



Medical Applications of Radiation

STERILIZATION BY RADIATION

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Areas of Medicine Where Radiation is Used:

➤ Sterilization of medical products

- Today, over half of all medical equipment used in hospitals is sterilized using radiation .***

➤ New drug testing

- Over 80% of all new drugs are tested with radioactive tagging before approval .***

➤ Medical Imaging

- Approximately 68 million CT scans are performed in the U.S according to the National Council on Radiation (NCRP) .***

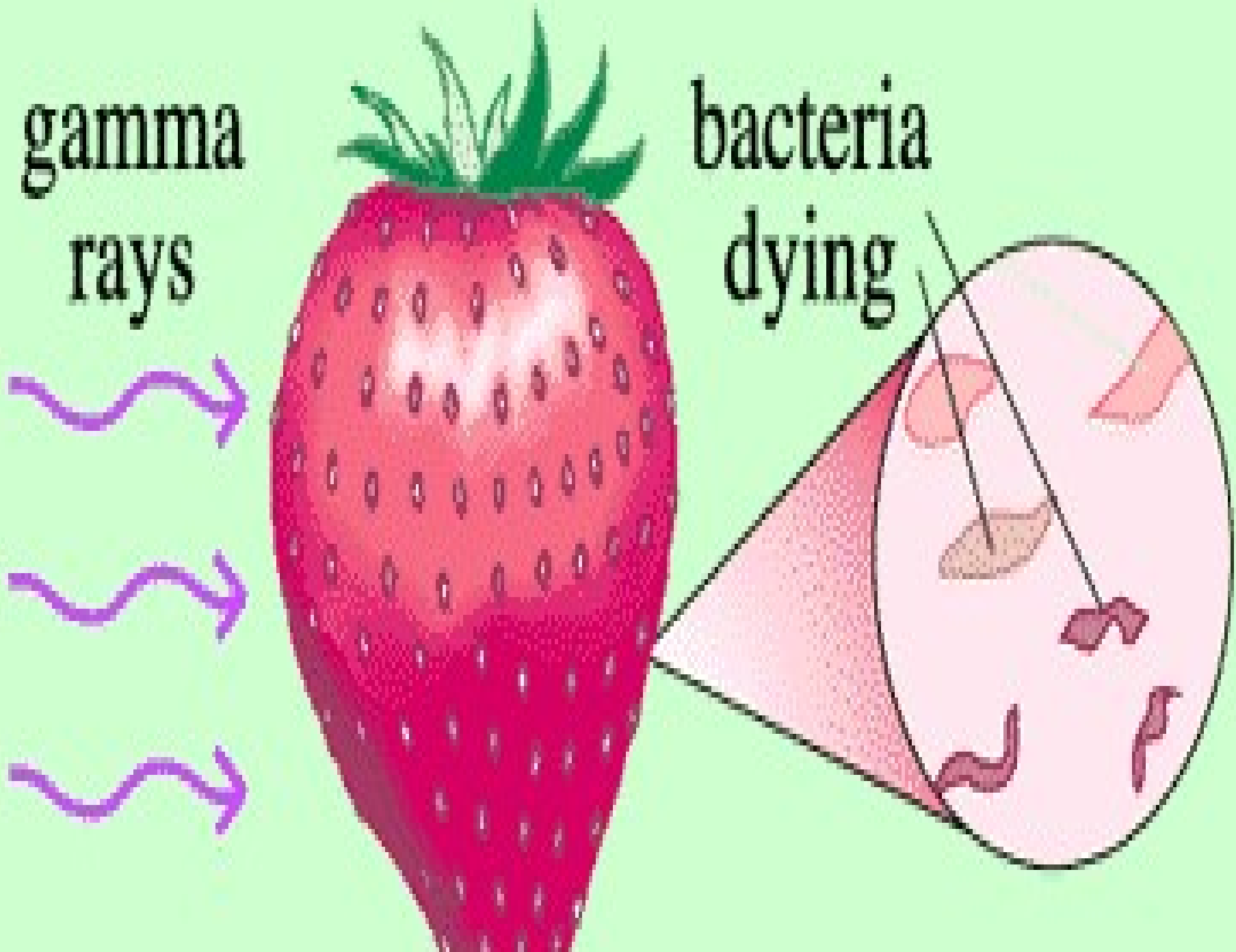


Sterilization

- ***Sterilization***
 - Complete destruction or removal of all forms of contaminating microorganisms
 - Methods of Sterilization
 - Steam Sterilization
 - Dry-heat Sterilization
 - Filtration Sterilization
 - Exposure to Ionizing Radiation
 - Gas Sterilization

gamma
rays

bacteria
dying





Sterilization by Radiation

Advantages

- Gamma radiation easily reaches all parts of the object to be sterilized
- Permits sterilization of heat-sensitive materials
- Relatively low chemical reactivity
- Instantaneous and simultaneous sterilizing effect

Disadvantages

- very dangerous
- only well-trained and experienced staff should decide upon the desirability of their use
- should ensure monitoring of the processes
- specially designed and purpose-built installations and equipment must be used

Sterilization dose

Survival fraction of the microorganisms is reversely proportional with the absorbed dose. Doses for sterilization should be chosen according to the initial bio burden, sterility assurance level (SAL) and the radio sensitivity of microorganisms. A sterility assurance level (SAL) is derived mathematically and it defines the probability of a viable microorganism being present on an individual product unit after sterilization.

SAL is normally expressed as 10^{-n} . SAL is generally set at the level of 10^{-6} microorganisms/ml or g for the injectable pharmaceuticals, ophthalmic ointment and ophthalmic drops and is 10^{-3} for some products like gloves that are used in the aseptic conditions.