



Irradiated Herbal Supplements Survey 2002

May 2003

BACKGROUND

Food irradiation is a process whereby a food is exposed to ionising radiation produced by electronic or radioactive sources. Irradiation can be used to reduce the level of harmful or spoilage microorganisms in food, kill any insects or pests that a food may harbour, delay ripening of fruits and vegetables and prevent sprouting or germination in foods such as potatoes, onions and garlic. While irradiation is not suitable for all foods, the process is generally considered safe when carried out under controlled conditions and in suitable facilities.

In 2002, the UK Food Standards Agency (www.foodstandards.gov.uk) reported that 42% of herbal supplements tested were found to have been irradiated. They sampled 14 product categories: alfafa, *Aloe vera*, cat's claw, devil's claw, garlic, ginger, *Gingko biloba*, ginseng, green tea, guarana, kava kava, saw palmetto, silymarin and turmeric. Irradiated samples were detected in each product category except green tea. Forty four of the 138 samples tested had been wholly irradiated, while a further 14 samples were identified as containing irradiated components.

The FSA results were included in the EC's "Report from the Commission on food irradiation for the period September 2000 to December 2001" (http://europa.eu.int/comm/food/fs/sfp/fi_index_en.html). This report is based on the results of inspections carried out in Member States to determine the level of compliance with legislation governing food irradiation. Eight Member States submitted data for the period and only 1.4% of the 6748 samples tested were in breach of the food irradiation legislation. However, the high incidence of irradiation of herbal supplements prompted the Commission to request that all Member States examine this sector within their own jurisdictions to determine the level of compliance.

EU LEGISLATION GOVERNING FOOD IRRADIATION

Under EU legislation, a food may be irradiated only if (a) there is a reasonable technological need, (b) it does not present a health hazard, (c) it is of benefit to consumers and (d) it is not used as a substitute for hygiene and health practices or for good manufacturing or agricultural practice.

Two EC Directives govern the irradiation of foods and their marketing within the EU: the Framework Directive (1999/2/EC) and the Implementing Directive (1999/3/EC), (http://europa.eu.int/comm/food/fs/sfp/fi_index_en.html). These were transposed into Irish law by Statutory Instrument number 297 of 2000.

The Framework Directive covers general and technical aspects for carrying out the irradiation process, conditions for authorising food irradiation, exemptions, and labelling requirements of irradiated foods. Facilities that irradiate food

destined for the EU market must be recognised by the European Commission and must comply with conditions set out in the Directives.

The Implementing Directive provides a list of foods and food ingredients that are authorised across the EU for treatment with ionising radiation. Currently, only dried aromatic herbs, spices and vegetable seasonings, with a permitted maximum overall average absorbed dose of 10 kGy, are listed. Until the list is completed, EU countries may continue to irradiate those foods on the EC list of national authorisations and they may also maintain any existing national restrictions or bans on irradiated foods.

SAMPLING AND ANALYSIS

Twenty-four herbal supplements were bought “off the shelf” in central Dublin retail stores (health stores, a supermarket and a pharmacy) in November 2002. Multiple packs of the same batch were purchased to provide sufficient amounts of sample for testing. Many of the herbal supplements were in capsule form, the capsule shell was removed and the contents alone were regarded as the sample.

The European Committee for Standardisation (CEN) has standardised a number of analytical methods for the detection of irradiated food products (http://europa.eu.int/comm/food/fs/sfp/fi07_en.html). Samples for this survey were tested by two standardised luminescence detection methods. The principle of the methods is based on the fact that most foods contain some level of mineral debris (typically silicates or bioinorganic materials) that trap energy when exposed to ionising radiation. When irradiated mineral debris is exposed to additional energy, such as heat or infrared light, this trapped energy is released in the form of light which can then be measured by sensitive light detection instruments.

Photostimulated luminescence (PSL) is an analytical method (EN 13751:2002) generally used as a screening tool to identify irradiated foods. In this survey it was initially carried out by the Public Analyst Laboratory of the Southern Health Board. When the results indicated that some products may have been irradiated, the FSAI decided to proceed with further testing using the more sensitive and reliable thermoluminescence (TL) method (EN 1788:2001). This testing was carried by a commercial laboratory which also tested the samples using the PSL method, for comparison purposes.

RESULTS

Table 1 shows the thermoluminescence (TL) results obtained for the herbal supplement samples tested. Ten of the 24 samples (42%) tested positive. Four of those 10 samples had been wholly irradiated while six others contained irradiated components. None of the samples were labelled to indicate that they, or any ingredients, had been exposed to ionising radiation.

The results of the photostimulated luminescence (PSL) analysis are given in Table 2 and compare the TL results with the PSL results from the different laboratories. The PSL results from the two laboratories differed for 8 samples. When compared with the more sensitive and accurate TL test, the PSL results from the Public Analyst laboratory reported 4 false negatives and 4 false positives, while the commercial laboratory results reported 4 false negatives and 3 inconclusive results. Only 3 of the samples that tested positive using the TL test were not detected by the PSL tests in either laboratory.

CONCLUSION

While there are no immediate food safety concerns arising out of this survey, the FSAI is concerned about the uncertainty associated with the irradiated products identified. Accordingly, the FSAI has advised that the industry consider removing from the Irish market the products that tested positive. Although irradiation of dried aromatic herbs, spices and vegetable seasonings is legal within the EU, such products, along with those retaining national authorisations, must be labelled so that consumers have a choice when purchasing these products. While some of the constituents of herbal supplements may be legally irradiated and marketed within the EU, no such authorisation exists to cover “Herbal Supplements”. Therefore, irradiated herbal supplements may not be marketed in the EU unless individual constituents were legally irradiated and the product is labelled appropriately.

The FSAI is continuing to investigate other herbal supplements to determine the level of these irradiated products on the Irish market and will broaden the investigation to cover other food types in the future.

FURTHER INFORMATION

Further information on this survey can be obtained from:

Food Safety Information Centre
Food Safety Authority of Ireland
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Table 1: Detection of Irradiation Herbal Supplements by Thermoluminescence (TL)

Product name	Brand	Best Before date	Batch code	TL Result
Raspberry leaves	Good'n'Natural Select Herbals	06/04	52380-06	irradiated
Devil's Claw	Solgar	03/05	50537	irradiated
Black Cohosh	Sona Herbal Remedies	10/04	BN11303	irradiated
Dong Quai	Boots	09/03	15213	irradiated
Turmeric	Cynara	03/05	L37652	irradiated component
Silymarin Milk Thistle	Good'n'Natural Select Herbals	10/04	MT013.42	irradiated component
Saw Palmetto	Good'n'Natural Select Herbals	05/05	89573 01	irradiated component
Unique Garlic	Holland & Barrett	02/05	54081-05	irradiated component
Butcher's Broom Root	Nature's Way Herbal Single	11/04	911115	irradiated component
Devil's Claw	Rivo	07/04	99080800	irradiated component
Devil's Claw	Boots	02/04	15541	inconclusive *
Black Cohosh	Herb Tech	09/04	B005.37	not irradiated *
Concentrated Garlic	Boots	11/04	2014969	not irradiated
Echinacea Plus tea	Dr Stuart's Botanical Teas	10/04	L2294	not irradiated
Echinacea	Good'n'Natural Select Herbals	07/04	E0010-29	not irradiated
Ginseng	Greenline	07/04	F09920	not irradiated
Guarana	Greenline	05/04	E07720	not irradiated
Milk Thistle Extract	Healthwise	09/04	747286	not irradiated
Camomile Herbal Tea	Heath & Heather	08/04	01:38 20004 08 2227E	not irradiated
Ginger	Hofels	07/05	321710	not irradiated *
Ultra Ginseng - Manchurian	Holland & Barrett	09/04	UG003.38	not irradiated
Korean Ginseng capsules	Red Kooga	07/04	74417	not irradiated
Siberian Ginseng	The health store	22/09/04	Q4212	not irradiated
Korean Ginseng	Tony Quinn	02/04	345210523	not irradiated

* Insufficient amount of mineral grains were obtained from the sample to satisfy the sensitivity requirements of the standard method, thus the result may be inaccurate.

Table 2: Comparison of Photostimulated Luminescence (PSL) results with Thermoluminescence (TL) Results

Product name	Brand	PSL1*	PSL2*	TL Result
Raspberry leaves	Good'n'Natura Select Herbals	+	+	irradiated
Devil's Claw	Solgar	+	+	irradiated
Black Cohosh	Sona Herbal Remedies	-	+	irradiated
Dong Quai	Boots	+	-	irradiated
Turmeric	Cynara	-	-	irradiated component
Silymarin Milk Thistle	Good'n'Natural Select Herbals	-	-	irradiated component
Saw Palmetto	Good'n'Natural Select Herbals	-	-	irradiated component
Unique Garlic	Holland & Barrett	+	-	irradiated component
Butcher's Broom Root	Nature's Way Herbal Single	+	-	irradiated component
Devil's Claw	Rivo	+	-	irradiated component
Devil's Claw	Boots	-	-	inconclusive**
Black Cohosh	Herb Tech	-	-	not irradiated**
Concentrated Garlic	Boots	+	+/-	not irradiated
Echinacea Plus tea	Dr Stuart's Botanical Teas	-	-	not irradiated
Echinacea	Good'n'Natural Select Herbals	-	-	not irradiated
Ginseng	Greenline	+	-	not irradiated
Guarana	Greenline	-	-	not irradiated
Milk Thistle Extract	Healthwise	-	-	not irradiated
Camomile Herbal Tea	Heath & Heather	-	-	not irradiated
Ginger	Hofels	-	-	not irradiated**
Ultra Ginseng - Manchurian	Holland & Barrett	-	+/-	not irradiated
Korean Ginseng capsules	Red Kooga	+	-	not irradiated
Siberian Ginseng	the health store	-	+/-	not irradiated
Korean Ginseng	Tony Quinn	+	-	not irradiated

* PSL1- carried out by the Public Analyst Laboratory, PSL2 carried out by a commercial laboratory

**Insufficient levels of mineral grains were obtained from the sample to satisfy the sensitivity requirements of the standard method, thus the result may be inaccurate.