Radioactive isotopes

Key words

alpha particle
gamma radiation
irradiation
isotope

1 Tracers

- Radioactive *isotopes* are used as tracers to monitor the movement of substances in plants and animals. A solution containing radioactive phosphorus-32 is introduced into the stem of a plant. A Geiger counter is used to detect the movement of the isotope through the plant.

2 Thyroid monitor

- A solution containing iodine-131 is introduced to the bloodstream of a patient with a defective thyroid. A Geiger counter is used to detect the isotope and monitor thyroid activity.

3 Food preservation

- Food is irradiated by exposing it to *gamma radiation*. *Irradiation* destroys disease-causing bacteria as well as those that spoil food, so the shelf life of food is extended.

4 Sterilization

- Gamma radiation is used to sterilize medical equipment.

5 Smoke detectors

- Americium-241, a source of alpha radiation, is widely used in smoke detectors. The *alpha particles* ionize the air in the sensing circuit. Any smoke particles interfere with this and cause a change in the current, which triggers an alarm.

6 Duration of death

- All organisms contain a specific ratio of radioactive carbon-14 to carbon-12. When an organism dies, no carbon-14 is added. After death, carbon-14 decays at a predictable rate: the half-life is 5,700 years. By comparing the ratio of carbon-14 to carbon-12, it is possible to say when an organism died.