

Review of current inspection devices that use ionising radiation

Area of research interest: [Chemical hazards in food and feed](#)

Study duration: 2010-06-01

Project code: FS231028

Conducted by: Defence Science and Technology Laboratory

Background

The Food Standards Agency has identified a need to consider the extent to which the widespread and increasing use of ionising radiations in security inspection devices for examining cargo, baggage and packages might result in breaches of regulations for the irradiation of foodstuffs. There is also a need to address public concern in this area. To inform this debate, the Defence Science & Technology Laboratory will use its pre-existing experience in developing and assessing inspection systems to:

- Review current technologies that utilise ionising radiation for security inspection to determine the ranges of energies and intensities of the radiation
- Through a process of horizon-scanning, assess potential future developments and the ranges of energies and intensities of the radiation in future systems
- Calculate the radiation doses likely to be delivered to foodstuffs by these systems and compare the doses and the equipment parameters with regulatory limits to ensure food safety.

Research Approach

DSTL will use their pre-existing knowledge and experience of developing and assessing security inspection equipment and their contacts within academia, industry and government to carry out a desk study that will provide information on current systems and on likely future developments. The focus will be on determining radiation output characteristics such as radiation energy, radiation intensity, exposure duration etc. This will take place over a 12 month period in which the first 6 months will focus on researching current equipment and the second 6 months on future developments. In the final 6 months, Dstl will carry out a comparison of radiation emissions with regulatory limits and implications for food safety and produce a final report covering all phases of the project.

Results

The Defence Science and Technology Laboratory (Dstl) has previously conducted two desk studies on behalf of the FSA to examine whether current, or emerging, security inspection technologies using ionising radiation fall under the scope of the Food Irradiation (England) Regulations 2009.

These regulations apply to equipment operating above any of the following levels:

- x-rays with energies in excess of 10 MeV;
- neutrons with energies in excess of 14 MeV;
- other radiations with energies in excess of 5 MeV;
- where the absorbed dose due to neutrons exceeds 0.01 Gy;
- where the absorbed dose from radiations other than neutrons exceeds 0.5 Gy.

There is no evidence in the available literature to suggest that radiation outputs from current security screening devices used in the UK exceed the above levels. However, some emerging technologies could exceed these levels. These technologies include linear accelerators for the production of x-rays, gamma generators based on nuclear reactions, compact neutron generators based on fusion reactions and laser-driven accelerators.

DSTL recommends the following:

- a watching brief is maintained on international recommendations from the WHO and FDA;
- a watching brief is maintained on all developing technologies in the area of security screening;
- as new security screening technologies are introduced across the world, technical and dosimetric data is collected to better inform the FSA.

Research report

England, Northern Ireland and Wales

PDF

[View Review of current and emerging technologies which use ionising radiation for security inspection purposes. as PDF\(Open in a new window\)](#) (256.3 KB)