

GAMMA IRRADIATION ENHANCES SHELF LIFE FOR DAIRY PRODUCTS



The International Dairy Foods Association reports that approximately 21 percent of the waste that reaches landfills and incinerators is food. Dairy products make up approximately 17 percent of those wasted foods, generated at the retail level and by consumers at home.¹

A major challenge in keeping dairy products fresh throughout the supply chain is contamination of yeast and mold, which are naturally present everywhere and quickly lead to untimely spoilage.² While pasteurization and preservatives can prevent spoilage and enhance product shelf life, some overlook the role clean packaging can play. To avoid spoilage, reduced shelf life, and possible product recalls, packaging materials must be decontaminated prior to product exposure to prevent the introduction of pathogens.

One technique used to sanitize dairy packaging is gamma irradiation. Though the word “irradiation” is perceived negatively, in reality, the opposite is true. The technology is highly effective in making dairy packaging less susceptible to airborne molds, bacteria, and yeast.

IRRADIATION IS SAFE AND USEFUL FOR DAIRY PACKAGING

Gamma irradiation is safe to use for all dairy packaging. Keep in mind the following about gamma irradiation:

- Gamma irradiation does not leave a residual on the dairy packaging.
- Irradiation is safe for consumers. Sterigenics uses a technology approved by the FDA using pure energy rays.
- Irradiation is not self-heating during the process. Unlike autoclave and other heating methods, irradiation can be used on many plastics and polymers to reduce bioburden. Companies don't have to worry about their package melting or warming.

TEMPERATURE IS A FACTOR

A key factor in maintaining shelf life is temperature. Dairy products, in particular, need to be in a controlled temperature environment during shipping and on store shelves. As dairy products are temperature-sensitive they are more vulnerable to shorter shelf lives, which makes it even more critical that the packaging is sanitary. Irradiating the packaging and maintaining temperature during transport and shelving help extend shelf life.

GAMMA IRRADIATION IMPROVES SHELF LIFE

While preservatives added to dairy products are intended to inhibit the growth of microorganisms, preservative-free dairy products increase their vulnerability to grow contaminants. The industry must find other solutions to reduce contaminants and ultimately enhance shelf life.

Using gamma irradiation to sanitize dairy packing prior to filling can ensure the contents are not exposed to contaminants. Extending shelf life has the potential to reduce waste across the supply chain. Dairy manufacturers may use the extra shelf life to increase the size of their production batches and decrease their frequency, which in turn reduces production waste. Increased shelf life can be beneficial to all supply chain participants: Retailers may sell more of a particular dairy delivery before it expires and in turn reduce waste, brand manufacturers may market their product against competitors as having a longer shelf life, and consumers will have more time to consume the product prior to its expiration.²





GAMMA IRRADIATION 101

Irradiation is a safe method used by manufacturers to reduce harmful spore formers. This proven technology assists packaging companies with overcoming product losses from spoilage, maintaining consumer safety, and protecting corporate and brand reputations.

HOW DOES IT WORK?

Irradiation uses high energy to disrupt the chemical bonds in the DNA of any living organism. The more DNA within an organism, the easier it is to eliminate it using irradiation. Simpler cells with less DNA require a higher amount of irradiation.

HOW EFFECTIVE IS IT?

Irradiation is very effective. Any living organism can be reached and killed using this method.

WHAT ARE THE BENEFITS?

- Unlike chemical decontamination, irradiation does not leave a residue. Chemical residues are not preferable

with packaging materials from which consumers will directly drink.

- Unlike some decontamination methods which cannot reach microorganisms due to blind or unreachable spots, irradiation leaves no place to hide. The energy source penetrates the entire product. Irradiation can therefore be a solution for sophisticated packaging that has intricate or hard to reach spaces.
- It is non-evasive. The energy waves go through the packaging and products.
- It is scalable. Irradiation can be scaled to meet the goals of each situation. The closer the need for near-sterility, the more irradiation can be applied.

WHEN SHOULD GAMMA IRRADIATION BE CONSIDERED?

Product design —Typically, irradiation is first considered by a manufacturer during the product design phase when it becomes apparent that an in-house solution will not work for decontamination.

Reformulation — Reformulation is another trigger point for manufacturers seeking new decontamination solutions. For example, removing preservatives from a beverage formulation creates the need for cleaner packaging.

Ultimately, processing with gamma irradiation reduces spoilage, enhances shelf life, is safe, and ensures that product arrives to the customer in good condition.

GAMMA FACILITIES

NORTH AMERICA

West Memphis, AR
Corona, CA
Gilroy, CA
Hayward, CA
Tustin, CA
Gurnee, IL
Schaumburg, IL
Charlotte, NC
Haw River, NC
Rockaway, NJ
Salem, NJ
Westerville, OH
Fort Worth, TX
Mulberry, FL
Hidalgo, MX

EUROPE

Fleurus, Belgium
Minerbio, Italy

ASIA

Bangkok, Thailand

SOUTH AMERICA

Cotia, Brazil
Jarinu, Brazil

REFERENCES

1. International Dairy Foods Association, <http://www.idfa.org/issues/food-waste>.
2. Westergaard-Kabelmann, Thomas, and Mette Dalgliesh Olsen, Reducing good waste and losses in the fresh dairy supply chain, Chr. Hansen impact study, Nov. 4, 2016.

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