

Establishing radiation processing capacities in Costa Rica

The challenge...

Radiation processing technology can enhance industrial efficiency and productivity, and can improve the competitiveness and quality of commercial products. For decades, the technology has added value to key production sectors in many IAEA Member States.

For instance, gamma irradiation (to control cell growth and ensure that nutrients are delivered only to cells that should grow) is used in preparing the human skin cells (feeder layers and irradiated grafts) that are used to treat diverse skin ailments and burns. In Costa Rica, the cells had to be shipped abroad for treatment, lengthening waiting times and recovery periods for patients. Additionally, Costa Rica's medical industry could not develop new products, as gamma radiation sources were not available to sterilize the materials. Recognizing the potential of radiation processing for income generation and economic development, Costa Rica decided to establish research scale radiation processing technologies at the Technology Institute of Costa Rica (ITCR).

The project...

With the support of the IAEA technical cooperation programme, Costa Rica aimed to establish a gamma irradiation facility that would meet the needs of the medical and agro-food research sectors. The initiative was in line with the national goal to strengthen Costa Rica's scientific and technological capacities, and to enhance its biomedical, biomaterials and agricultural industries.

Through the TC programme, Costa Rican professionals in ITCR received training to develop the specialized human resource capacities needed to improve therapeutic treatment of patients.

In addition, two laboratories with the capacity to grow human cells were established in order to facilitate the production of autologous human keratinocytes and fibroblasts for transplantation to patients with burns, ulcers and other skin lesions.

The impact...

The new irradiation facility is paving the way for in-vitro culture of skin cells for therapeutic purposes in Central America and the Caribbean. Tissues will be readily available for clinical patients with epidermal conditions, and other human tissues are likely to be available in the future.

Valuable experience is also being gained in the design and construction of polymeric matrixes composed of Costa Rican aquaculture materials, such as collagen from skins of tilapia and chitosan from shrimp shell. These residues may potentially be used as biomaterials for tissue engineering and for application to skin lesions.

In future, the project will contribute to improved food security and food safety in Costa Rica, as it will be used to investigate the development of new crop varieties and the possible application of food irradiation.



National counterparts working at the ITCR.