Putting contamination of meat into a practical context

Contamination is a very broad term and basically means the addition of something (a contaminant) which should not be there! Contaminants range from physical to chemical to microbiological in nature and some are very easy to detect, while others are not.

A contaminant may not always be a contaminant. For example, bone is a contaminant in a boneless product because such a product should not contain bone, whereas in most products the presence of a piece of bone is not viewed as negatively.

Contaminants can enter the food chain at any level from the farm through to the further processing packing line. The needle shaft that breaks off and remains in in the animal, the Salmonella enteritidis that enters a poultry breeding flock and then contaminates the broiler progeny or the animals that are slaughtered inside an antibiotic's withdrawal period are all examples of contamination arising at farm level.

One can see how a contamination could arise at the feed mill if the antibiotic previously cited was incorrectly added to a finisher feed.

Contamination can occur in transportation or lairage and a good example of this is the sulphonamide drug that is excreted via the urine. If one pig in a batch is treated on farm and then urinates on other pigs or in a pen that the pigs will go into, the other pigs can be contaminated by the sulphonamide being absorbed through their skins.

The processing plant should not be overlooked as a source of contaminants. Examples here include glass from a broken light bulb, material coming off badly worn conveyors, lubricants, disinfectants, polythene packing material and clips or staples.

Malicious contamination

Finally, we must never overlook the possibility of malicious contamination after the meat products have left the premises. This can occur during distribution, in the retail outlet or even in the consumer's own home.

This last scenario occurs when the fraudulent consumer is looking for further free products or compensation from the supermarket chain and can be a real problem when genuine cases are reported in the media that stimulate copycat false claims.

If we look at recent major product recalls, such as those associated with melamine in China, E. coli O104:H4 in West Germany, Salmonella enteritidis in Spanish eggs in the UK and dioxins in German animal feed we can see that the contaminants, affected products and geography are all variables.

If we look at British FSA logged recalls those associated with glass, metals, blue polythene and allergens predominate.

Against this backcloth, what can we do as managers? We can not screen every product for every possible contaminant! The answer is that we have to do a risk assessment and then focus our resources and energy into preventing the most probable contaminants getting into our meats and meat products.

Joint responsibility

This requires a concerted effort from both your suppliers and your own staff. It is reasonable to put an onus on your suppliers to provide materials which are 'fit for purpose' and in a meat or food context this includes free of contaminants.

Thus, we can ask our suppliers to assure us of the status of the goods we receive from them. However, if we do this we also have a responsibility to our business to satisfy ourselves that the systems they use to

Suspended death sentence

On Monday 25th July 2011, a Chinese court gave lengthy sentences to five people for their involvement in producing and selling tainted pork. It is yet another case of a contaminated food scandal in the nation.

The pigs were fed clenbuterol, a poisonous chemical, to produce lean meat. As China is the world's number one consumer of pork, there is a direct potential to make more money.

The five found guilty of the practice were giving sentences ranging in harshness from nine years to a suspended death penalty. They were charged with 'endangering public security by using dangerous means' according to state media.

The accused defended themselves by blaming loopholes and that no cases of illness were reported.

The severity of the sentences is likely to be a warning attempt by the authorities to prevent further food safety scares, which are now common in China.

Source: NTD Television, China

Caesium contamination in beef

High levels of radioactive caesium have been found in straw fed to cattle on a farm in the town of Asakawa, Fukushima Prefecture, Japan. This was discovered after excessive levels of the substance were detected in beef shipped from the Prefecture, which contains the crippled Fukushima Daiichi Nuclear Power Station.

Source: Kyodo News, Japan

X-ray detection of bones

Marel has introduced the new SensorX bone detection system that automatically finds bones and other foreign objects in poultry meat.

It was designed to tackle the chicken bone problem that, until now, has been an unavoidable part of chicken processing.

The SensorX scans the product using advanced X-ray technology and detected contaminants can be highlighted on a high resolution display for easy removal.

The SensorX commonly achieves a 99% detection rate for calcified bones larger than 2mm with a false positive rate of <3%.

USA allergen contaminations

The number of recalls for bacterial pathogens found in beef, pork, and poultry has so far declined in 2011, but recalls of meat and meat products for allergens has risen.

There have been 27 recalls for undeclared ingredients in the first six months of this year, of which 20 were the result of undeclared allergens. In the last two years there were 32 recalls for undeclared allergens.

While allergen-related recalls are up, recalls for meat contaminated with pathogens were running at historically low levels during the first six months of 2011.

achieve this are appropriate and robust enough. Hence, we need to do supplier audits.

But it is not just a case of contaminants coming in with goods from a supplier. Contamination can come from virtually anywhere. So how do we know where all these potential sources are?

The simplest way is to take a very large piece of paper and on it draw our meat production line from breeders and feed mill right through to abattoir and further processing and on through the distribution chain to the consumer. On this we can superimpose the most likely contaminants and their various possible sources.

Identifying contaminants

So, what is a likely contaminant? These can be identified by using our own knowledge and that of our consultants. We can also reference our own customer complaints for the last few years as well as national and regional data available from FSAs, specialist research centre and laboratories and take note of reports in the trade press.

It is also prudent to ensure that, in this context, that you are at least meeting your customers' requirements because, in the case of a problem arising, you will need to assure your customers that you were complying with their requirements for contamination control.

Even so, something will be missed, but you need to be able to show that you have assessed the risks for your own operation and done something to eliminate or minimise these risks. In China nobody foresaw the possibility of melamine becoming a contaminant of animal feed and the problems that followed! Accordingly, nobody had any checks or controls for melamine in place. It is therefore essential that a system of review and renewal is in place that amends your contamination prevention system to meet and counter emerging threats.

In essence, you need to do all that can be reasonably expected of you! Therefore, it is prudent to benchmark yourself against similar operations in your sector and satisfy yourself that you are at least doing as much as they are.

Let us now focus in a bit more detail on what you can be doing in your abattoir or meat processing/further processing operation.

There is no wonderful cure all which, if installed in your operation, will protect your products from all contamination! As a general rule, the less we actually handle a product the fewer the opportunities for contamination to occur. So, the first thing we can do is review our processes and make them as streamlined as possible with the least possible opportunities (points in the production process) where contamination can occur. Ideally, production should be in a straight line coming in at one end of the production area and leaving at the other.

The more crowding and clutter there is in a work area the greater the risk that something could go wrong – this need not be contamination, it can be anything to do with the process, for example, mislabelling, wrong weighing or omitting an ingredient.

So, a very good management exercise is to look at a production area in the following way. The area has a floor, ceiling and walls and anything placed in that room/area must be absolutely essential for the operations undertaken in that area. Anything that is not essential should be removed! In some companies the first stage for this exercise is to order the skip! Shelves should be banned because all they do is encourage staff to keep/store things in the work area!

When we are considering physical contamination, remember gravity! We should never have anything above exposed product, for example a conveyor line or a mixer, that can harbour dust or dead insects because, sooner or later, they will be dislodged and fall into or onto our product and contaminate it.

We do not want things like ceiling struts or girders, light fittings that are not flush with the ceiling, overhead cables, pipes or ducting above exposed product.

We then need to consider how a contaminant could come into a production area. There are three things in addition to product, ingredients and packaging, that come into production areas all the time and we need to consider what we can do to remove, or at least greatly minimise, the risk(s) they represent. These three things are people, air and water:

- People naturally represent a whole host of potential contaminants ranging from buttons and zippers through to hair, eyelashes and nail varnish through to salmonella. Staff need to be aware of the risks they represent and why it is important to remove these risks from the operation. Then they need to know how we will achieve this. For example the importance of good fitting hairnets and washing hands thoroughly after going to the toilet are the sort of issues all staff should be adequately briefed and trained on.
- Water can easily be contaminated at source and during on site storage and we need to be sure that this is not occurring. This is done by regularly monitoring the water we use at point of use and treating it with something like chlorine so that any bacteria which should not be there are controlled.
- Air can carry dust, debris and microbes into our facilities. Flying insects also come in with the air. We need to ensure doors and windows are not left open and, if they are, that a suitable fine meshed screen is in place to prevent insect ingress.

Essential auditing

Many contaminants, including foreign bodies, come from the production area so management need to know the risks that are present and then find ways of countering these. First of all the risks need to be identified and this can be done by an audit in which potential sources of foreign bodies are identified, such as fraying conveyors, light fittings with no protective covers in place, incorrectly stored chemicals, peeling labels, damaged tiles or peeling paintwork.

Then, for each of these, a corrective action, with a time limit for completion, needs to be identified. Needless to say, the next audit starts by confirming that the corrective actions identified on the previous audit have been discharged.

At the end of the day the attitude of the company to contamination avoidance and a culture in which everyone has an eye open for possible risks is the foundation for contamination control within the production area.

Like so many aspects of risk management, successful contamination avoidance in the production area is dependent on having the will, the time and the resources available! ■

Antibiotic residues in USA

By law, no meat sold in the USA is allowed to contain antibiotic residues that violate FDA standards. The USDA's Food Safety Inspection Service (FSIS) conducts tests for chemical residues, including antibiotics, sulphonamides and various other drugs, pesticides and environmental chemicals in meat, poultry and egg products intended for human consumption.

The FSIS Residue Violation Information System List identifies all producers that have marketed food animals which have tested positive for antibiotic residues at slaughter.

In the USA such people can be banned from selling animals for human consumption. In the red meat sector, veal producers have been highlighted as violators.