



## Irradiation of Food

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Author: Christopher Barclay

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This note describes issues arising from use of the technique of irradiating food, mainly to preserve freshness.

### Contents

<b>1</b>	<b>Explanation of food irradiation</b>	<b>2</b>
<b>2</b>	<b>The position in the UK</b>	<b>3</b>
<b>3</b>	<b>Are irradiated products being sold without labelling in the UK?</b>	<b>4</b>
<b>4</b>	<b>EU law on the irradiation of food</b>	<b>5</b>
<b>5</b>	<b>The Food Commission campaign against irradiation</b>	<b>7</b>
<b>6</b>	<b>Food Standards Agency consultation on regulations, 2009</b>	<b>8</b>

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# 1 Explanation of food irradiation

The Food Standards Agency provides the following description:

## **Irradiation**

Irradiation can be used to kill the bacteria that cause food poisoning. It can also delay fruit ripening, help stop vegetables such as potatoes and onions from sprouting and delay other deterioration.

It is a process that produces a similar effect to pasteurisation, cooking or other forms of heat treatment, but irradiation only raises the temperature of food by a few degrees and so there is less impact on taste, look and texture. The irradiation of spices, for example, does not change their flavour or aroma.

It is used in many parts of the world because it is an effective way of killing bacteria.

## **How does it work?**

Beams of radiation pass into food and transfer energy. Bacteria absorb some of this energy and are killed.

However, most energy is absorbed by the food itself and it causes the formation of short-lived molecules known as free radicals, which also kill micro-organisms, such as bacteria, and also interact with other food molecules. Free radicals are also formed in food by other processing techniques, including cooking, chopping and grinding.

Irradiated food is not the same as radioactive food. Radioactivity is present naturally in our environment, including the food that we eat. Food irradiation does not add to the natural radioactivity in food. Irradiating food does not make it radioactive – just as food that has been heated in a microwave oven does not give out microwaves.

## **Is it safe?**

Decades of research worldwide have shown that irradiation of food is a safe and effective way to kill bacteria in foods and extend its shelf life.

All food preservation techniques cause chemical changes in food – that is how they work. The changes caused by food irradiation are similar, although less, than those caused by other preservation techniques, such as cooking, canning and pasteurisation.

## **What foods are irradiated in the UK?**

Current national regulations allow for the irradiation of seven categories of food: fruit, vegetables, cereals, bulbs and tubers, spices and condiments, fish and shellfish, and poultry. However, only one UK licence, for the irradiation of a number of herbs and spices, has so far been granted.

## **How do I know if a food has been irradiated?**

There is no noticeable difference to the smell, taste or appearance of food that has been irradiated. However, all foods, or ingredients of foods listed on the label, that have been irradiated, must be labelled as 'irradiated' or 'treated with ionising radiation'. When irradiated food is not pre-packed and is sold to be eaten immediately (for

example, in restaurants) it must be marked or labelled on a menu, notice or ticket so you can see it when deciding what to eat.

If the restaurant is using irradiated dried herbs and spices for seasoning there may instead be a general indication on a menu, notice, ticket or label that food sold there may contain those types of ingredients.

For several food types, including meat, herbs and spices, there are tests that can show if food has been irradiated. These are used in surveys by the Food Standards Agency to make sure that the rules on irradiation are not being broken.<sup>1</sup>

The irradiation of food has been used on a small scale for several years across the world. Irradiation can be used to kill bacteria that cause food poisoning, such as salmonella, campylobacter and E.coli. It can also delay fruit ripening and help stop vegetables such as potatoes and onions from sprouting. It is used in many parts of the world because it is an effective way of killing bacteria and with some food, such as spices that are dried in the sun, irradiation kills bacteria without changing their flavours or aromas. The Food Standards Agency website sums up as follows on safety:

Decades of research worldwide have shown that irradiation of food is a safe and effective way to kill bacteria in foods and extend its shelf life.

All food preservation techniques cause chemical changes in food – that is how they work. The changes caused by food irradiation are similar, although less, than those caused by other preservation techniques, such as cooking, canning and pasteurisation.<sup>2</sup>

## 2 The position in the UK

The irradiation of food is permitted provided it has been irradiated in accordance with the *Food (Control of Irradiation) Regulations 1990* (as amended) and labelled in accordance with the *Food Labelling Regulations 1996*.<sup>3</sup> A PQ in July 2002 reaffirmed the position:

**Mr. Greg Knight:** To ask the Secretary of State for Health what assessment he has made of the safeguards in place to prevent the sale of irradiated goods in the United Kingdom; and what regular monitoring takes place in this regard.

**Ms Blears:** The sale of irradiated foods in England are strictly controlled by the Food (Control of Irradiation) Regulations 1990, as amended by the Food Irradiation Provision (England) Regulations 2000. Similar legislation applies in Scotland, Wales and Northern Ireland.

The enforcement of these is the responsibility of local authorities. Periodic checks are carried out to ensure that irradiated foods are not being incorrectly marketed and action taken where necessary.

For example, in a recent survey by the Food Standards Agency a number of dietary supplements were found to contain non-approved irradiated ingredients and the companies concerned were told to withdraw the affected products. A copy of the survey report has been placed in the Library.<sup>4</sup>

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<sup>1</sup> Food Standards Agency, [Irradiation](#)

<sup>2</sup> <http://www.eatwell.gov.uk/healthissues/factsbehindissues/irradiation/>

<sup>3</sup> The 1990 Regulations (SI 2490) were amended by 2000 SI 2254 and 2002 SI 1922

<sup>4</sup> HC Deb 4 July 2002 cc 577-8W

This was updated by a reply in December 2004:

**Mr. Roger Williams:** To ask the Secretary of State for Health whether irradiation treatment of (a) fruit, (b) vegetables, (c) cereals, (d) bulbs and tubers, (e) spices and condiments, (f) fish and shellfish and (g) poultry is permitted in the UK.

**Miss Melanie Johnson:** Under current United Kingdom food irradiation regulations <sup>1</sup> any person can apply for a licence to irradiate food that falls within the following categories:

- (a) fruit (includes fungi, tomatoes and rhubarb);
- (b) vegetables (includes pulses);
- (c) cereals;
- (d) bulbs and tubers (potatoes, yams, onions, shallots and garlic);
- (e) spices and condiments (dried substances normally used for seasoning);
- (f) fish and shellfish (includes eels, crustaceans and molluscs);
- (g) poultry (domestic fowls, geese, ducks, guinea fowls, pigeons, quails and turkeys).

At present, only one UK irradiation facility holds a licence to irradiate food and this licence permits the irradiation of a range of dried herbs, spices and seasonings at a facility in Swindon. Dried spices and condiments are currently the only foods that can be irradiated in the UK.

The schedules to the food irradiation regulations set out what is required in an application for a food irradiation licence and it is the Food Standards Agency who consider applications and who inspect food irradiation facilities in the UK.

*Sources:*

<sup>1</sup> The Food (Control of Irradiation) Regulations 1990 as amended.

The Food (Control of Irradiation) Regulations (Northern Ireland) 1992 as amended.<sup>5</sup>

There is scarcely any irradiated food in British shops, and it would have to be labelled. On the whole there is little irradiation in Europe, and it concentrates on herbs and spices because they are such high value products that irradiation makes economic sense. There is little interest in irradiating fruit in Europe because the market is near enough to where the fruit is grown so there is little need to extend shelf life. The Netherlands and France do some irradiation but apparently not fruit. They do not do much because Germany, the key European market, is very hostile to food irradiation.

### **3 Are irradiated products being sold without labelling in the UK?**

An article in 2001 suggested that food irradiation might be taking place under different labelling:

Alert shoppers may be surprised to see new small print creeping onto their food labels. Examples include "This product has been electronically pasteurised" or "Treated by cold pasteurisation", or "This food has been sterilised with E-beam technology". These descriptions are designed to give the impression that food has been processed with clean, precisely controlled technology, claiming to be the solution to bacterial food poisoning. But in fact electronic pasteurisation, E-beam technology, ionising sterilisation and electron beam treatment are all roundabout ways of saying that the food has been irradiated.<sup>6</sup>

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<sup>5</sup> HC Deb 20 December 2004 c1476W

<sup>6</sup> "Food irradiation returns in disguise", *Food Magazine*, January/March 2001 p 4

In June 2002, the Food Standards Agency detected covert irradiation of food imported into the UK:

A wide range of dietary supplements sold in the UK have been irradiated in breach of food regulations, a Foods Standards Agency survey has found. Companies with affected products have been told to remove them from sale. The only foodstuffs allowed to be irradiated and sold in the UK are herbs and spices – and only if they are labelled to say they have been irradiated. But in a survey of dietary supplements, prawns and shrimps, and herbs and spices, 42% of dietary supplements (58 out of 138 samples) tested were irradiated. Five out of 202 prawn and shrimp samples were also irradiated. One out of the 203 herb and spice samples tested was irradiated but not labelled to say so.<sup>7</sup>

#### 4 EU law on the irradiation of food

The European Union agreed on a Directive in 1999 after more than a decade of disagreement between Member States. The following reply to a PQ shows the British Government's support.

**Mr. Rooker** [holding answer 8 March 1999]: The Government considers that the recently adopted EC Directive on Irradiated Food represents an important step in harmonising food irradiation legislation across the EU. Amongst other things, this will require all irradiated foods to be clearly labelled in line with current UK requirements. The Directive will be implemented in the UK within the prescribed time frame of 18 months from the date when the Directive is published by the EC Commission.<sup>8</sup>

The Framework Directive lays down the general rules for irradiation and the labelling requirements.<sup>9</sup> A second Directive includes the following passage (Article 2):

Member States may not prohibit, restrict or hinder the marketing of foodstuffs irradiated in accordance with the general provisions of the framework Directive and the provisions of this Directive on the grounds that they have been so treated.<sup>10</sup>

Article 6 of the Framework Directive covers labelling.

The labelling of foodstuffs treated with ionising radiation shall be governed by the following provisions:

1 in the case of products intended for the ultimate consumer and mass caterers:

(a) if the products are sold as items, the words "irradiated" or "treated with ionising radiation" shall appear on the label as provided for in Article 5(3) of Directive 79/112/EEC.

In the case of products sold in bulk, these words shall appear together with the name of the product on a display or notice above or beside the container in which the products are placed;

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<sup>7</sup> Food Standards Agency News Release, *Survey Reveals Illegal Irradiation of Foods*, 7 June 2002

<sup>8</sup> HC Deb 18 March 1999 c 815W

<sup>9</sup> *Council Directive on the approximation of the laws of the Member States concerning foods and food ingredients treated with ionising radiation*, OJ L 66, 13.3.99

<sup>10</sup> *Council Directive on the establishment of a Community list of foods and ingredients treated with ionising radiation*, OJ L 66, 13.3.99

(b) if an irradiated product is used as an ingredient, the same words shall accompany its designation in the list of ingredients.

In the case of products sold in bulk, these words shall appear together with the name of the product on a display or notice above or beside the container in which the products are placed;

(c) by way of derogation from Article 6(7) of Directive 79/112/EEC, the same words shall be required in order to indicate the irradiated ingredients used in compound ingredients in foodstuffs, even if these constitute less than 25% of the finished product;

2 in the case of products not intended for the ultimate consumer and mass caterers:

(a) the words provided for in the previous paragraph shall be used to indicate treatment of both the foods and the ingredients contained in a no-irradiated foodstuff;

(b) either the identity and address of the facility which carried out the irradiation or its reference number as provided for in Article 7 shall be indicated;

3 the indication of treatment shall in all cases be given on the documents which accompany or refer to irradiated foodstuffs.

There is a list of products on which irradiation may be used and Annex I of the Framework Directive contains conditions for authorising food irradiation.

1 Food irradiation may be authorised only if:

- there is a reasonable technological need,
- it presents no health hazard and is carried out under the conditions proposed,
- it is of benefit to the consumer,
- it is not used as a substitute for hygiene and health practices or good manufacturing or agricultural practice.

2 Food irradiation may be used only for the following purposes:

- to reduce the incidence of food-borne disease by destroying pathogenic organisms,
- to reduce spoilage of foodstuffs by retarding or arresting decay processes and destroying spoilage organisms,
- to reduce loss of foodstuffs by premature ripening, germination or sprouting,
- to rid food stuffs of organisms harmful to plant or plant products.

A PQ in July 2005 updated the position with further sources of information:

**Mr. Amess:** To ask the Secretary of State for Health if she will list each EU country where food irradiation is permitted; what products can be irradiated in each case; what assessment she has made of the irradiation of products from non-EU countries imported into the United Kingdom; and if she will make a statement.

**Caroline Flint:** Food irradiation falls into the Food Standards Agency's (FSA) area of responsibility. I am advised by the FSA that all European Union countries permit the irradiation of food, subject to their irradiation facilities obtaining approval from their national competent authority. Although irradiated food is permitted in all EU countries, it does not follow that there are approved food irradiation facilities in each member state. An up-to-date list of approved food irradiation facilities in EU member states is available at:

[http://europa.eu.int/comm/food/food/biosafety/irradiation/approved\\_facilities\\_en.pdf](http://europa.eu.int/comm/food/food/biosafety/irradiation/approved_facilities_en.pdf).

Dried aromatic herbs, spices and vegetable seasonings are currently the only foods that can be irradiated in, and traded freely between, all EU countries. A number of EU

countries also permit other categories of food to be irradiated. However, up-to-date information on all the permitted foods in the different member states is not held centrally. In practice, not all permitted foods are in fact irradiated as this depends on the existence of an approved facility for the irradiation of each foodstuff. The European Commission provides annual reports on all food irradiated in practice each year at EU facilities. The most recent information currently available is for the year 2002 at [http://europa.eu.int/eur-lex/en/com/rpt/2004/com2004\\_0069\\_en01.pdf](http://europa.eu.int/eur-lex/en/com/rpt/2004/com2004_0069_en01.pdf).

Irradiated foods imported into the EU from non-EU countries must have been irradiated at facilities approved by the European Union. There are currently five approved facilities outside the EU, three in South Africa, one in Turkey and one in Switzerland. Decisions on the approval of food irradiation facilities in non-EU countries are based on the results of inspections performed by the Food and Veterinary Office of the European Commission. FVO inspection reports are published at [http://europa.eu.int/comm/food/fs/inspections/fi/reports/index\\_en.html](http://europa.eu.int/comm/food/fs/inspections/fi/reports/index_en.html).

All food imported from non-EU countries is subject to food safety controls carried out on the basis of risk assessment by local food authorities at the point of entry into the United Kingdom. As regards irradiated food, food products that do not comply with the Food (Control of Irradiation) Regulations 1990 (as amended) can be refused entry or destroyed.<sup>11</sup>

## 5 The Food Commission campaign against irradiation

The Food Commission has ran a campaign against food irradiation. Their website contains further information about it, [Food Irradiation Project](#).

Here is their overview of the campaign:

### **The Food Irradiation Campaign**

Between 1987 and 2002, the Food Irradiation Campaign, run within the Food Commission, led public awareness over the problems of irradiation technology.

Food irradiation is promoted by some international bodies and industry groups as the answer to the problem of food poisoning, and as a means to combat world hunger by reducing spoilage and extending shelf life of food. However, there are widespread concerns over the possible health, safety and environmental impacts of food irradiation. The creation of dangerous toxins in the foods, loss of nutrients, potential use of the technology to cover up unhygienic food production, and risks to worker safety are just a few of the many issues still unresolved.

The Food Irradiation Campaign maintains that:

- Food irradiation is not a solution for cleaning up foods which are unhygienically produced and unfit for consumption;
- Food irradiation benefits larger producers and traders rather than consumers and small-scale producers;
- Food irradiation helps to extend the distance food can travel (known as 'food miles') and is not conducive to the promotion of more local food supplies;
- Good food doesn't need irradiating.

(...)

The success of the Food Irradiation Campaign can be judged by the continued refusal of consumers to ask for irradiated food, and the cautious approach by supermarkets who don't put it on their shelves. In 1990 the UK permitted irradiated foods to be sold to

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<sup>11</sup> HC Deb 18 July 2005 cc1461-2W

consumers, but twelve years later not a single supermarket is knowingly selling irradiated products.

## **6 Food Standards Agency consultation on regulations, 2009**

In January 2009 the Food Standards Agency published the draft Food Irradiation (England) Regulations for consultation:

The food irradiation regulations have been in place for nearly 20 years and have been amended several times. Consolidating the regulations and their amendments into one statutory instrument would make them easier to follow. Amendments to English regulations in 2000 were intended to fully implement the requirements of Directives 1999/2/EC and 1999/3/EC, which can be found at the related links section below. However, these amendments did not adequately address the national procedures relating to food irradiation facilities in non-European countries, and so this must now be corrected. The Agency would also like to take this opportunity to simplify the control system and to do this we would like to change the licensing system and the food irradiation licence issued to irradiation facilities. In addition, the Agency is considering if licensing and inspection fees are necessary. Finally there are areas where the regulations could be made more up-to-date, for example the definition of cereals. The intention is to reduce the administrative burden for companies and enforcement officials.

To this end, the FSA is to produce new food irradiation regulations which provide for the requirements detailed in Directives 1999/2/EC and 1999/3/EC (the food irradiation directives). These Directives must be transposed into domestic law. We would welcome any comments you may have on how this could be done in a more simple and less burdensome way. The Agency does not intend to alter the labelling requirements for irradiated food that are included in the Food Labelling Regulations 1996, as amended.

### **Proposals**

The following takes each key aim and explains in detail the rationale behind the new regulations.

#### **Approval of third country facilities**

The Food (Control of Irradiation) Regulations 1990 allow the UK to 'recognise' food irradiation facilities in third countries (non-EU countries), even if they are not approved by the European Community. To do so would be in breach of Article 9 of Directive 1999/2/EC. Food that has been irradiated in a third country for sale in the UK must have been irradiated at a facility that has been approved by the Community. The current regulations are being operated in a way that ensures that the Directive is not breached and no third country food irradiation facilities have been separately 'recognised' by the UK. Nevertheless, the intention of the regulations is to implement the requirements of the Directive in full.

#### **Approval of UK Facilities**

Directive 1999/2/EC requires that food irradiation facilities in EU member states are approved by their National Competent Authority and in the UK this is the FSA. Prior approval of UK facilities is implemented by a licensing system, under which the licence contains conditions required in detail by the regulations. An improvement would be to set out the requirements once, as requirements of the regulations themselves. This would simplify the format of the licence document so that it is concise and where



appropriate refers to the regulations on food irradiation without unnecessary duplication of text.

### **Removal of inspection and approval fees**

The Food (Control of Irradiation) Regulations 1990, as amended, include measures to collect fees to cover the costs occasioned by official food irradiation controls such as applying for prior approval, varying existing approvals and the inspection of irradiation facilities. However, Official Food and Feed Controls Regulations, to give effect to European Regulation 882/2004, came into force on 1 January 2007 and Article 27, of Regulation 882/2004 establishes the legal basis for the financing of all official food controls. In order to comply with Article 27 the Agency proposes no longer to collect fees to cover the costs of food irradiation controls. However, this should not exclude the collection of fees where additional expenses exceed normal enforcement activities (in line with Article 28 of Regulation 882/2004).

### **General update to the regulations**

- Definition of cereals – the current regulations refer to the 'Intervention Functions (Delegation) Regulations 1972' and as these are no longer in force this definition should be removed.
- Dried aromatic herbs, spices and vegetable seasonings – one of the permitted categories of food that can be allowed to be irradiated is 'spices and condiments'. In the interests of clarity this category should be altered to 'dried aromatic herbs, spices and vegetable seasonings', so as to meet the exact description in the Annex of Directive 1999/3/EC.
- Food must be in a suitably wholesome state – The current national regulations require that a food irradiation facility specifies what microbiological criteria and the type and frequency of microbiological examination they will use. We propose to change this so that the applicant must show the methods they will use to ensure food is in a 'suitably wholesome state'. This more accurately reflects the requirements of Directive 1999/2/EC and the approach taken in European Regulations 852/2004 and 853/2004 to food hygiene regulation.
- The seven categories of food – until a Community positive list of foodstuffs is established, several member states, including the UK, maintain national authorisations of foods which may be treated with ionising radiation. In the UK, seven categories of foods can be irradiated. These are fruit; vegetables; cereals; bulbs and tubers; spices and condiments (amended as dried aromatic herbs, spices and vegetable seasonings); fish and shellfish; and poultry. The Agency does not propose to change the list of foods as part of this update, other than altering the 'spices and condiments' category as mentioned above. However, the Agency could consider adding other types of food to the permitted list under Article 4(5) of Directive 1999/2/EC, but only if this food is already on the permitted list of another member state.

Options being considered

Three options have been considered:

1. do nothing
2. produce a further amendment to existing Regulations in order to alter domestic Regulations

3. revoke existing regulations and amendments and remake a new Statutory Instrument that fully implements the Directives and consolidates existing food irradiation regulations

Option [3] is preferred; it is the one that best meets the policy objective of correctly implementing European Directives and simplifying current regulations. This option is in line with the Government's better regulation agenda.

#### Key proposals

- to amend the procedures for the approval of third country facilities to fully implement Directive 1999/2/EC
- to replace the current licensing system with a simpler system and a shorter style licence where most of the legal requirements are contained in the Statutory Instrument, rather than the licence
- no longer to charge fees for routine official controls, e.g. fees for licence applications, variations and for inspections
- to consolidate the existing regulations and amendments and make various drafting improvements.<sup>12</sup>

The new Food Irradiation Regulations were made on 24 June and came into force on 31 July 2009.<sup>13</sup> The Explanatory Memorandum lists the pieces of EU legislation that are implemented and explains what the new regulations do:

As well as making minor and drafting changes, the Regulations—

- (a) define “properly irradiated food” (regulation 3(2) and Schedule 1);
- (b) prohibit the irradiation of food unless it is wholesome and is irradiated in accordance with the Regulations and with a licence (regulation 4(1));
- (c) provide for the issue and contents of licences, the requirements to be observed by a licensee, and the variation, cancellation or suspension of licences (regulation 4(2) and Schedule 2);
- (d) restrict the importation of irradiated food (regulation 5);
- (e) restrict its storage or transport (regulation 6);
- (f) restrict its sale (regulation 7);
- (g) require the documents which accompany irradiated food to contain certain information (regulation 8);
- (h) provide for their enforcement (regulation 9);
- (i) create offences and prescribe penalties (regulation 10);
- (j) apply various provisions of the Food Safety Act 1990 for the purposes of the Regulations (regulation 11); and
- (k) revoke the Food (Control of Irradiation) Regulations 1990/2490 so far as they apply in relation to England, regulations 2 to 16 of the Food Irradiation Provisions (England)

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<sup>12</sup> Food Standards Agency, [Draft Food Irradiation \(England\) Regulations 2009](#), 29 January 2009

<sup>13</sup> [The Food Irradiation \(England\) Regulations 2009](#), (2009 SI 1584)

Regulations 2000/2254 and the Food (Control of Irradiation) (Amendment) (England)  
Regulations 2002/1992 (regulation 12).