Undeclared Irradiation of Foods: Where are the Risks ?

Food Irradiation

Food can be treated with ionising radiation in order to control bacterial growth or other pathogens, and delay spoilage, ripening or sprouting. Although emotive with consumers in many cultures, food irradiation is accepted as safe and is legal in most jurisdictions. There is no discernible effect on the food other than would be found with conventional heat pasteurisation. It can be argued that irradiation is an attractive alternative to standard preservatives, pesticides or biocides, as it leaves no residues in the food.

Irradiation tends to be more widely accepted in hotter climates where food poisoning is a higher risk. In the UK, there is little public appetite for irradiated food.

European legislation recognises this aversion of many consumers to irradiated food, and the right of consumers to choose. It is a clear legal requirement that irradiated foods and ingredients must be labelled as such. Irradiation is also limited to specific foods where there is a strong technical benefit (a list generally delegated to each Member State's national law) and irradiation can only be performed at approved premises.

Testing for Unlabelled Irradiation

Testing food for undeclared irradiation is difficult and expensive. It is a niche expertise that relatively few laboratories offer. Measurement relies on detecting the tiny amount of irradiation energy that is absorbed by minerals within the food and can be released as luminescence if the sample is stimulated. Most tests use a two-stage process; photostimulated luminescence as an initial screen followed by the more specialist thermoluminescence only if needed. Even then, interpretation can be difficult and subjective. Results are obscured by other ingredients such as salt which – if mined from underground – has its own absorbed energy from natural geological radiation.

Given the difficulty and expense, food businesses and enforcement authorities target their testing resources at where undeclared irradiation is most likely to occur. Risk factors include:

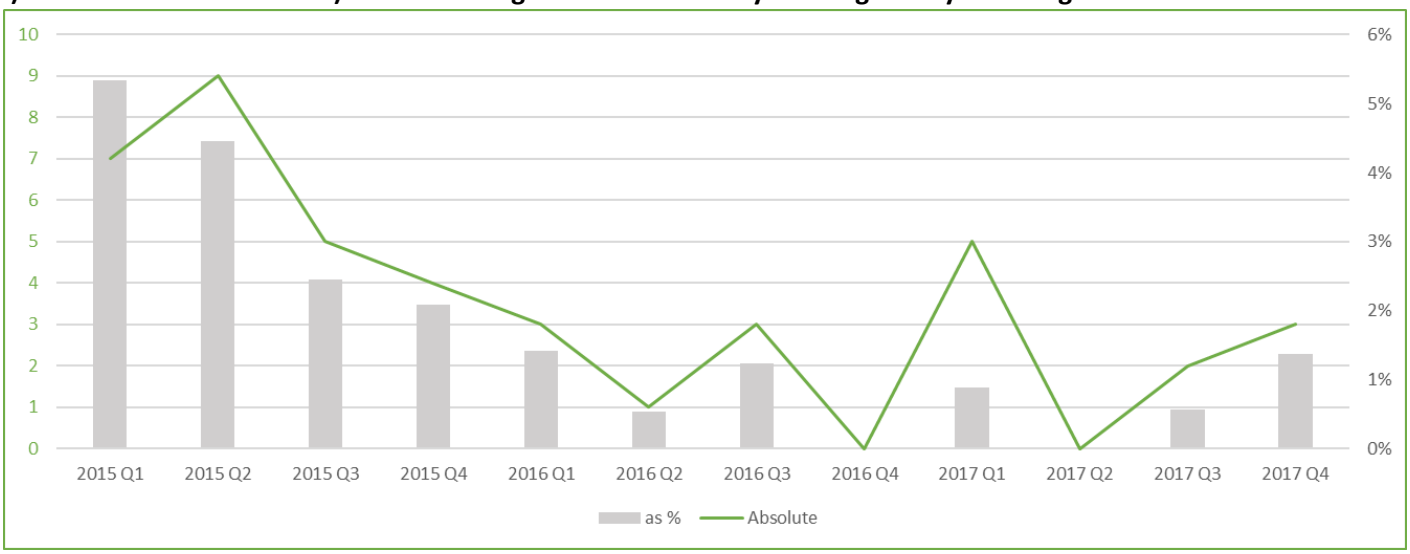
- products from countries where irradiation is common for domestic consumption;
- foods which are legal to irradiate and trade in the EU (provided they are labelled);
- long-life products with a known risk of microbiological contamination; and
- foods with a track history of unlabelled irradiation.

Two types of foods which routinely flag as higher risk are shellfish and ground spices. Most due diligence testing schemes will target these, though not exclusively.

Recent Trends: Detected Incidents

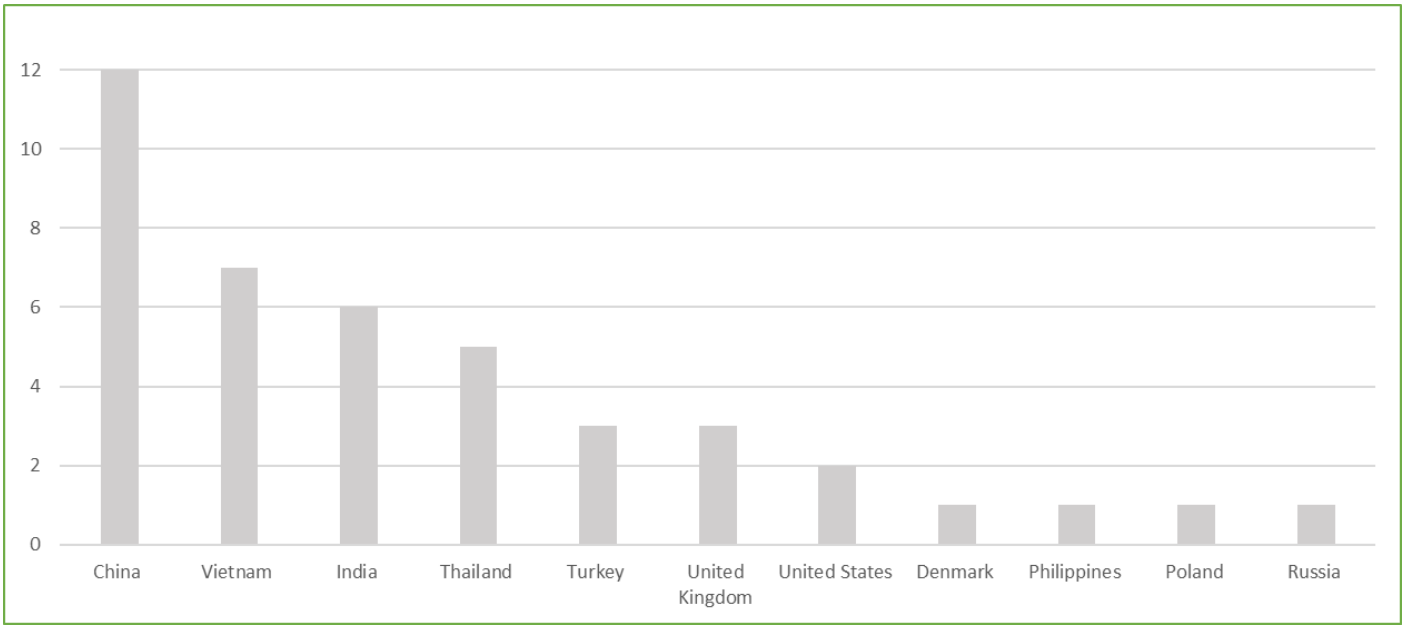
Known cases of undeclared irradiation remains low in both absolute terms and as a proportion of all regulatory labelling and authenticity issues. There has been a slight drop in their relative significance over the past three years.

Figure 1. Global Undeclared Irradiation Reports[1] 2015 – 2017:
i) Absolute Numbers and ii) as a Percentage of all Authenticity and Regulatory Labelling Issues



Most reports related to food that originated in China or South East Asia.

Figure 2. Undeclared Irradiation Reports 2015 – 2017: Source of product

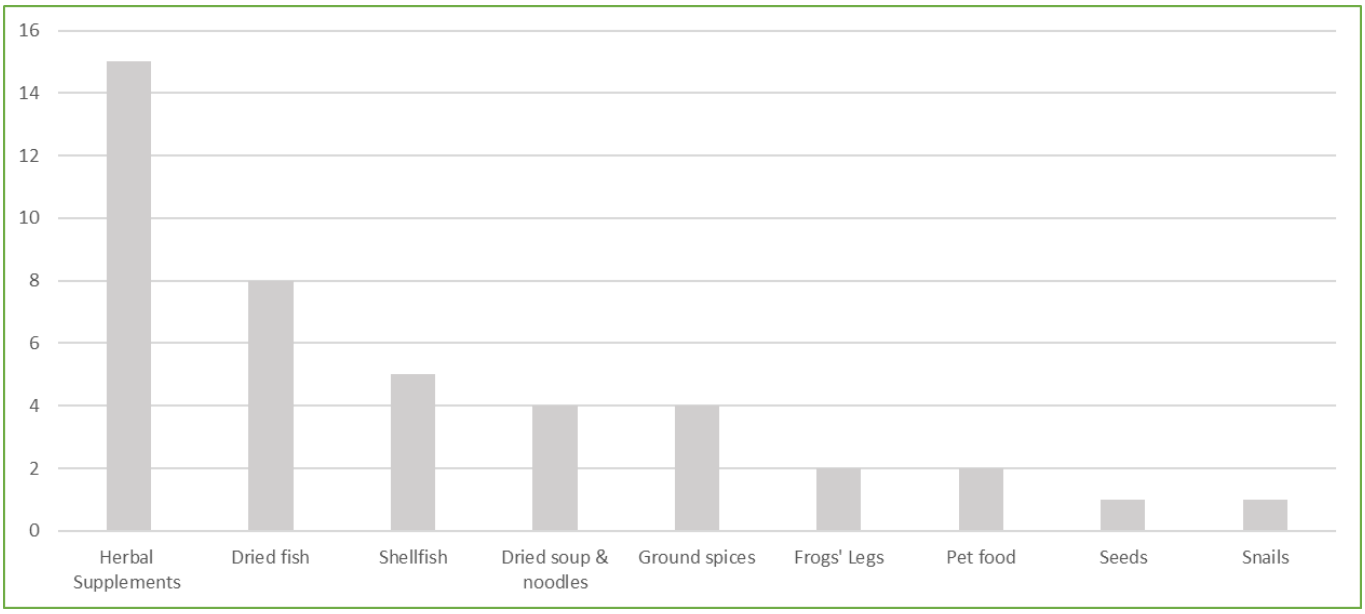


The three reports in UK produce all related to crayfish.

[1] All reported incidents used in this paper are as collated on the Fera Horizonscan database. "Regulatory and labelling" issues exclude undeclared allergens.

Ground spices accounted for relatively few of the reported incidents, given that they account for such a high proportion of the testing activity within Europe.

Figure 3 : Undeclared Irradiation Incidents 2015 – 2017: Types of product



Six of the herbal supplement reports related to different incidents involving Red Yeast Rice Extract produced in China.

Conclusions

Ingredients and imports that have undergone undeclared irradiation continue to be a small but significant risk to both legal compliance and brand reputation. Verification testing is necessarily infrequent, and so must be carefully targeted. The focus on shellfish and spices remains valid, although spices appear well-controlled by the specialist suppliers and risks for retailers and end-users of raw materials appear lower than commonly perceived. Herbal supplements, dried fish, and dried soups and noodles should be included within the higher risk products. Chinese Red Yeast Rice Extract supplements are a very specific risk.