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Irradiation efficiency of products needing low radiation doses by using a depleted Cobalt-60 source

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Abstract

In order to determine the radiation processing efficiency of a Cobalt-60 source at the end of its useful life for products needing low radiation doses, measurements of absorbed doses was established by Fricke dosimeters and were performed by using UV-visible spectrophotometer. Taking into account its huge virtue in different diseases (cancer, heart-vascular, Cholesterol-lowering effect...) and the short time required for its irradiation, garlic '*Allium sativum L.*' was considered in this study. Therefore, boxes containing garlic were irradiated with 50, 100 and 150 Gy during 7, 18 and 29 min, respectively. The relative absorbed dose mapping showed a symmetrical distribution in the front and in the back faces of garlic box. Thus, Cobalt-60 source is revealed to be efficient in the irradiation of garlic even at the end of its useful life.

Keywords:

Cobalt-60; Garlic; GIP; dose distribution; Fricke dosimeter.

1. Introduction

The Tunisian pilot-scale Cobalt-60 source is dedicated for sterilization of medical devices with single use (syringe, surgical gowns, suture etc.) and decontamination of fresh foods (fruits, vegetables, salads and meat products, potato, garlic, onions etc.) as well as dry foods (dehydrated or dried spices, dried fruits, dried vegetables etc.).

After one half of the source useful life (commissioning at 1999), the radiation processing quality control was conducted and was studied by different ways (Farah et al., 2006, Gharbi et al., 2005, Kadri et al., 2005, Kadri et al. 2006).

As predicted by IAEA-TECDOC-937, 1997, a dose delivered at a high dose rate is being more effective than the same dose delivered at a low rate. In this context, the Tunisian

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