



factsheet

Beneficial Uses of Cobalt-60

In the mid-1950s the increasing demand for sterile single-use medical devices led to a rapid expansion in the use of gamma irradiation to sterilize products as the technology provided a very effective means of ensuring sterility. Since then the range of applications that benefit from Cobalt-60 irradiation has grown enormously. A diverse array of products are now routinely processed to improve their characteristics and to meet market requirements. Irradiation using Cobalt-60 is an international industry that positively impacts daily on the health and wellbeing of a large proportion of the world's population.



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Beneficial Applications Of Cobalt-60 Radiation Processing Include:

Medical Devices

The primary application of Cobalt-60 continues to be the sterilization of single-use medical devices such as surgical gowns, latex gloves, catheters, scalpels, bandages and implants. These medical devices can be processed in their final packaging as gamma irradiation using Cobalt-60 has the ability to penetrate the devices in their packaging and sterilize the materials within.

Today a very broad range of medical products, including complex devices, are routinely sterilized using gamma irradiation. The technology remains a key sterilization technology and hence an important part of healthcare manufacturing around the world.

Food Treatment

Certain foods and food ingredients are treated with gamma irradiation to make them safer, reduce spoilage and extend shelf life. Irradiation can kill parasites and microorganisms that can lead to food poisoning and can prevent pests from developing in stored product, replacing the use of chemical preservatives and pesticides.

The World Health Organisation and many other international organisations have concluded that food treated by irradiation poses no particular toxicological, microbiological or nutritional problem and various categories of food can now be irradiated in approximately 80 countries¹.

Other Applications

A broad range of other products and materials benefit from exposure to ionising radiation – other applications include: the modification of polymers to improve their thermal and mechanical characteristics; the decontamination of cosmetic raw material and applicators; the treatment of fresh produce to prevent the spread of disease and consumption of crop by invasive species of insects; the preservation of cultural heritage items; and the treatment of gemstones to improve their colour.

Other Non-processing Applications

In addition to its applications in radiation processing, Cobalt-60 is used as a radiation source for medical radiotherapy where it is used in cancer treatment to control or kill malignant cells. Cobalt-60 is used as the radiation source in Gamma Knife equipment that enables non-surgical treatment of brain tumours.

In industry Cobalt-60 is used for industrial radiography, a form of non-destructive testing; in well logging, particularly in the oil exploration industry; and in the printing industry to monitor the flow of inks and thickness of paper.

Cobalt-60 plays an important role in the scientific community, from stem cell research to the design and testing of components for the aerospace and nuclear energy industries.

¹ WHO/FAO reference





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Economic & Social Contribution Of Cobalt-60

- **The US medical device market** was valued at more than US \$140B in 2015 which represents approximately 45% of the global market according to the U.S. Government Accountability Office statistics. In 2015 U.S. exports of medical devices were valued at approximately US \$45B in 2015.²
- **The 2012 U.S. Economic Census reports** that the medical device industry employed more than 356,000 people in the U.S. at over 5,800 establishments.³
- **Sterilization is a critical step** in the manufacture of most single-use medical devices. It is estimated that approximately 40% of medical device Sterilization is performed using Cobalt-60 gamma irradiation.⁴ Over 200 large-scale commercial gamma irradiation facilities are in operation in approximately 50 countries worldwide.
- **Gamma irradiation** using Cobalt-60 contributes to the health and welfare of much of the world's population. The technology supports the manufacture of a vast array of products and enables many important services to be provided and scientific research to be undertaken. The application of Cobalt-60 and the radiation processing industry make an important and beneficial economic and social contribution globally.

Environmental Contribution Of Cobalt-60

Cobalt-60 is a specifically manufactured radioisotope produced using energy that would otherwise be lost. The isotope has a relatively short half-life and is small in volume so that the environmental legacy of use is manageable. Cobalt-60 does not require large volumes of fossil fuels to be burnt and does not produce gaseous waste.

Sterilization using with Cobalt-60 provides an alternative to processes such as fumigation and chemical treatments that consume large amounts of energy and generate significant amounts of gaseous waste. Irradiation as a phytosanitary treatment provides an alternative to fumigation using methyl bromide that depletes the ozone layer.

Summary

Cobalt-60 contributes enormously to the health and wellbeing of a large proportion of the global population and has a positive economic, social and environmental impact that is sustainable for the future.

The International Irradiation Association (iia) advocates the safe and beneficial use of irradiation and supports the developments in gamma, electron beam and X-ray technologies.

² 2016 Top Markets Report – Medical Devices; May 2016; International Trade Administration, United States of America Department of Commerce, http://trade.gov/topmarkets/pdf/Medical_Devices_Top_Markets_Report.pdf, Page 8)

³ 2016 Top Markets Report – Medical Devices; May 2016; International Trade Administration, United States of America Department of Commerce, http://trade.gov/topmarkets/pdf/Medical_Devices_Top_Markets_Report.pdf, Page 7)

⁴ International Irradiation Association estimate