Sterigenics

GAMMA IRRADIATION:

IS CONTAMINATION REDUCING YOUR BEVERAGE SHELF LIFE?

Packaging materials in the beverage industry often harbor microorganisms and introduce the risk of contamination. To avoid spoilage, reduced shelf life, and possible product recalls, the packaging materials must be decontaminated prior to product exposure.

Two trends have increased the risk of beverage/liquid products contamination in recent years: preservative free drinks and increasingly sophisticated packaging designs. These trends are exposing the limitations of in-house decontamination methods. As manufacturers seek more robust microbial reduction, irradiation can be a highly effective technology and a solution to the problem.

MICROORGANISMS: A MACRO PROBLEM FOR BEVERAGE PACKAGING

Molds, fungi, and other microorganisms are so pervasive in the air and on human and indoor surfaces, they are hard to avoid. Thus, packaging materials are often contaminated by the time they reach filling. This becomes a problem when packaging — such as caps, lids, or poly liners — has direct contact with beverage products. The resulting contamination can lead to destruction of the product if it is not fit to distribute or sell.

The trend of preservative-free drinks increases the vulnerability of beverages to the growth of the contaminants. In the past, preservatives added to beverages inhibited the growth of microorganisms. The beverage industry now must find other solutions for reducing contaminants to enhance shelf life and reduce spoilage.

The other trend in the beverage industry causing increased contamination risk is the increasingly complicated designs of bottle closures and packaging. Fitments and bottle cap closures are examples of this. The more intricate package designs can result in "blind" spots such as overlapping parts, or difficult to reach areas for in-house decontamination methods. Consumer safety is therefore at risk.

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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 TO CONSIDER IRRADIATION

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.

IS PACKAGE IRRADIATION A SOLUTION FOR YOU?

If you are seeking to control risk of contamination introduced by your packaging materials, consider irradiation. Irradiation reaches all microorganisms regardless of the intricacies of the package and can be scaled to your microbial-reduction goals.