

# Chemical Food Safety

QUARTERLY REPORT

NO. 52

## POTENTIAL FOOD SAFETY INCIDENTS OCTOBER TO DECEMBER 2015

FSI No	Date	APHA Regional Lab or external post mortem provider	Species	Confirmed Toxin (suspected toxin)	Source
2015-049	02-10-15	Penrith	Cattle	Botulinum	Not established
2015-050	07-10-15	Penrith	Cattle	Lead	Point source in silage bale
2015-051	09-10-15	Thirsk	Cattle	Botulinum	Poultry litter
2015-052	15-10-15	External provider	Cattle	Lead	Battery in silage bale
2015-053	26-10-15	Shrewsbury	Cattle	Botulinum	Poultry litter
2015-054	29-09-15	External provider	Cattle	Lead	Not established
2015-055	03-11-15	Shrewsbury	Sheep	Botulinum	Poultry litter
2015-056	09-11-15	Shrewsbury	Cattle	Botulinum	Poultry litter
2015-057	09-11-15	Starcross	Cattle	Copper	Total feed
2015-058	04-11-15	Trading Standards	Pigs	Dioxins	Environmental
2015-059	17-11-15	Thirsk	Sheep	Lead	Geochemical
2015-060	11-11-15	Bury St Edmunds	Ducks	Lead	Lead shot
2015-061	03-12-15	Penrith	Cattle	Lead	Tracing from 2015-050
2015-062	04-12-15	Bury St Edmunds	Cattle	Lead	Waste site
2015-063	03-12-15	Shrewsbury	Cattle	Botulism	Broiler carcass
2015-064	04-12-15	External provider	Cattle	Hepatotoxic agent	Not established – associated with landfill

**KEY:** Incidents in Wales highlighted in grey.

## HIGHLIGHTS

As expected in association with the timing of harvest, botulism incidents increased this quarter. This occurs because broiler litter is moved, spread and ploughed into harvested arable land as it provides a good source of nitrogen and organic matter.

An unusual incident was reported to us by Trading Standards. Eggs from a small backyard flock from a small holding were found to be contaminated with dioxins as a result of routine monitoring on the statutory surveillance scheme for residues. Pigs were also reported to be at the same site. Muscle sampling of two of these pigs also confirmed dioxin levels above the permitted EU level. The source was initially suspected to be as a result of the small holding site being close to an old landfill site however the dioxin profile indicated that the raised levels might be associated with household bonfires sites. Bonfires and historic bonfire sites at small holdings are known to be a source of environmental dioxins. As a result of the incident the Animal and Plant Health Agency (APHA) provided information to the National Pig Association and the British Pig Association in the hope that they will raise the issues with their members. APHA will also be communicating with the poultry industry. Under the Animal Welfare Act 2006 and related legislation, animal owners and farmers have a duty of care to provide a suitable environment for keeping animals. In addition, under the Food Safety Act 1990 and associated Food and Feed Hygiene Regulations animal keepers are required to show due diligence to protect the food chain.

Year (4th quarter)	Total	Lead	Botulism
2015	16	7	6
2014	8	4	2
2013	8	2	6
2012	21	5	7
2011	13	3	4

The table indicates that the number of incidents identified in England and Wales in this final quarter of 2015 appears consistent with general trend, and increased from 2014.

## LEAD INCIDENTS

**An incident is recorded where the kidney or liver lead concentrations exceed 0.5 parts per million (ppm) wet matter (WM), muscle lead concentration exceeds 0.1ppm WM, milk lead concentration exceeds 0.02ppm or blood lead concentration exceeds 0.48µmol/l.**

**(ppm equates to mg/kg)**

Most incidents arise from cases that are submitted to APHA following animal disease outbreaks. APHA receives clinical samples or carcasses for investigation enabling confirmation of lead poisoning. However, occasionally as a result of laboratory testing, we come across high blood or tissue lead levels that, although not high enough to cause clinical signs of poisoning, are still important in terms of food residues and food safety.

Risk management measures for lead incidents involve:-

- 1) Removal of animals from the source of lead;
- 2) The implementation of a sixteen week voluntary withdrawal; and
- 3) Further blood sampling for blood lead analysis. This is used as a biomarker of internal (carcase) lead residues.

Should the animals be close to or at finishing weight, the following parameters are then followed:-

- < 0.15 µmol/l: no further restrictions required.

- 0.15 µmol/l to 0.48 µmol/l: provide food chain information (FCI) to the abattoir and ensure offal is discarded.
- > 0.48 µmol/l: provide food chain information to the abattoir, ensure offal is discarded and make an additional assessment risk assessment as to whether carcass meat requires testing prior to carcass release.
- >1.00 µmol/l: provide food chain information to the abattoir, ensure offal is discarded and carcass meat requires testing for lead residues prior to carcass release. Ideally a further withdrawal period should be observed.

## **Lead incidents in cattle**

### **FSI 2015-050**

Lead poisoning was diagnosed in a fifteen-month-old beef finisher. The kidney lead concentration from this animal was 805 µmol/kg DM, equivalent to 35.0 mg/kg WM. The animal was part of a group of seven store cattle that had been purchased for finishing, going to two different holdings. The details of the exact clinical history were vague but it was thought that some of the group appeared partially sighted soon after they arrived at their destination farms and four (two from each holding) developed neurological signs and died. APHA received a kidney from the second animal to die. A single assumed 'healthy' animal from the group had been sold on immediately to a third holding and this too was traced (see 2015-061). All farmers involved were given advice on the risk management required to protect the food chain. The holding that the cattle had originated from was also traced. The likely source of lead was discussed with the supply farmer and it was concluded that if the lead exposure had occurred at this holding then it was most likely a point source poisoning (eg battery) in the silage being fed; there were no links to geochemical exposure either via grazing or in the feed or silage. Other cattle from this holding were blood tested and no evidence of lead exposure detected.

### **FSI 2015-052**

Increased blood lead concentrations were identified in an original group of thirteen fattening cattle on a small holding in the South West. The blood lead concentrations on the eleven samples were 1.06, 0.08, 0.63, 0.55, 0.44, 0.62, 0.30, 1.03, 0.49, 0.46 and 0.59 µmol/l. About one month previous to this one animal from the group had died unexpectedly and another showed blindness and incoordination before it died. Lead poisoning was suspected and confirmed by tissue analysis on the liver and kidney. The outbreak occurred following the feeding of a purchased bale of silage, after running out of home-grown forage feed. After feeding the silage bale the stockman was reported to have found broken battery remains consistent with the purchased silage bale having been the source of lead. Since the animals were close to slaughter weight the owner was advised that FCI details must be provided to the abattoir if blood lead concentrations exceeded 0.15 µmol/l, requiring offal to be discarded and muscle analysis carried out. The finisher with the highest blood lead concentration was selected for slaughter and the muscle lead concentrations confirmed as compliant, being well within EU acceptable limits. The farmer and abattoir were therefore advised that the rest of this group of cattle could be slaughtered into the food chain provided offal was discarded, but no further muscle testing was required.

### **FSI 2015-054**

A raised lead concentration was detected in the kidney of a four-month-old beef calf that died with an acute septicaemia. This was the only affected animal in a group of fifteen. The kidney lead concentration was 21.8 µmol/kg DM, equivalent to 0.70 mg/kg WM. No source of lead was detected but it is possible that the source was historic at this level of exposure. APHA recommended that the group observe a sixteen week withdrawal after which a cohort of the rest of the group should be blood tested to establish whether this was a one-off or whether further risk management measures might be required.

### **FSI 2015-061**

As a follow up to FSI 2015-050, one animal which had been sold on from the original group of seven was traced. A raised blood lead concentration was detected at 0.94µmol/l. The animal was not due to be moved or sold in the near future and therefore poses no risks to the food chain at present. The farmer, in liaison with his veterinary surgeon, has agreed to have the animal re-tested in six to nine months' time when it is closer to finishing weight. The results of this re-test will determine the full extent of risk management measures required.

#### **FSI 2015-062**

Lead poisoning was diagnosed in a sixteen-month-old bullock initially presenting with neurological signs but which later died. The blood lead concentration of the affected animal was 1.20 µmol/l. There was only one other animal in the group which was unaffected. The source of lead was suspected to be associated with an old waste site, described as a fly-tipping area, to which the two animals had access. The other bullock was moved and the owner agreed not to use the field for grazing until the waste site was fenced off to prevent cattle accessing the waste. The private veterinary surgeon will blood sample the remaining bullock for lead analysis to establish whether it was sub-clinically exposed. The farmer agreed to initially observe a sixteen week withdrawal restriction on the bullock. Further risk management advice will be dependent on the result of blood lead analysis. When exposure involves a waste site it is possible that animals could also be exposed to other undesirable chemicals. However the risk management imposed for lead exposure, with the prolonged sixteen week withdrawal period, allows for most other chemicals to be excreted and not be of concern.

#### **Lead incidents in sheep**

#### **FSI 2015-059**

A raised kidney lead concentration was detected in a six to eight-month-old lamb that died as a result of ill thrift and lungworm infection. The kidney lead concentration from this lamb was 42.7 µmol/kg DM, equivalent to 1.60 mg/kg WM. The source of lead was suspected to be of geochemical origin. There were approximately 70 other lambs in the group which had been on the same grazing since September 2015. There were also twenty cattle on the farm that were grazing in the same area. The livestock were removed from this field. APHA recommended that the potentially lead-exposed groups (both lambs and cattle) observe a sixteen week withdrawal and that after this period cohorts from the two groups are blood tested to establish whether there is evidence of lead exposure and whether further risk management measures may be required. Minimal measures would likely require animals to be sold and/or slaughtered into the food chain with FCI requiring offal to be discarded.

#### **Lead incidents in birds**

#### **FSI 2015-060**

Lead poisoning was diagnosed in four ducks submitted to the Royal Veterinary College for post mortem. Lead shot was observed in the gizzard of the ducks and one kidney analysed for lead confirmed a very high concentration of 1133.0 µmol/kg DM, equivalent to 61 mg/kg WM. A group of 350 'wild' ducks, intended for shooting, were acquired approximately seven weeks previously, with some deaths starting to occur after they had been on the estate for three weeks. Single dead birds were being picked up daily and deaths totalled 25 to date. There were also a few clinically affected birds that were unable to fly. The pond that the ducks frequented was situated within an estate which hosted pheasant shoots. Shot birds were supplied to a local butcher to sell. The estate manager confirmed that only healthy flying ducks had been shot and that pheasants were unaffected. Following the diagnosis of lead poisoning the estate agreed to suspend the supply of ducks to local butchers. The source of lead to the ducks was suspected to be linked to the fact that ducks filter feed and the ponds were heavily contaminated with lead shot. Lead shot was confirmed not to be used on the duck shoots, but it was for pheasant shooting. Since it seems likely that the risk of lead exposure to ducks will remain high and that they will not be suitable to enter the food chain the estate has decided not to restock with ducks in the future. Several shot pheasants were also screened for kidney lead residues but lead was not detected.

## BOTULISM INCIDENTS

In botulism incidents, carcasses and produce from cattle and sheep showing clinical signs should not enter the food chain.

FSI	Nos. Affected	Species	Type & age	Source of exposure
2015-049	5 from a group of 35	Cattle	Yearling beef cattle	Distant link to broiler litter
2015-051	2 deaths	Cattle	18-month-old beef cattle	Indirect exposure to broiler litter
2015-053	6 from a group of 150	Cattle	18 to 22-month-old dairy heifers	Indirect exposure to broiler litter
2015-055	5 from groups totalling 450	Sheep	Adult ewes	Direct and indirect exposure to broiler litter
2015-056	3 from a group of 15	Cattle	18-month-old beef stores	Direct exposure to broiler litter
2015-063	2 from a group of 15	Cattle	In-calf dairy heifers	Potential for direct exposure to broiler litter/carcasses

### Botulism incidents in cattle

#### FSI 2015-049

A tentative diagnosis of botulism was reached to account for the death of five yearling beef cattle from a group of thirty-five. Initially two yearlings were found dead but over the next two days three others were found in lateral recumbency and of these, one was euthanased and the others died. An initial brief response to treatment with calcium and magnesium was also noted. A post mortem was carried out on the euthanased animal. Gross observations included mild enteritis and reddened small intestine content but there was no other notable pathology. Laboratory testing proved unrewarding but ruled out possible differential diagnoses. No testing for botulinum toxin was carried out. The source of botulism was suspected to be associated with a poultry broiler unit situated approximately 1.5 miles away from the affected cattle. Apparently there had also been suspected cases of botulism on a neighbouring farm the same distance away the previous year. However there was no clear history of broiler litter stacking or spreading on nearby neighbouring fields. APHA commented that it would be useful to have more detailed information on movements of broiler litter in the days preceding the suspected outbreak as 1.5 miles is considered a fair distance to allow for indirect exposure to occur. APHA advised that should further cases occur, intestinal content be tested for botulinum toxin. The use of vaccination was also discussed. The farmer was advised that no clinically affected cattle should be presented to the food chain and that any recovering animals should observe a further eighteen day restriction following the cessation of clinical signs.

#### FSI 2015-051

A diagnosis of botulism was reached to account for the death of two eighteen-month-old beef cattle and clinical signs consistent with botulism in a third animal. The source of botulism was suspected to be associated with broiler litter being spread on neighbouring fields a few weeks before the first affected animal was seen. The broiler litter has since been ploughed in. The farmer was advised that no clinical affected cattle should be presented to the food chain and that any recovering animals should observe a further eighteen day restriction following the cessation of clinical signs.

#### FSI 2015-053

Suspected botulism was diagnosed in a group of eighteen to twenty-two-month-old in-calf dairy heifers. Six heifers were affected and died or were euthanased from a group of 150. The first case occurred on 7<sup>th</sup> October and there were no new cases after 15<sup>th</sup> October. The farm runs a large

dairy unit utilising grass-based New Zealand-type grazing management. The source of botulism was suspected to be associated with broiler litter spread onto nearby arable fields. There were thought to be several sources all within 500m of where the heifer groups were grazing. The farmer was advised that no clinically affected cattle should be presented to the food chain and that any recovering animals should observe a further eighteen day restriction following the cessation of clinical signs. The farmer initially moved his cattle away from the source and is in the process of vaccinating his cattle against Botulinum types C and D.

#### **FSI 2015-056**

Botulism was diagnosed in a group of fifteen eighteen-month-old beef stores. Three animals showed signs of weakness and flaccid paralysis and died. The source of botulinum toxin was associated with direct exposure to broiler litter in the farm yard and occurred when the group was being moved from grass to housing. Broiler litter is delivered to the farm every ten weeks for spreading onto grassland. The farmer was reminded of his duty to protect the food chain. The farmer was also advised that no clinically affected cattle should be presented to the food chain and that any recovering animal should be placed under a further eighteen day restriction following the cessation of clinical signs. The farmer prevented livestock from being able to access the broiler litter in the farm yard although he is now considering stopping the deliveries. APHA gave the farmer advice on the risks of botulism in cattle and sheep associated with broiler poultry litter. This included advice on vaccination as a means of prevention.

#### **FSI 2015-063**

Botulism was diagnosed as the cause of death of one in-calf dairy heifer from a group of fifteen, and clinical signs deemed typical of botulism in a second. The farm was situated next door to a poultry broiler unit that has its own incinerator. However from time to time wildlife has transported poultry carcasses into nearby grazing fields. The farmer confirmed that if poultry carcasses were found on the grazing fields they were immediately removed and disposed of; however this was an infrequent occurrence. The farmer was advised that no clinically affected cattle or produce from clinically affected cows should enter the food chain and that any recovering animals should observe a further eighteen day restriction following the cessation of clinical signs. The farmer was reminded of his duty to protect the food chain. APHA gave the farmer advice on the risks of botulism associated with broiler units and broiler litter. The farmer was also provided with advice on vaccination. The poultry unit is to be checked to ascertain there are no breaches to the Animal By-Products regulations and that broiler carcasses are suitably secured prior to incineration.

### **Botulism incidents in sheep**

#### **FSI 2015-055**

Botulism was diagnosed in a flock of 450 ewes with access to five grass fields. Five ewes showed signs of weakness and died following spreading broiler litter on neighbouring grassland fields. The first death occurred four days after spreading. The boundary fence between some of the fields was reported to be poor (a single strand of sheep wire netting) and broiler litter was observed to have breached the boundary fence allowing the sheep direct access to broiler litter. No carcass material was present in the broiler litter. The sheep were immediately moved away from the source. The farmer was advised that no clinically affected sheep should be presented to the food chain and that any recovering animals should observe a further eighteen day restriction following the cessation of clinical signs.

### **COPPER POISONING**

**FSA/PHA incident trigger is when the liver copper concentration exceeds 500 mg/kg WM.**

**Especially in sheep, chronic copper poisoning can also occur when liver concentrations of copper are well below this incident trigger value. The same food safety advice is still**

**provided. The APHA normal reference range for liver copper concentrations in sheep is 300 to 8000 µmol/kg DM, equivalent to approximately 5 to 125 mg/kg WM.**

#### **FSI 2015-057**

Copper poisoning was diagnosed in an adult milking Holstein/Friesian dairy cow. The cow died following a short malaise with jaundice. Post mortem examination confirmed the diagnosis. The liver copper concentration was 876 mg /kg WM. Two other cows from the herd of 250 also died in the previous month before but the cause(s) of these deaths had not been investigated. The affected cattle were all from the same high yielding group. This group is housed continually and receives a total mixed ration (TMR). Cows from the low yielding group which are turned out to graze were unaffected. APHA have given advice to the farmer and private veterinarian on copper poisoning in cattle. APHA advised that the cattle diets are reviewed and that the total copper fed is accurately calculated and reduced. Additional minerals added to the TMR were removed and no further cases occurred. None of the affected group of cows was intended for slaughter at the current time.

The level of copper in milk as a food source is, in general, not considered to pose a risk to food safety.

#### **OTHER INCIDENTS**

##### **FSI 2015-058**

A recent investigation involving APHA and the Local Authority highlighted the importance of ensuring that outdoor poultry and pigs are kept on sites that are likely to be free of dioxins and dioxin-like PCBs. In this recent incident pigs were kept outdoors on a small holding adjacent to a former landfill site. During the summer there had also been free-range laying hens on the site. Routine residue monitoring of eggs confirmed dioxin contamination resulting in the flock being depopulated. Since there were also pigs on the same site there was concerned that they too could be at risk of also being contaminated and as a result dioxin testing of the pigs was undertaken. There was no ill health in the pigs but analysis of muscle from two different pigs confirmed that the total level of dioxins exceeded EU maximum permitted limits of 1.0 and 1.25 pg/g fat respectively, even taking into account the relative uncertainty measurement of 15% (Commission Regulation EC 1881/2006). The permitted maximum levels of dioxins in pig meat are low and can easily be exceeded and when the permitted levels are exceeded the carcass is deemed unfit for human consumption. This meant that the majority of the other pigs which had been potentially exposed for the same amount of time should not be allowed to enter the food chain unless further private testing was able to prove that their meat would be compliant. However testing for dioxins is very expensive so this is not a practical option. In this incident the main issue was one of compliance with legislation rather than food safety, because had this same level of dioxins been detected in sheep and cattle muscle the level would have been deemed to be compliant; the permitted limits for these species are not set as low. The owner(s) of the pigs agreed that the pigs would be moved and that meat from pigs over six months of age would not enter the food chain. APHA also gave advice to the landlord whom rented out the land.

##### **FSI 2015-064**

Suspected poisoning by a hepatotoxic agent was diagnosed in two eighteen-month old heifers grazing at a site close to a capped landfill. Ten heifers had been placed on the site in March to manage the grazing under a conservation scheme. Two heifers died unexpectedly in July and August and the second to die was submitted for post mortem. A further heifer died and was submitted in November for post mortem examination. In both the heifers examined the liver had a nutmeg appearance and there was severe necrosis evident. The carcass was also generally oedematous. The first heifer also had a grossly abnormal heart which had initially been thought to be the cause of death. Exposure to lead, copper and ragwort was ruled out. The seven remaining heifers, and two other cull cows, that were latterly moved onto the site but which all appear well, were moved off site and housed. These cattle were then screened for raised liver enzymes as a marker for liver pathology but the liver enzymes were not raised. The manager agreed to observe a

28 day voluntary restriction on the remaining cattle. The following further advice was given by APHA:-

- a. Remove cattle from the site;
- b. Cattle that have had access to the site should be placed under a 28 day voluntary restriction. This will allow most chemicals to be excreted;
- c. Only small ruminants (sheep and goats) should have access to the capped area to prevent damage and any breaches to the cap should be remediated and/or fenced off to prevent access;
- d. Should there be future ill health in animals at the site the cause should be investigated fully. If poisoning is again thought likely then the site should be investigated as potentially contaminated land and the suitability of the site for keeping animals reconsidered; and
- e. After 28 days the two cull cows, provided there is no ill health, can be presented to the abattoir with food chain information and liver and kidneys should be removed and discarded as a precautionary measure.

### **PLANT-RELATED INCIDENTS**

**In general, except for ragwort and bracken fern, plant toxicity incidents are not considered to pose a significant risk to the food chain.**

#### **Bog asphodel poisoning**

Post mortem examination was carried out on the sixth six-month-old lamb from a total of 100 to develop clinical signs of photosensitisation, including swollen faces, lips and ears with oozing yellow serum and yellow mucous membranes. The lambs affected were from different groups but all grazing fields across Dartmoor with exposure to Bog asphodel. The likely demise of the animal examined was confirmed as a terminal *E.coli* septicaemia with gross evidence of a fibrinous peritonitis, pleuritis and pericarditis; however a severe underlying liver pathology with jaundice, discoloured urine and raised liver enzymes was confirmed which was consistent with a diagnosis of secondary photosensitisation.

#### **Pieris poisoning**

Two separate incidents of pieris poisoning were reported. Poisoning with these plants, which are members of the Ericaceae family, is due to Grayanotoxins, which are known to bind sodium channels in excitable cell membranes exerting their effect on nerve, heart and skeletal muscle tissues.

- 1) Following the moving of approximately seventy ewes to away ground, several were found dead and bloated and another approximately six were found recumbent and dribbling from their mouths. There was evidence that they had broken into an adjoining garden and eaten plants there. At post mortem examination all three ewes examined had a large number of leaves present in their rumen contents. Some leaves had smooth edges and some were serrated. Some were yellow in colour, others green. There were also numerous pale seed heads present. The finding of large numbers of leaves together with seed heads that resembled those seen on pieris plants is consistent with clinical signs and death in these animals due to pieris poisoning. There was also evidence of previous fluke infection but this would not have been responsible for the clinical signs and death in these animals.
- 2) Pieris poisoning was diagnosed in a group of about fifty ewes. Seven presented with clinical signs and several died. Clinical signs included vomiting/depression/excitation and some showed hind leg paresis, dragging their hind legs. Diagnosis was made based on clinical signs and exposure to the cut plant.

#### **Acorn (oak) poisoning**

Two separate incidents of acorn poisoning were reported. The main toxic principles are considered to be tannic acid and its metabolites gallic acid and pyrogallol, all of which are nephrotoxic.

- 1) Acorn poisoning was diagnosed as the cause of death of one ewe from a group of twenty. The ewes had been at grass but because this was poor had recently been brought inside and fed haylage. This ewe was seen to have diarrhoea but after housing showed rapid weight loss and inappetence. At post mortem examination there were ulcers observed on both sides of the tongue and the mucosa of the ventral oesophagus. The rumen content was watery with green fibre and white pale pieces of material suggestive of broken up acorns. There were a few ulcers on the mucosal surface of the abomasum. The large intestine content was scant with longitudinal haemorrhages on the mucosa of the large intestine. The ulceration of the tongue, oesophagus and abomasum is consistent with the ewe being uraemic when it died and this was confirmed with high aqueous humour urea and creatinine. The kidney cortices were pale, supporting a nephropathy.
- 2) Acorn poisoning was diagnosed in two seven-month-old lambs from a group of ten that presented with malaise and inappetence. One lamb was euthanased and submitted for post mortem examination. The mucosa anterior to the larynx was necrotic and had a yellow appearance. The oesophageal mucosa was necrotic along its whole length and the rumen contents contained numerous acorns. Large intestinal contents were soft. There was gross evidence of nephrosis and renal biochemical parameters (urea and creatinine concentrations) were very high, confirming renal failure.

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