

GAMMA PROCESSING OF FOOD AND HEALTHCARE PRODUCTS

RADIATION TECHNOLOGY CENTRE



*Providing Irradiation Services
for
Enhanced Quality*



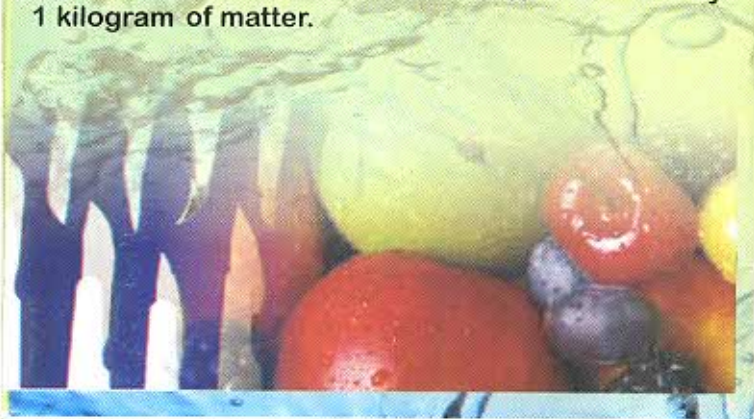
RADIATION TECHNOLOGY CENTRE

The Radiation Technology Centre (RTC) houses the multi-purpose gamma irradiation facility (GIF) which was acquired under an International Atomic Energy Agency (IAEA) Technical Assistance Programme in 1994. The GIF is a category IV wet storage irradiator with a Cobalt-60 source. The irradiator is monitored and controlled from an electronic control panel. Sequentially interlocked controls are provided for personnel access, radiation chamber lockup sequence and source exposure operations, thus enhancing safety to operators. The operation of the GIF is supported by 2 cold storage facilities maintained at 12 - 15°C and 0 - (-20°C).

GAMMA IRRADIATION PROCESS

Gamma Irradiation is high energy electromagnetic photons comparable to ultraviolet rays in sunlight or X-rays. The irradiation process involves the controlled exposure of products to gamma radiation generated by the natural decay of the radioisotope Cobalt-60.

The quantity of energy absorbed by the product is called the "Dose", measured in kGy (kilo Grays). 1 Gy corresponds to 1 Joule of energy absorbed by 1 kilogram of matter.



ADVANTAGES OF GAMMA IRRADIATION

- Total penetration of final packaging
- Highly effective and efficient process
- "Cold process" – no temperature influence
- Time/Dose is the only variable – easy validation and control
- No quarantine time
- Can be applied at various stages of manufacturing process



QUALITY AND SAFETY CONTROL

- Approved by Ghana Standards Board, World Health Organization, Food and Agriculture Organization.
- RTC regulated by Radiation Protection Board of Ghana.
- Safe process: no residues, no radioactivity induced.
- Environmentally friendly.
- Integral part of GMP (General Management Procedures)
- Dosimetry Laboratory ensures accurate dose delivery and measurement



APPLICATIONS FOR THE MEDICAL, PHARMACEUTICAL AND COSMETIC INDUSTRIES

Radiation sterilization improves the hygienic quality of medical items and devices as well as that of pharmaceutical and cosmetic raw materials. The process can improve the sterility assurance level of products to 10^{-6} or 1/1,000,000 CFU/gram. The sterility of products is maintained for as long as the packaging is intact. The process is more efficient and also safer than the conventional sterilization processes such as autoclaving and fumigation by gas (ethylene oxide). Autoclaving frequently destroys heat sensitive plastic and other materials used in the manufacture of most single-use medical items. Ethylene oxide causes pollution and its residue is carcinogenic.

APPLICATIONS FOR THE FOOD INDUSTRY

The process of food irradiation ensures the destruction of bacteria, fungi, insects and other parasites that cause food spoilage and disease. The radiation treatment also prevents germination / sprouting in some foods whiles delaying ripening and senescence in others. Food irradiation does not cause significant changes in the chemical composition, nutritional value, taste or appearance. Since food irradiation is a physical process, it does not leave any residues in the treated food products. Due to the penetrating power of radiation, food irradiation can be an end process, that is, the food is irradiated in its final package; thus preventing post-irradiation contamination. Health and food safety authorities in about 40 countries have approved irradiation of more than 40 different food products.



Product/Item	Objective of processing
Pineapple, Citrus, Pawpaw	Phytosanitary & quarantine, delay ripening
Banana, Mango	Phytosanitary & quarantine, delay ripening & senescence
Garden eggs (Egg plants), Okra, Chillies	Phytosanitary & quarantine, delay ripening
Yam, Potato, Ginger, Onion	Sprout inhibition
Spices and Condiments	Microbial decontamination, insect disinfestation
Dehydrated vegetables (dried)	Microbial decontamination, insect disinfestation
Gari, Kokonte	Microbial decontamination, insect disinfestation
Maize dough (semi- dried)	Microbial decontamination, insect disinfestation
Cassava dough (semi-dried)	Microbial decontamination, insect disinfestation
Cowpeas, Groundnuts, Bambara beans, Soybeans	Microbial decontamination, insect disinfestation
Sorghum, Millet, Maize, Rice	Microbial decontamination, insect disinfestation
Frozen, dried and smoked fish	Microbial decontamination, insect disinfestation
Dried and smoked meat	Microbial decontamination, insect disinfestation
Poultry	Microbial decontamination

Product/Item	Objective of processing
Medical products	
Intravenous infusion sets	Sterilization
Intravenous infusion fluids	Sterilization
Syringes, Gloves	Sterilization
Cotton wool, Gauze	Sterilization
Surgical kits, Catheters	Sterilization
Midwifery & delivery packs	Sterilization
Tissue grafts	Sterilization
Pharmaceutical/Cosmetic products	
Ointments, Creams	Microbial decontamination
Powders (talc, starch)	Microbial decontamination
Ophthalmic preparations	Microbial decontamination
Gelatin capsules	Microbial decontamination
Dried herbal products	Microbial decontamination

For further information, contact:

The Manager,
Radiation Technology Center

Tel.: +233 – 208115399

E-mail: adugyamfi21@yahoo.com

OR

The Director,
Biotechnology and Nuclear Agriculture
Research Institute (BNARI),

P. O. Box LG 80, Legon-Accra, Ghana

Tel.: +233 – 21 – 402286

Fax: 23 – 21 – 402286 / 400807

E-mail: bnari@gaec.org

Website: www.bnari.org

LOCATION: ATOMIC

RTC is within the premises of the GAEC, Atomic which is located 24km to the north of Accra. It is 6km off the main Legon-Madina road and between the Haatso and Atomic Down.

Direction

