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## Using of Radiation Sterilization

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There are 2 general types of radiation used for sterilization, ionizing radiation and non-ionizing radiation. Ionizing radiation is the use of short wavelength, high-intensity radiation to destroy microorganisms. This radiation can come in the form of gamma or X-rays that react with DNA resulting in a damaged cell. Non-ionizing radiation uses longer wavelength and lower energy. As a result, non-ionizing radiation loses the ability to penetrate substances, and can only be used for surfaces sterilizing.

For enforcement of the Law on State Supervision of Public Health and the Law on the safe deployment of nuclear and radiological activities in Moldova we developed the scientific technology on ionizing radiation of products of different origin on the base of International Standard ISO 11137 with adaptation at the country needs and specific. This scientific elaboration specifies requirements for validation, process control and routine monitoring in the radiation sterilization and will be implemented under the IAEA coordination.

It is stipulated that the following sources of ionizing radiation can be used: gamma radiation from radionuclides  $^{60}\text{Co}$  or  $^{137}\text{Cs}$ ; X-rays generated from machine operated from a nominal energy (maximum photons energy) less than or equal to 5 MeV; electrons produced by machines operated from a nominal energy (maximum energy of electrons) less than or equal to 10 MeV. High energy rays damage the DNA of living organisms and make them unable to grow or reproduce.

The elaboration stipulated that the mean total dose of absorbed radiation (kGy) (maximum) for the treatment of dried herbs, spices and vegetable products consist up to 10 kGy.

Gamma and E-Beam sterilization are planned to be used for medical devices. From experience of other countries is known that both methods are equally effective, but E-Beam is more powerful and hence the exposure time of the device is lesser.

During radiation certain parameters of the irradiating unit, according to legal metrology standard, must be controlled and continuously recorded. For installations using radionuclides, the parameters include speed transmission of product or time spent in the radiation zone and indications confirming correct position of source. For accelerator facilities, the parameters include speed transport of product and energy level, current of the electron and the width of barrier installation.

Before starting the irradiation for a certain category of food minimum/maximum dose level can be determined by performing dose measurements throughout the product volume. These validation measurements must be carried out in sufficient numbers (eg, 3-5 times) to allow consideration of variations in density or geometry. The dose reference position will be quantitatively correlated with minimum/maximum dose. Reference position is to be situated in a convenient place, where dose variations are reduced. If the fluid unpackaged products are irradiated, minimum and maximum dose cannot be determined. In this case, it is preferable to conduct surveys to determine the extremes dose.

### Country/Organization invited to participate

Republic of Moldova

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