

# Food safety: are you identifying all food contaminants?

Food producers are faced with the challenge of catering to ever-diverse consumer tastes while maintaining production line efficiency. But one focus that must never change is how best to maintain food safety. To avoid financial and reputational damage caused by physical contaminants, x-ray detection and inspection specialist Sparc Systems has identified the common culprits in food products and how to improve identification and consequently avoid a costly recall.

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The first duty of any food manufacturer is to supply its customers with a product that is safe. By removing contaminants found in food products, a supplier can ensure consumer safety, comply with regulatory standards and offset the risk of waste and recalls, all of which can cause significant damage to a business.

The most common culprits include metal,

**In the raw ingredient phase, food is exposed to different processes increasing the risk of foreign fragments entering the supply chain.**



for example fragments that break off during mechanical cutting and blending operations, glass, from storage or packaging, and hard plastics introduced by fatigued tools and equipment.

But despite recent legislation focusing on prevention rather than control, identifying physical contaminants is not always as straightforward as it may seem.

## Identifying the hazards in each sector

In the raw ingredient phase, food is exposed to different processes – from cutting meat, filleting fish, grinding spice or mixing dry and wet baking ingredients.

Later down the line, you may be cutting larger quantities into more convenient single serve-portion or preparing ready-cut vegetables – potentially leading to foreign fragments in the food supply chain.

Each sector comes with its own set of risks. With convenience meals, there can be more than eight production steps between sourcing ingredients to packing, and more than five different product components in each product. As a result, metal and plastic contamination risks are increased.

Intrinsic contaminants are common in protein ingredients, such as bones or teeth from fish, meat and poultry. They can also occur in fresh produce, for example fruit and vegetable pips or egg shells.

In the dairy and bakery sectors, physical hazards may occur through ingredients used during processing (stones, sticks, glass and feathers etc) and could even be introduced from packaging material, for example paper, plastic and glass.

Additional objects that fall under the category include those accidentally exposed by the workforce, for example fingernails and jewellery or processing tools.

## Food recalls rise by 10%

The threat of ignoring these risks is significant. In one study, the FDA found that approximately one quarter of all food related complaints it received over the



**For greater traceability, Sparc x-ray units have a protective high-density acrylic window with doors enabling operatives to see 200 packs per minute travelling through the system.**

course of a year involved the presence of a visible foreign contaminant.

This same study indicated that nearly 15% of the complainants had reportedly suffered an injury or illness, which they attributed to the foreign material.

As the global food supply chain grows increasingly complex, the FDA's Food Safety Modernization Act (FSMA) has shifted focus from response to prevention and is driving the adoption of track-and-trace technologies in all sectors.

But despite stricter regulatory measures to prevent physical hazards from occurring, recall incidents increased in the US by 10% between 2013 and 2018, a major contributing factor linking a rise in physical contaminants including metal, glass and plastic.

Over the past year, multiple high-profile cases have gained traction in the media. Among them Tyson Foods recalled 69,000lb of frozen, ready-to-eat chicken strips that may have been contaminated with metal.

More recently, Chicago-based meat processing giant Amity Packing Company Inc underwent a similar situation, recalling approximately 2,020lb of raw ground beef products over the presence of clear, thin, pliable plastic.

The rising prevalence of recall cases implies regulations and current systems for food safety are not totally aligned with changes in food production. Cutting corners on safety could be an expensive mistake in the long term.

Many equipment manufacturers – Sparc Systems included – highlight the significance of strategic planning when selecting critical control points to optimise inspection lines.

### Upfront investment for ROI

Before selecting the type of inspection equipment, buyers should first determine the potential sources of contamination on the particular product line and manufacturing process.

Take a step back and look at each processing point, the equipment that is being used, and every possible contamination scenario. Revisit this regularly as part of a HACCP-compliant assessment plan and do not wait for a crisis to hit before developing your recall response.

If the most common contaminant is metal, it is advisable to consider a highly sensitive metal detector as a first option. But if your production line involves multiple processes and ingredients, or if you use metal foil for packaging, an x-ray system provides a ‘catch-all’ solution.

X-ray might cost more upfront, but consider the practicalities of dealing with a product recall and the costs it incurs. There is the issue of assembling a crisis team and notifying regulatory bodies and relevant members of your supply chain, not to mention retrieving and destroying the product and investigating the cause of the contamination.

### Confidence in your brand

Of far greater significance in the long term is the damage to the business’s reputation. News of a recall spreads fast on social media, and often leads to a reduction in sales and a loss of confidence in your brand. In fact, according to a Harris Interactive poll, 55% of US consumers reported that they would switch brands temporarily following a product recall, while 21% said they would avoid purchasing any brand made by the offending manufacturer.

The key benefit of x-ray is that it is non-destructive, non-selective and can be used to detect a larger range of materials with high resolution.

With optional integrated data collection software, the latest models give food manufacturers the tools to detect metal, glass, mineral stone, rubber compounds and calcified bones, while disclosing any product defects and process and packaging problems with 100% accuracy. Together, the benefits translate into cost savings.

Look for additional details that can save



**Hard plastics, along with metal and glass, are the common culprits of foreign food contaminants, representing 25% of all FDA food complaints.**

you money in the long run. All Sparc inspection systems – including the Apollo x-ray and Iris Pipeline x-ray – use electro drives rather than compressed air to facilitate faster inspection.

These electric drives are proven to save food factories £4,000 annually per line.

### Complementary technologies

The benefits of x-ray technology are made all the more prevalent when working in conjunction with streamlined inspection machinery.

Beyond finding physical contaminants, factory food waste is a large and continually growing issue for manufacturers and one where choices about production equipment (including x-ray and other quality control) can have a surprisingly significant impact on outcomes.

The ready meal and chilled product sectors alone generate 12% of global food waste, with poor quality production including under- or over-packing accounting for 3.5% of this share.

A checkweighing feature provides the means to process product at an accurate weight, offsetting the potential of both product giveaway and incomplete packages from reaching the market.

This is precisely where the competing demands of food safety and food waste overlap – and where the latest inspection technology can help to cut waste and ensure safety and quality.

Depending on the supply chain and physical hazard risks that come with it, a combination unit – whether x-ray and checkweighing or metal detection and checkweighing – is a worthy investment.

Sparc’s Theia combination x-ray machine detects contaminants such as metal, glass or bone. In addition to automatically removing

fails from the production line, it disposes of packages that have an out-of-tolerance weight into a separate lockable bin so contaminated packs do not get confused for under or overfilled ones.

This in turn leads to bottom line savings, as weight-rejected items can be reworked and sent back into the production line.

For traceability and to enhance personal safety, Sparc has designed a protective high-density acrylic window on its Apollo and Theia systems so that operatives can see up to 200 packs per minute travelling through the system.

Rather than carrying on unaware, operatives can halt production lines instantly, slide open the doors, clear and clean the conveyor, minimising disruption and reducing the likelihood of product damage. The systems also offer fully traceable paperless machine testing audits, ensuring transparency at this critical point in the process.

### The future of inspection solutions

Which technology is best suited to a particular operation will depend largely on the results of a food safety audit and the types of contaminants a manufacturer is expected to encounter. If metal is the only concern, a fully integrated, combination metal detection packaging inspection and checkweighing system is a practical combination.

In the interests of increased consumer safety, production quality and waste reduction, solutions such as Sparc’s Cerberus Checkweigher provides scales and metal detection in one space-saving unit.

With both technologies in place, a combination unit is capable of rejecting items containing metal contaminants, inspecting the label and reducing product giveaway and subsequent food waste by up to 55%.

Of course, the decision to invest in x-ray or metal detection equipment is dependent upon a manufacturer’s requirements. Both technologies come with their own advantages; neither should be a replacement for good manufacturing practices, but rather food safety units should complement the process based on needs and risks.

For many years, x-ray technology has been pitted against metal detection as a way to prevent foreign material from entering the supply chain.

However, given that the global inspection machines market is projected to reach \$774 million by 2024 from \$592 million in 2019, Sparc anticipates that the market will witness a growth in companies adopting combination systems to ensure a more fail-safe inspection solution.

Ultimately, as food safety legislation shifts from control to prevention, the speed in which a manufacturer can publicly pinpoint the source of a physical contaminant is imperative and can minimise the damage to brand reputation. ■