



## Irradiations Effect on Cannabis

### Background

As an agricultural product, cannabis can be exposed to contamination with pathogenic fungi, bacteria, yeast, and mold during growing, drying, packaging, and/or delivery, which may put consumers at health risks. For example, fatal pulmonary Aspergillosis has been reported in some users, especially immune-compromised patients, who were treated with and/or were using inhaled cannabis products. Outbreaks of Salmonella-caused enteritis have been reported and Clostridium botulinum has been identified in some cannabis extracts.

### Irradiation and Cannabis

Radiation technologies such as gamma and electron beam (E-beam) irradiation are commonly-used treatment methods to address many of the safety concerns with herbal products, including cannabis. Radiation processing does not significantly affect the chemical or physical properties of cannabis and can effectively reduce microbial contamination to levels considered safe for human use.

These radiation technologies are safe, effective, and well documented with over 40 years of use worldwide for the decontamination of medical devices, pharmaceutical products, food, spices, bulk raw materials, cosmetics, and herbal products.

### Radiation Technologies Offer

1. Various levels of penetration of product and packaging, depending on the modality used
2. Minimal temperature effects
3. Reduced post harvesting losses by suppressing sprouting and contamination
4. Control of insect pests
5. Reduction of food-borne diseases
6. Extended shelf-life
7. No residuals on the product

### Radiation Effects

With many diverse cannabis products available to patients and consumers, there is increased focus on reducing product contamination that may result in potentially unsafe products for human consumption. As radiation is used in the treatment of cannabis, numerous publication studies have been conducted to investigate some of the potential effects of gamma and E-beam irradiation. Results of these studies have demonstrated the following:

1. Cannabinoids, terpenes, and moisture content are not changed by irradiation
2. Irradiation does not cause changes in the content of THC and CBD, generally considered the most therapeutically active components in medicinal cannabis
3. Studies of limited numbers of cannabis varieties show some reduction in the effect on the terpenes but kept the terpene profile qualitatively the same. Terpenes can alter the flavor and psychoactive experience to end users in recreational uses
4. Comparison of outdoor grown vs. indoor grown cannabis can have an impact. In general, natural environmentally grown cannabis (outdoor) has less oxidized and degraded cannabinoids and more terpenes (quantity and type of terpenes). The product is only as good as environmental conditions, so potency can fluctuate
5. Studies are continuing on the safety for medical and recreational cannabis needs, and the best regulations to assure safety

### Summary

The growing and distribution processes for medicinal and recreational cannabis can result in contamination of product through yeast, mold, bacteria, and other pathogens as described above. Radiation technologies such as gamma and E-beam are effective methods for the bioburden reduction of cannabis, either as bulk material or in its finished packaging, adhering to regulatory standards.

### FOR MORE INFORMATION

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### RESOURCES

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