 Americans each year.

All-Natural Food

The human body may become addicted to foods that contain excess sodium, sugar, saturated and trans fats. This excessive amount of sodium, sugar and fat in processed and fast foods explain our country's obesity epidemic, increase in the incidence heart disease, diabetes and cancer and the increase in overall healthcare costs.

Food in its purest form is best utilized by the body to prevent and manage disease – no chemicals, additives, dyes, steroids, hormones or antibiotics. According to the Natural Products Association, livestock on an all-natural farm cannot be unnecessarily given antibiotics or growth hormones, which is a common practice in conventional agriculture. Other countries have established strict regulations against Recombinant Bovine Growth Hormone. It is banned in Canada, Australia, New Zealand, Japan and all 25 nations of the European Union due to concerns about human health effects; however, it is currently still allowed to be used in the United States. An estimated 71 percent of all U.S. antimicrobials are fed routinely to beef cattle, poultry and swine for non-therapeutic purposes. Some experts think using antibiotics excessively may contribute to the rise of antibiotic resistance and superbugs.

Food labels and advertising can be extremely confusing and misleading. It's important that you don't confuse free-range and hormone-free labels with all-natural. Look for "all-natural." That means the food is grown, harvested and processed according to USDA standards that include restrictions on amounts and residues of pesticides, hormones and antibiotics. All-natural foods cannot be treated with any sewage sludge, bioengineering or ionizing radiation. The benefits of eating all-natural foods include higher nutrient values, better-quality taste and environmentally friendly manufacturing. The nutrient content of our food has decreased 1,000 percent in the past 60 years and more than 70,000 new chemicals have been introduced to foods. Only time will reveal the impact these foods will have on our health.

Lack of Food Inspections

Imports account for nearly 60 percent of the fruits and vegetables we consume, and 75 percent of the seafood – *yet only 1 percent of those foods are inspected before they cross our shores.*

“Hundreds of scientists and inspectors responsible for food safety have personally experienced political interference in their work, and that’s bad for public health,” said Francesca Grifo, director of UCS’s Scientific Integrity Program. Dean Wyatt, a USDA veterinarian who oversees federal slaughter house inspectors, said his agency regularly punishes inspectors for writing up legitimate safety violations. “Upper-level management does not adequately support field inspectors and the actions they take to protect the food supply,” said Wyatt. “Not only is there lack of support, but there’s outright obstruction, retaliation and abuse of power.”

The Hidden Toll On Our Environment

Despite natural food’s rising popularity, we’re still mainly reliant on a farming system that uses roughly 500,000 tons of toxic pesticides per year, which pollutes our waterways and blood streams while gobbling up millions of gallons of fossil fuels.

Each year, 817 million tons of food is shipped around the planet. The result is that a basic diet of imported products can use four times the energy and produce four times the emissions of an equivalent domestic diet! A solution to this excessive shipping is to purchase food from local producers; this avoids long distance travel, overuse of plastic packaging and chemical preservatives required for transporting food long distances.

Flash-frozen, chemical-free meats, fish and vegetables are packaged in a material called Dupont Iolon film, which is completely biodegradable. By flash freezing and vacuum sealing, essentially all bacteria are killed, preventing any cross contamination.

The Benefits of Flash Freezing and Vacuum Sealing

When any meat is vacuum-sealed with an impermeable polymer, oxygen cannot get inside the package or reach the product. This lack of oxygen kills all the aerobic bacteria (bacteria that needs oxygen to live). By killing aerobic bacteria, such as salmonella, the product is cleaner and safer. This also causes the meat to appear darker (purplish red) versus the bright red seen in stores.

By blast freezing the product at 50 degrees below zero, several things occur. First, any flavors in the product are locked in because the freezing occurs so quickly. Also, there is no crystallization on or in the product, making it more consistent since the stromal proteins are not broken down. The most important benefit of blast freezing is that it kills 99.47 percent of the anaerobic bacteria, such as E. coli. As a result of this process, the product is cleaner and safer.

A more detailed explanation of the process involves an examination of muscle tissue and muscle proteins. Muscle tissue contains many proteins serving many different functions. Muscle proteins can be grouped into three general classifications: myofibrillar proteins, sarcoplasmic proteins and stromal proteins.

Myofibrillar proteins are also known as salt-soluble proteins because of their ability to be dissolved in salt solutions. The sarcoplasmic proteins consist mainly of the glycolytic enzymes. These proteins are also known as the water-soluble proteins. Myoglobin, the oxygen-binding protein inside the muscle cell, and

hemoglobin are members of this protein class. Myoglobin and hemoglobin are responsible for the typical red color of meat. The darker color of beef versus pork (or chicken leg versus chicken breast muscle) is due to larger quantities of these pigment proteins. The heme group also changes in color with oxygen binding and oxidation, and when complexed with nitrite during meat curing. Stromal proteins, or connective tissue proteins, consist primarily of collagen and elastin.

In order to get the bright red color, which is usually seen on the surface of meat purchased in the supermarket, oxygen from the air needs to react with the meat pigments or sarcoplasmic proteins. When oxygen attaches itself to the myoglobin, it is converted to oxymyoglobin, which is the pigment responsible for the red color in meat.

One must realize that although the bright red color is appealing, oxygen is also causing the meat to deteriorate and be susceptible to aerobic bacteria. For instance, growth of psychrophilic bacteria (i.e. spoilage bacteria) is sustained because of high oxygen transmission rates through materials used for meat packages in the supermarket.

Most of the problems that are addressed with tray and over-wrap packaging of fresh or frozen meat are overcome with vacuum packaging. If more consumers become educated about the color of ground beef or meats in general, there would be a greater acceptance of vacuum packaging. Composite polymer films, also known as laminates, have low water vapor and oxygen transmission rates and are used for vacuum packaging.

In vacuum packaging, metmyoglobin is formed because of low levels of oxygen that are entrapped in superficial tissue layers. However, basically all pigment forms are gradually transformed to the purplish-red deoxymyoglobin, as respiratory enzymes in muscle and microorganisms use the leftover oxygen. Carbon dioxide production and some pH lowering from carbonic acid formation is a result of this respiratory activity.

For vacuum-packaged ground beef or any meats, a purplish-red color is common because the vacuum condition excludes air from coming into contact with the ground beef. Vacuum packaging combined with an oxygen impermeable film could considerably improve shelf life of all meats. When blast freezing is added immediately after vacuum sealing, the shelf life is vastly increased.

REFERENCES

American Association of Meat Processors, October 2010